Systematic review of the Absorptive Capacity Theory and its' application to mHealth Technologies for Adverse Drug Reaction reporting in Uganda

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Background and Purpose- Mobile health (mHealth) technologies are increasingly important for improving healthcare delivery and patient safety. In Uganda, expanding digital infrastructure offers opportunities to use mobile devices for communication, data collection, and patient management. However, utilization of mHealth technologies for reporting Adverse Drug Reactions (ADRs) remains low, limiting the effectiveness of pharmacovigilance systems. While prior studies have examined mHealth applications in maternal and child health, infectious disease management, and health education, little research has systematically explored their underutilization in ADR reporting. This systematic review sought to examine how Absorptive Capacity (ACAP) has been defined, conceptualized, and operationalized in Information Systems (IS) research, identifies its levels of analysis and key determinants, and assesses its relevance as a theoretical lens for understanding enablers of mHealth utilization for ADR reporting in Uganda.

Methods - Peer-reviewed English-language studies published between 2010 and 2025 that examined ACAP in IS, information technology, mHealth innovations, or ADR reporting were reviewed. Searches were conducted in PubMed, Scopus, Web of Science, IEEE Xplore, and Google Scholar, following Joanna Briggs Institute (JBI) systematic review guidelines. Screening and duplicate removal were documented using a PRISMA flow diagram. Of 134 records identified, 25 studies met the inclusion criteria.

Results - The review found that ACAP is a dynamic, multi-level capability comprising structural elements such as knowledge systems and infrastructure, and behavioral elements including learning and collaboration. These capacities operate at individual, team, and organizational levels .

Conclusions - Understanding mHealth utilization for ADR reporting in Uganda requires integrating individual, team, and organizational absorptive capacities. This multi-level approach provides deeper insight into how mHealth technologies can strengthen pharmacovigilance in public healthcare environments.

Keywords : Absorptive Capacity, mHealth technologies, Utilization, Adverse Drug Reactions, Pharmacovigilance, Healthcare

1   Introduction

The advent of mobile health (mHealth) technologies presents a transformative opportunity for improving healthcare service delivery and patient safety worldwide [1]. mHealth, which encompasses the use of mobile devices and applications to support medical and public health practices, has gained traction due to its potential to enhance communication, data collection, and patient management [2][3]. Recent advancements in mobile devices, sensors, and connectivity have further expanded the scope of mHealth, positioning it as a cost-effective platform for addressing persistent gaps in health service delivery, especially in underserved and remote communities [4]. Innovations such as mobile applications, wearable devices, telemedicine platforms, and digital health records have enabled more efficient data collection, remote monitoring, and patient engagement, thereby improving access to essential health services [5]. These technologies have been applied across diverse areas including chronic disease management, maternal and child health, mental health, and disability services, while also empowering patients through improved health literacy and patient-centred care models [6] [7]. At the same time, mHealth forms a critical component of the broader digital transformation of healthcare, which leverages digital technologies to improve clinical practices, service efficiency, and health outcomes [8]. The integration of digital tools into healthcare systems supports better management of large volumes of health data, enhances quality control, and reduces service delivery costs [9]. This transformation also creates new opportunities for healthcare practitioners

by reshaping training, workflows, and decision-making processes, reinforcing the role of mHealth as a key enabler of modern, responsive, and data-driven healthcare systems [10] [11].

Over the past decade, Uganda has seen a significant increase in the integration of digital technologies into healthcare delivery, driven by the country's expanding Internet access [12]. The Ministry of Health (MoH), through the Digital Health Strategy (2020–2024) and the Health Sector Development Plan (HSDP III), has prioritized the use of mHealth technologies for disease surveillance, health information dissemination, and reporting of health events, including Adverse Drug Reactions [13]. These policy frameworks provide an enabling environment for digital health innovation; however, their effective implementation depends heavily on the institutional absorptive capacity of healthcare facilities and frontline health workers [14]. According to [15], mobile phones, due to their widespread availability and portability, have become an effective tool for disseminating targeted health information. For instance, short messaging service (SMS) capabilities are utilized for various purposes, including disease surveillance and patient notifications, such as reminders for medical appointments and medication adherence, thereby enhancing public health outcomes [16]. As emphasized by [15], the integration of mHealth technologies into healthcare systems offers significant potential for enhancing the efficiency and effectiveness of healthcare service delivery. While mHealth technologies present immense opportunities for improving healthcare delivery in Uganda, their utilization remains relatively low [17]. Research indicates that although a substantial number of healthcare workers are aware of mHealth technologies, many have yet to use them, particularly for tasks such as disease diagnosis and reporting Adverse Drug Reactions. Empirical evidence by [18] on mHealth access and utilization indicates that, among 87 participating healthcare professionals, the majority possessed knowledge of mHealth technologies. However, only 38% had ever used such technologies, 55% had never used them, and 7% were uncertain about their prior usage. This underutilization underscores a persistent gap between awareness and practical application of mHealth solutions for ADR reporting. The low utilization of mHealth technologies in reporting ADRs presents a critical challenge, particularly in low-resource settings where such innovations hold substantial potential to improve healthcare outcomes [17]. As such, further research is needed to examine the low utilization of mHealth technologies in reporting ADRs [19].

Numerous studies have identified a range of barriers to mHealth utilization at both individual and organizational levels to include aspects such as financial, social, legal, and ethical [20]. Other factors include limited awareness of mHealth benefits, low digital literacy, lack of interoperability, data security concerns, and insufficient empirical evidence supporting cost-effectiveness. However, despite these well-documented obstacles, there remains limited research examining the underutilization of mHealth technologies in reporting ADRs through the theoretical lens of Absorptive Capacity [21]. Existing studies have tended to focus on areas of family planning and reproductive health, maternal and child health, infectious disease management, health education and promotion, and nutrition and dietary support [22]. Reporting ADRs is critical for improving pharmacovigilance, ensuring patient safety, and enhancing healthcare outcomes [23]. As such, this systematic review aims to address this gap by exploring how Absorptive Capacity Theory can be applied as a theoretical lens to understand the enablers of mHealth utilization for reporting Adverse Drug Reactions in public healthcare settings. By using ACAP to identify the underlying barriers and enablers of utilization of mHealth technologies in reporting ADRs, the study generates insights that could inform strategies for improving the uptake and effective use of mHealth innovations, particularly in reporting ADRs in resource-constrained healthcare environments. Our review sought to address the following research questions:

- RQ1: How has Absorptive Capacity been defined, conceptualized, and operationalized in peer-reviewed Information Systems literature?
- RQ2: What are the levels of analysis of Absorptive Capacity?
- RQ3: What factors have been identified as key determinants influencing Absorptive Capacity?
- RQ4: How can Absorptive Capacity be used to explain the enablers of mHealth utilization for reporting Adverse Drug Reactions in public healthcare settings in Uganda?

We address these questions through a scoping review of peer-reviewed articles, conference papers, and institutional reports published between 2010 and 2025. This approach allows us to synthesize how Absorptive Capacity has been defined and conceptualized, while identifying recurring themes and gaps. The review also highlights the different levels of analysis at which Absorptive Capacity has been applied and examines the determinants that shape its development. In doing so, the study advances theoretical understanding of Absorptive Capacity within Information Systems research and offers practical insights for strengthening mHealth utilization and pharmacovigilance in resource-constrained healthcare settings.

2   Materials and Methods

This systematic literature review was conducted in accordance with the Joanna Briggs Institute (JBI) methodology for scoping reviews, ensuring a systematic and rigorous approach to identifying, selecting, and synthesizing relevant literature. It was reported by the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews) framework. Validity was ensured through a predefined protocol, explicit inclusion criteria, multi-database searching, and theory-guided synthesis of findings, ensuring accurate representation of the literature. Reliability was enhanced by documenting and standardizing the review procedures, enabling replication of the search, screening, and synthesis process.

2.1   Inclusion criteria

The review focused exclusively on peer-reviewed journal articles to ensure the use of credible and academically rigorous sources. Only studies published in English were considered, to allow for accurate comprehension and analysis. Articles included in the review specifically focused on Absorptive Capacity in Information Systems, Information Technology, mHealth innovations, and ADR reactions. A key inclusion criterion was that the studies must explicitly apply, discuss, or integrate the Theory of Absorptive Capacity, whether as a theoretical framework, analytical lens, or conceptual construct. To enhance contextual relevance, the review included studies conducted in developing countries or within public healthcare settings, reflecting environments like Uganda. Additionally, the review was limited to literature published between 2010 and 2025 to capture contemporary developments in both mHealth and Absorptive Capacity Theory.

2.2   Exclusion criteria

Studies were excluded if they did not discuss or reference the Theory of Absorptive Capacity, even if they were related to mHealth, as such studies would not inform the conceptual framing of the current research. Research conducted exclusively in private healthcare settings was also excluded, as the organizational dynamics and resource environments differ significantly from public systems like Uganda's. Other excluded works included conference abstracts, editorials, commentaries, and dissertations, as these do not meet the empirical and peer-reviewed standard of evidence required for this review. Lastly, studies focusing solely on mobile applications outside the healthcare domain were also excluded to maintain a clear focus on mHealth innovations.

2.3   Search Strategy

To identify relevant literature for this systematic review, a comprehensive and structured search strategy was employed across multiple academic databases. A purposive and criterion-based sampling approach was used, whereby only studies that met the inclusion criteria were retained for synthesis. The primary aim of the search was to locate peer-reviewed journal articles that examine how Absorptive Capacity has been conceptualized and applied within the context of mHealth innovations in healthcare settings. The search was conducted using a combination of keywords and boolean operators to capture a wide range of relevant studies. Core search terms included: "Absorptive Capacity" AND "mHealth", "mHealth technologies" AND "healthcare", "innovation adoption" AND "Absorptive Capacity", and "knowledge absorption" AND "digital health" AND "Adverse Drug Reactions". These terms were adapted to suit the syntax requirements of each database and were combined using boolean operators like AND, OR, and NOT to refine the results.

The databases searched included PubMed, Scopus, Web of Science, IEEE Xplore, and Google Scholar. PubMed captures biomedical and public health literature, IEEE Xplore covers technological and engineering perspectives, while Scopus, Web of Science, and Google Scholar provide broad, multidisciplinary indexing to ensure inclusivity and minimize publication bias. Filters were applied to limit the results to articles published in English, between 2010 and 2025, and in peer-reviewed journals. Manual searches of the reference lists of relevant articles were also conducted to identify additional studies that may not have appeared in the initial database results, a process known as backward citation tracking. To manage and screen the identified articles, reference management software, Zotero, was used to remove duplicates and organize sources. Titles and abstracts were screened based on the inclusion and exclusion criteria, followed by a full-text review of selected articles to

determine their eligibility for final inclusion. This systematic search strategy ensured a rigorous and transparent process for gathering literature that could meaningfully inform the conceptualization of Absorptive Capacity in mHealth research, particularly in contexts similar to the Ugandan healthcare system.

2.4   Study Selection

The study selection process of study followed a structured and transparent approach in line with the JBI methodology for scoping reviews. After conducting comprehensive searches across selected databases, all identified records were imported into the Zotero reference management tool to facilitate the removal of duplicate entries. The selection process was carried out in two main stages: title and abstract screening, followed by full-text review. In the first stage, the titles and abstracts of all retrieved articles were screened against the predefined inclusion and exclusion criteria. At this stage, studies that did not meet the criteria, such as those not focused on mHealth, not mentioning Absorptive Capacity, or conducted in non-healthcare settings, were excluded. Articles that appeared potentially relevant were then subjected to full-text review in the second stage. During this phase, the full texts were reviewed to confirm eligibility. The reasons for exclusion at the full-text stage were recorded for transparency and accountability. The entire selection process was documented using a PRISMA flow diagram (Figure 1), which outlines the number of records identified, screened, excluded, and ultimately included in the final synthesis. This rigorous selection process ensured that only studies meeting the methodological and conceptual criteria of the review were included, thereby enhancing the credibility and reliability of the findings.
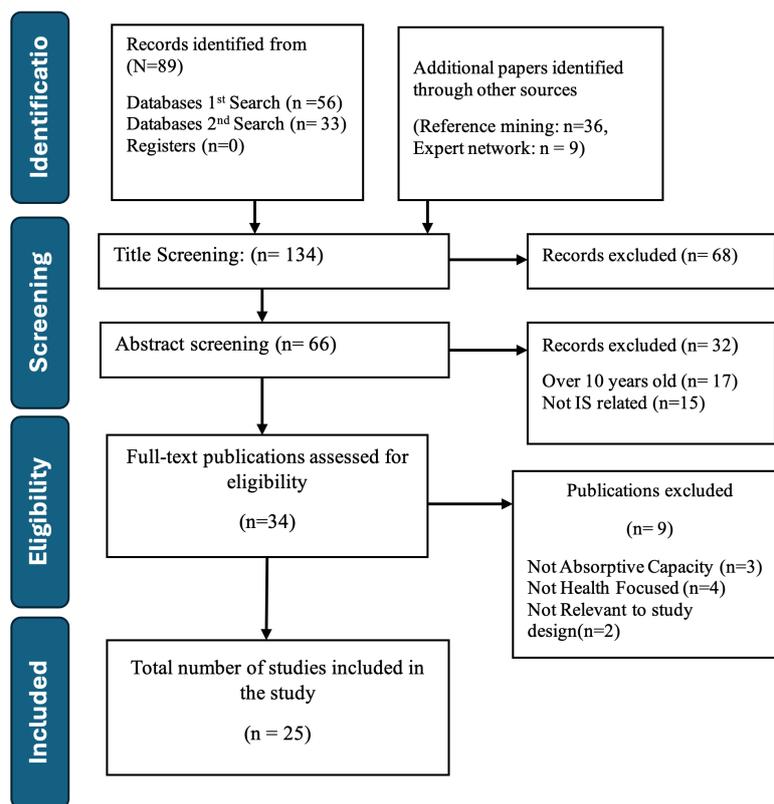

Figure 1. Search results and study selection and inclusion process

Figure 1 shows that a total of 89 records were retrieved from electronic databases, comprising 56 from the first search and 33 from a second round of database searches. Additionally, supplementary records were identified through reference mining (36 records) and consultations with an expert network (9 records), resulting in a broader pool of potentially relevant studies. After compiling all sources, a total of 134 unique records underwent title screening. At this stage, 68 records were excluded for reasons such as irrelevance to the research topic or lack of

alignment with the inclusion criteria. The remaining 66 records were subjected to abstract screening, during which 32 additional articles were excluded, 17 for being more than ten years old, thus not meeting the currency criteria, and 15 for lacking relevance to information systems (IS), a core element of the review focus. This left 34 full-text articles, which were assessed comprehensively for eligibility based on the established inclusion and exclusion criteria. From this pool, 9 articles were excluded at the full-text review stage. The reasons for exclusion included: lack of focus on Absorptive Capacity (n=3), studies that were not health-focused (n=4), and studies with designs that did not align with the scope of the review (n=2). Ultimately, 25 studies met all the criteria and were included in the final synthesis of the scoping review. These studies collectively provided valuable insights into how absorptive capacity has been conceptualized and operationalized in the context of mHealth innovations in healthcare, laying the foundation for conceptualizing the current study on the utilization of mobile health technologies for reporting adverse drug reactions by Ugandan healthcare professionals.

2.5   Data extraction

During the data extraction phase of the review, a structured template was developed to capture key information from each included study. The data extracted covered a wide range of themes aimed at supporting a comprehensive understanding of how ACAP has been conceptualized and applied within the context of mHealth innovations. To begin with, basic study characteristics were collected, including the name of the author(s), publication year, journal or source of publication, the country or geographical focus, and details about the organization(s) involved in the study. Additionally, the study design or methodology employed in each article was noted to provide insights into the research approaches commonly used in ACAP and mHealth literature. Particular attention was paid to how each study defined Absorptive Capacity, including its origin and theoretical development, to trace how the concept has evolved. Where applicable, any modifications or extensions of the original ACAP theory were documented. This included information on the dimensions of Absorptive Capacity referenced in the studies, such as acquisition, assimilation, transformation, and exploitation of knowledge, as well as the levels of analysis (individual, group, organizational, team, or environmental level) at which ACAP was explored. Furthermore, data were extracted on the determinants of Absorptive Capacity, such as prior related knowledge, Research and Development (R&D), or external collaborations.

The applications of Absorptive Capacity within each study were also recorded, focusing on the types of indicators, measurement approaches, instruments, or scales used to assess ACAP. Studies were examined for their focus on various forms of innovation, whether technological (mobile platforms), procedural (health reporting processes), or strategic (policy implementation), and how such innovations were introduced or integrated into existing systems. Details on the adoption process, including the conditions under which innovations were accepted and put into practical use, were extracted as well. Further emphasis was placed on studies that explored the application of ACAP in Health Information Systems (Health IS), with a particular focus on mHealth technologies. Specific attention was given to the role and effectiveness of mHealth technologies in Uganda to establish contextual relevance. The review also captured insights related to the reporting of ADRs using mHealth platforms, an area central to the present study. Finally, the review documented how the selected studies demonstrated the relevance of Absorptive Capacity to the utilization of mHealth technologies in healthcare. This included examining how knowledge acquisition, assimilation, transformation, and exploitation influenced the uptake and consistent use of mHealth technologies, particularly in low-resource public healthcare settings such as those in Uganda. Through this approach, the extracted data provided a strong foundation for conceptualizing ACAP in the context of mHealth technologies for ADR reporting.

2.6   Data analysis and presentation

Data were analyzed and presented in accordance with the research questions guiding this scoping review. The analysis involved a systematic examination of the selected literature to extract relevant information pertaining to each of the four guiding questions. First, the data were analyzed to identify how the concept of ACAP has been defined and conceptualized within the Information Systems literature. Particular attention was paid to how scholars have framed the dimensions of ACAP, and how these have evolved over time. Second, the analysis explored the levels of analysis at which Absorptive Capacity has been applied. Studies were categorized based on whether they examined ACAP at the individual, group, organizational, team, or inter-organizational level, and patterns across these levels were identified and synthesized. Third, the review identified the key determinants of

Absorptive Capacity. These included internal organizational factors such as prior related knowledge, Research and Development, Individual Absorptive Capacity, and external factors like environmental dynamism and institutional support. The analysis sought to highlight how these determinants contribute to or hinder an entity's absorptive capabilities. Finally, the data were analyzed to determine how Absorptive Capacity Theory can be used as a theoretical lens to understand the enablers of mHealth technologies utilization, specifically in the context of reporting ADRs in public healthcare settings. The analysis highlighted how ACAP has been applied to interpret knowledge processes, innovation adoption, and system readiness in low-resource environments, such as Uganda. The findings are presented thematically under each of the four research questions, providing a structured synthesis of the existing literature and laying the groundwork for future empirical inquiry.

3   Results

3.1   Definitions, Conceptualizations, and Operationalizations of Absorptive Capacity in Information Systems Literature

Results show that all 25 (100%) papers reviewed acknowledge the foundational work of [24] , illustrated in Figure 2, who originally defined ACAP as a firm's capacity to identify valuable external knowledge, integrate it, and apply it for commercial gain. 18(72%) of the studies conceptualize ACAP as a multidimensional organizational capability encompassing the processes of knowledge acquisition, assimilation, transformation, and exploitation. For instance, [25] define ACAP as comprising these four interrelated routines, emphasizing its dynamic and developmental nature. These studies generally depict ACAP as an evolving capacity that enables organizations to manage external knowledge effectively, facilitating innovation and competitive advantage over time. The emphasis is on how organizations build routines and structures that support continuous learning and knowledge flow internally. Across the literature, Absorptive Capacity has been conceptualized both as a potential capacity and a realized capacity. [26] [27] highlight that Potential ACAP refers to an organization's ability to acquire and assimilate external knowledge, and Realized ACAP focuses on transforming and exploiting this knowledge to drive innovation and improve performance. These dimensions capture the sequential processes involved in converting external knowledge into actionable outcomes [28]. Specifically, acquisition refers to identifying and obtaining relevant external knowledge, assimilation involves interpreting and understanding this knowledge, transformation focuses on combining it with existing internal knowledge, and exploitation represents the application of transformed knowledge to achieve organizational goals [26] [29]. This conceptualization added granularity to the understanding of ACAP and provided a structured basis for its application across diverse contexts [30] [31].

About 5 (20%) of the reviewed papers focus on ACAP as a facilitator of organizational learning and change, highlighting its role in preparing firms for technology adoption and adaptation. These studies typically associate higher levels of ACAP with increased organizational readiness to implement new technologies by enabling better internal knowledge sharing, internalization, and application. Importantly, many of these works underscore the critical role of top management in fostering ACAP through strategic leadership, resource support, and creating a knowledge-sharing environment, which enhances the organization's capacity to utilize external knowledge assets.
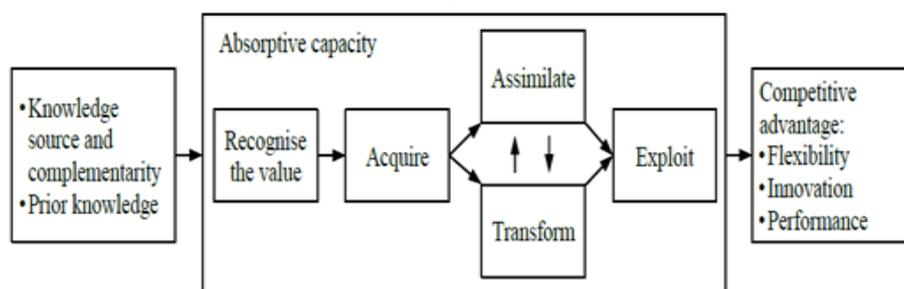

Figure 2. Absorptive capacity components: Source: Cohen and Levinthal (1990)

A smaller subset, around 2(8%), conceptualizes ACAP within the framework of a firm's dynamic capabilities and strategic resilience. This perspective views ACAP less as a set of processes but as a strategic resource that underpins a firm's ability to adapt to external pressures such as regulatory changes, market shifts, or technological

disruptions. These studies argue that ACAP, as part of an organization's broader strategic capability, contributes to sustained innovation, organizational agility, and long-term competitive advantage by enabling ongoing adaptation and learning in complex environments. They viewed ACAP as a mechanism by which organizations develop innovation capabilities and sustain competitive advantage, especially in complex and dynamic environments such as healthcare.

Literature consistently conceptualizes ACAP as a comprehensive, adaptable organizational resource that encompasses multiple routines and processes for knowledge management. While most definitions emphasize its dynamic and developmental aspects (72%), a significant portion highlight its role in organizational learning (20%) and strategic resilience (8%). These varying perspectives collectively reinforce the idea that ACAP is central to effective technology adoption, innovation, and maintaining competitive advantage in rapidly changing environments. These findings indicate that while the majority of studies frame ACAP as an organizational-level construct, there is growing recognition of the influence of social, behavioral, and institutional factors in shaping how ACAP is developed and operationalized.

Table 1. Conceptualization of Absorptive Capacity

Perspective	Share of Studies	Key Conceptual Focus	Representative Scholars/Studies	Core Characteristics	Implications for Practice and Theory
Multidimensional Organizational Capability	18 studies (72%)	ACAP as a set of interrelated processes: acquisition, assimilation, transformation, and exploitation of knowledge	[25] [26] [32]	Views ACAP as a dynamic, developmental, and routinized process enabling continuous learning and innovation.	Enhances understanding of ACAP as a process-based capability that fosters innovation and sustained competitive advantage through effective external knowledge utilization.
Facilitator of Organizational Learning and Technology Adoption	5 studies (20%)	ACAP as an enabler of learning, knowledge sharing, and technological adaptation	[33] [34] [35] [36] [37]	Focuses on internal learning, knowledge integration, and managerial support. Highlights the role of top management, leadership, and culture in enhancing absorptive potential.	Shows ACAP as a learning-oriented capability that improves readiness for technology implementation, especially in evolving environments.
Dynamic Capability / Strategic Resilience Perspective	2 studies (8%)	ACAP as part of a firm's broader dynamic capabilities and strategic resource base	[38] [39]	Conceptualizes ACAP as a strategic resource that underpins adaptability to external shocks, regulatory changes, and technological disruptions.	Positions ACAP within strategic management theory, linking it to organizational agility, resilience, and long-term innovation capacity.

Source: *Authors' synthesis from reviewed literature (2010–2025)*

3.2   Operationalization of Absorptive Capacity

Out of the papers reviewed, a clear majority, 17 (68%), focus primarily on the definition and conceptualization of absorptive capacity, emphasizing its role as a dynamic organizational capability for learning and knowledge use. In contrast, only 8 (32%) of the studies proceed to operationalize absorptive capacity through measurable dimensions and indicators explicitly. This pattern indicates that while the concept of absorptive capacity is well established theoretically, empirical operationalization remains comparatively limited and uneven across the literature.

Among the studies that operationalize absorptive capacity, all 8 (100%) converge on the four-dimensional structure of acquisition, assimilation, transformation, and exploitation, suggesting strong consensus on these core dimensions. Specifically, acquisition is operationalized in 7 (88%) of the studies using indicators such as environmental scanning, R&D investment, external partnerships, and prior related knowledge, highlighting its role as a boundary-spanning capability. Assimilation is operationalized in 7 (88%) of the studies through indicators related to knowledge sharing, cross-functional communication, training, and documentation, reflecting its grounding in organizational learning routines.

Table 2. Operationalization of Absorptive Capacity

Dimension	Defining Characteristics	Indicators	Representative Studies
Acquisition	Ability to identify and acquire external knowledge	Environmental scanning; R&D investment; external partnerships; prior knowledge	[30] [40] [41] [42]
Assimilation	Ability to interpret and internalize knowledge	Knowledge sharing; cross-functional communication; training; documentation	[30] [40] [41] [42]
Transformation	Ability to combine new and existing knowledge	Reconfiguration of routines; integration of ideas; experimentation	[30] [40] [41] [42]
Exploitation	Ability to apply knowledge for value creation	New products/services; process improvements; performance gains	[30] [40] [41] [42]

Source: *Authors' synthesis from reviewed literature (2010–2025*

The transformation dimension appears in 6 (75%) of the operationalized studies, with indicators focusing on the reconfiguration of routines, integration of ideas, and experimentation, underscoring its role in recombining new and existing knowledge. Similarly, exploitation is operationalized in 6 (75%) of the studies, primarily through indicators of new products or services, process improvements, and performance gains, thereby linking absorptive capacity to tangible organizational outcomes. Overall, these findings show that although fewer studies move beyond conceptual discussion, those that do demonstrate strong alignment in how absorptive capacity is operationalized, reinforcing its applicability for empirical analysis of technology adoption and innovation outcomes.

3.3   Levels of Analysis of Absorptive Capacity

The concept of ACAP has been analyzed at different levels of analysis within the literature. Based on the reviewed papers, the levels of analysis primarily include individual,11(44%), group 4(16%), organizational, 21(85%), and team-level, 4(16%). Each level provides a unique perspective on how ACAP functions within organizations and influences technology adoption, innovation, and competitive advantage. Below is a detailed discussion of these levels.

Table 3. Level of analysis of ACAP

Level of Analysis	Unit of Analysis	Indicators / Measures of ACAP	Key Conceptual Focus	Representative Studies	Implications for Research and Practice
Individual Level	Individual employees or managers within the Organization	•Knowledge acquisition and learning ability • Expertise and prior related knowledge • Cognitive ability and motivation • Individual leadership and empowerment	ACAP as a function of individual skills and learning processes that underpin organizational absorptive routines	[28] [35] [43]	Building individual learning and skill development enhances organizational ACAP. Leadership commitment fosters conducive knowledge-sharing environments.
Group Level	Workgroups or functional units within the organization	• Knowledge sharing within & across groups • Communication & collaboration routines • Problem-solving & joint decision-making practices	ACAP as a social process where group interactions facilitate assimilation & transformation of knowledge	[31] [44] [27]	Strengthening intra- and inter-group communication improves knowledge diffusion and innovation outcomes.
Organizational Level	Organization as a whole	• Knowledge acquisition, assimilation, transformation, and exploitation routines • R&D intensity and innovation systems • Organizational learning culture and structure	ACAP as a dynamic organizational capability that evolves through structured systems and processes	[30] [32] [26] [35] [45] [36]	Enhancing structural systems, R&D capacity, and organizational learning improves innovation and strategic adaptation.
Team Level	Teams at the Meso Level-Outside the Organization	• Team learning and interaction frequency • Improvisation and harmonization processes • Shared cognition and collective problem-solving • Knowledge identification and transfer	ACAP as a meso-level construct that captures the collective ability of teams to absorb and apply knowledge in dynamic contexts	[46] [47]	Recognizing team-level absorptive capacity helps bridge micro–macro gaps and promotes innovation through adaptive team learning and collaboration.

Source: *Authors' synthesis from reviewed literature (2010–2025)*

Studies that had the individual in the organization as a unit of analysis represented 11(44%) of the reviewed data set. The studies emphasize the role of individual managers and employees in developing and utilizing ACAP. At this micro level, ACAP is associated with individual staff members' human capital, expertise, and knowledge management practices. The capacity for knowledge acquisition and transformation begins with individual learning

processes. For example, [28] [35] [43] posit that individual routines and skills are foundational to organizational routines, underscoring the importance of individual capabilities in knowledge assimilation. [43] highlight the role of individual leadership and empowerment, suggesting that top management's beliefs and participation influence the organizational environment and thus impact ACAP's development. This implies that at the individual level, developing skills, fostering individual learning, and encouraging participation are essential for building overall organizational ACAP.

While less explicitly detailed in the reviewed studies, 4(16%) of the studies relate to the role of groups within organizations. The emphasis at the group level is on how knowledge is shared, assimilated, and exploited across units within the organization. This includes routines, communication channels, and collaborative practices. The notion that organizational routines for knowledge sharing and integration are built upon group interactions. The role of organizational socialization, problem-solving groups, and cross-functional groups in facilitating the transformation and exploitation phases of ACAP [31] [44] [27] . This implies that effective internal communication, collaboration, and shared routines between groups are vital for enhancing ACAP at this intermediate level.

Most prominently discussed in the literature, 21(85%) of the reviewed studies, notably, [30] and [32], ACAP is conceptualized as an organizational capability comprising routines and processes for knowledge acquisition, assimilation, transformation, and exploitation. For example, [26] define ACAP as a set of organizational routines and processes that enable firms to manage knowledge effectively. The papers, by adopting an organizational definition, emphasize that ACAP is a dynamic capability that evolves through organizational routines, systems, and structures that facilitate learning and innovation, and hence the organizational level unit of analysis. Key dimensions of ACAP at this level include knowledge acquisition-which refers to the organization's routines for sensing external knowledge, assimilation- which refers to the internal processes for understanding and interpreting external knowledge, transformation- which is considered as the ability to reconfigure or recombine internal knowledge for new applications, and exploitation- which entails institutionalizing and applying knowledge to generate value and competitive advantage. Study results from this unit of analysis illustrate that organizations with high ACAP can better recognize, internalize, and utilize external knowledge for strategic benefits, including technology adoption like mHealth innovations [35] [45] [36]

The team-level analysis of ACAP, as articulated by [46] [47] emphasizes understanding how knowledge absorption processes function within the meso-level context of teams, rather than at the macro-organizational or micro-individual levels. [46] propose a novel conceptualization of absorptive capacity specifically at the team level, introducing four new dimensions that capture the unique dynamics of knowledge processing within teams. These dimensions include identification, which refers to a team's ability to recognize individuals' specialized knowledge areas and promote internal knowledge sharing; harmonization, which involves coordinating diverse perspectives to integrate individual knowledge into a shared understanding; improvisation, defined as the capacity to generate creative solutions under time or resource constraints; and consummation, the ability to articulate and communicate newly acquired knowledge effectively. Together, these dimensions form a comprehensive and multidimensional model that reflects the active and dynamic nature of team-level absorptive capacity [47]. Unlike firms, which benefit from stability, established routines, and organizational memory, teams are often temporary, diverse, and operate in fluid environments, lacking structured memory systems. As such, their knowledge absorption processes are more complex and less reliant on embedded routines. The team's effectiveness in recognizing, assimilating, and applying external knowledge, therefore, depends on these newly proposed capabilities, which are essential for navigating the challenges of diversity, limited resources, and high contextual variability.

The reconceptualization of Absorptive Capacity by [46] introduces a multi-level framework that distinguishes between macro-level latent processes and meso-level active processes. At the macro level, which reflects the traditional understanding of Absorptive Capacity, the organization engages in four key activities: recognizing the value of external knowledge, acquiring that knowledge, assimilating and transforming it internally, and finally exploiting it to improve organizational performance. These activities occur over time, resulting in a progression from the organizational knowledge stock at time T_1 to an enhanced knowledge stock at time T_2.

A critical innovation in this framework is the introduction of the meso-level active context. This level represents the actual behavioral and operational mechanisms through which knowledge is put into use within the organization. The interaction between these two levels is facilitated through explicit linkages. A macro-to-meso link occurs when newly recognized knowledge is transferred into the meso-level for active engagement. Conversely, the meso-to-macro link feeds the outcomes of meso-level experimentation, such as prototypes of products or processes, back into the macro-level exploitation phase. These bi-directional links emphasize the

dynamic and iterative nature of knowledge absorption, where both levels contribute to organizational learning and innovation.
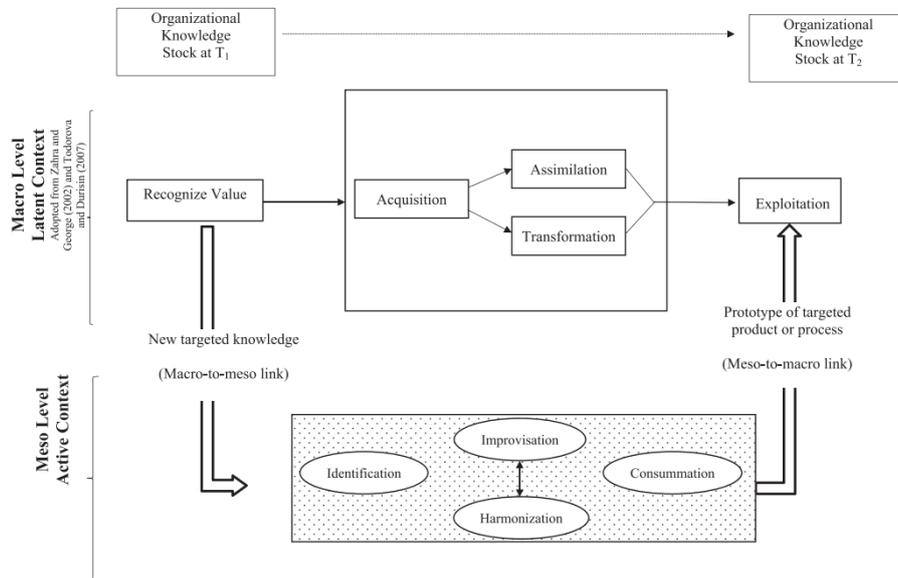

Figure 3. Reconceptualizing Absorptive Capacity, Yildiz, Murtic, and Zander (2024).

In this case, [46] model expands the traditional view of ACAP by embedding an active meso-level layer that captures the practical enactment of knowledge. This conceptualization highlights that knowledge absorption is not only a cognitive or structural process but also a behavioral and contextual one, deeply rooted in the day-to-day practices of organizational actors. It thereby provides a more comprehensive understanding of how organizations learn and innovate over time.

(a) Comparison and contrast between Team-level and other group-levels

Compared to traditional group-level conceptual frameworks of ACAP , which emphasize structured routines, formal communication channels, and collective knowledge assimilation across functional units, the team-level framework advanced by [46] offers a more dynamic, behaviourally grounded perspective. Whereas group-level models view ACAP as emerging from stable organizational routines that facilitate coordination and knowledge sharing, the team-level conceptualization focuses on the active enactment of knowledge processes within smaller, adaptive units operating outside the organization. This contrasts with earlier models that largely treat knowledge absorption as a linear, process-driven activity. The team-level approach thus complements rather than replaces group-level unit of analysis by revealing how absorptive capacity manifests as an emergent, practice-based capability within collaborative teams, bridging the gap between individual cognition and organizational learning.

Table 4. Comparison of Group vs Team-Level Conceptualizations of ACAP

Dimension	Group-Level ACAP	Team-Level ACAP
Unit of Analysis	Workgroups or functional units within organizations	Teams as independent, adaptive learning systems outside the Organization
Core Focus	Knowledge sharing, coordination, and assimilation through established organizational routines	Dynamic enactment of knowledge processes through improvisation and collaboration
Key Processes	Acquisition, assimilation, transformation, exploitation	Identification, harmonization, improvisation, consummation

Nature of Processes	Structured, routine-based, and largely top-down	Emergent, behaviorally enacted, and context-dependent
Underlying Mechanisms	Organizational socialization, communication channels, and cross-functional collaboration	Team creativity, adaptability, and shared cognition
Knowledge Flow	Vertical and formalized; directed through organizational structures	Horizontal and fluid; iterative between team members and organizational layers
Contribution to ACAP Theory	Explains how organizations coordinate and institutionalize knowledge	Explains how teams activate and operationalize knowledge absorption under dynamic conditions

Source: *Authors' synthesis from reviewed literature (2010–2025)*

3.4   Determinants Influencing Absorptive Capacity

A central determinant of absorptive capacity, identified in 19 out of 25 studies (76%), is the organization's, individual's, or team's ability to recognize, acquire, and gather relevant external knowledge. [48] [32] [28] consistently highlight prior related knowledge as essential for identifying valuable external information. Recognition of knowledge involves the processes and mechanisms through which organizations scan the environment, establish sensing routines, and allocate resources for knowledge search. Empirical studies demonstrate that knowledge acquisition is supported by R&D investments, patent portfolios, and established routines for external engagement, all of which enhance an organization's capacity to detect and access external knowledge flows.

Seventeen studies (68%) emphasize knowledge assimilation as a key process in absorptive capacity, involving how organizations interpret, understand, and internalize the knowledge they acquire. Assimilation entails developing shared understanding, building internal communication channels, and creating learning routines that foster collective sense-making. This determinant is particularly influenced by team dynamics such as trust, collaboration, and the formation of shared mental models. These studies show that effective assimilation relies on an organization's cognitive structures and internal social capital, which enable the conversion of new information into accessible and actionable knowledge.

Fifteen of the reviewed papers (60%) discuss knowledge transformation or conversion as another critical determinant. This involves the ability to combine newly acquired knowledge with existing knowledge to generate new insights, refine processes, or create novel practices. Transformation typically occurs through internal routines that support learning integration and adaptation. The literature links this capability to organizational flexibility, integrative mechanisms, and the presence of dynamic routines that allow for the recombination of knowledge. Transformation is especially vital in adapting external knowledge to fit internal operations and in facilitating innovation.

Almost half of the reviewed studies,12(48%) address knowledge exploitation, which refers to the organization's ability to apply absorbed knowledge to practical ends such as product innovation, service improvement, or process optimization. Exploitation represents the realization of absorptive capacity, where knowledge is put to use to achieve performance outcomes. Supporting findings suggest that exploitation is associated with innovation output, R&D effectiveness, and creative problem-solving. Organizations with robust mechanisms for knowledge application are better positioned to turn ideas into tangible outcomes and sustain competitive advantage.

Group-level capabilities were highlighted in 13 studies (52%), underscoring the micro-foundations of absorptive capacity within group settings. These capabilities include skills such as identification of internal knowledge, improvisation under uncertainty, integration of diverse viewpoints, and consummation the clear articulation of new knowledge. These competencies are particularly important in R&D and project-based teams where knowledge processes are decentralized and less routinized. The literature suggests that teams with strong internal coordination, cognitive diversity, and a learning-oriented culture significantly enhance absorptive capacity at the organizational level.

Leadership and organizational culture were identified as important determinants in 11 studies (44%). Leadership influences absorptive capacity by shaping strategic vision, fostering openness to external ideas, and facilitating resource allocation. Transformational leadership styles, in particular, promote a culture of learning,

risk-taking, and collaboration factors that are conducive to effective knowledge absorption. Cultural attributes such as trust, openness, and innovation orientation also determine how knowledge is shared and integrated across organizational boundaries. Cross-cultural studies further indicate that cultural compatibility affects the ease with which external knowledge is assimilated and exploited.

The most commonly cited determinant, mentioned in 20 studies (80%), is the availability of organizational resources and routines. This includes knowledge management systems, institutionalized processes, learning infrastructures, and organizational slack. These elements form the structural backbone that supports the absorptive capacity process, facilitating both the acquisition and transformation of knowledge. The presence of well-established routines and supportive infrastructures ensures that knowledge flows are captured, processed, and disseminated effectively throughout the organization.

Nine studies (36%) address the role of resource constraints and the need for improvisation in sustaining absorptive capacity. In settings with limited access to financial, technological, or human resources, such as many public healthcare systems, organizations must rely on creativity, flexibility, and spontaneous problem-solving to absorb and apply knowledge. Improvisation allows teams to adapt quickly to changing conditions and make efficient use of available resources. This determinant is particularly relevant in volatile environments, where traditional routines may not suffice and agility becomes essential for knowledge absorption.

Twelve papers (48%) highlight external networks and relationships as significant enablers of absorptive capacity. Alliances, partnerships, and collaborations with external entities such as universities, research institutions, suppliers, and customers serve as vital sources of new knowledge. Strength, diversity, and trust within these networks determine the quantity and quality of knowledge flows. Robust external linkages not only enhance knowledge acquisition but also facilitate assimilation by offering platforms for dialogue, shared learning, and co-creation.

Finally, 11studies (44%) point to contextual and contingency factors as influencing the effectiveness of the other determinants. Variables such as team size, task complexity, industry dynamics, technological uncertainty, and environmental turbulence affect how absorptive capacity is developed and operationalized. These studies argue that the relative importance of each determinant may vary depending on the organizational setting, making absorptive capacity a context-sensitive construct. This insight supports the need for adaptive and tailored approaches to building absorptive capacity across different sectors and organizational forms.

The high prevalence of resources and routines (80%) highlights their central role in enabling absorptive capacity, while recent studies increasingly emphasize team-related determinants such as identification and improvisation, signaling a shift toward a more granular, team-level understanding of knowledge processes. Although leadership and cultural factors are addressed slightly less frequently, they remain crucial in shaping the organizational environment that supports absorptive activities.

Relatedly, [48] notes that Absorptive capacity is shaped by a combination of internal and external factors. They explained that internal factors encompass elements such as the organization's existing knowledge base, the individual absorptive capacity of employees, their educational levels, and the diversity of their professional backgrounds. Additional contributors include the roles played by gatekeepers, the effectiveness of cross-functional communication, the prevailing organizational culture, the size of the company, and its level of organizational inertia [28].

Furthermore, investment in research and development and human resource management significantly influences absorptive capacity [27]. On the external front, [42] note that the knowledge environment surrounding the organization and its position within broader knowledge networks play a pivotal role. An organization must possess a high level of ACAP to effectively integrate and apply external knowledge, particularly in contexts such as technology transfer, where diffusion channels, organizational interactions, and R&D resources are vital for success [49]. The implications of an organization's prior knowledge base, the individual absorptive capacity of employees, and investment in R&D on overall ACAP and competitiveness are profound [28]. A well-developed knowledge base enhances a firm's ability to recognize, assimilate, and exploit new information, fostering continuous innovation and adaptability in dynamic markets [27].

Table 5. Determinants of Absorptive Capacity

Determinant	Number of Papers	Percentage (%)	Description Summary
Knowledge Acquisition	19	76%	Recognizing and gathering relevant external knowledge.
Knowledge Assimilation	17	68%	Interpreting and understanding acquired knowledge.
Knowledge Transformation /Conversion	15	60%	Converting knowledge into usable formats and routines.
Knowledge Exploitation / Application	12	48%	Applying knowledge to innovate and improve.
Group-Level Capabilities	13	52%	Skills like identification, improvisation, integration at team level.
Leadership and Culture	11	44%	Leadership style and organizational culture influence absorptive capacity.
Resources and Routines	20	80%	Availability of routines and knowledge resources.
Resource Constraints and Improvisation	9	36%	Handling resource limitations via improvisation.
External Relationships and Networks	12	48%	External linkages providing critical outside knowledge.
Contextual and Contingency Variables	11	44%	Influences from environment, size, and technology complexity.

Source: *Authors' synthesis from reviewed literature (2010–2025)*

Employees with high individual ACAP, supported by diverse educational and professional backgrounds, contribute to the effective internalization and application of external knowledge, thereby improving organizational learning [50]. Additionally, sustained investment in R&D not only strengthens technological capabilities but also enhances knowledge-sharing mechanisms, leading to superior innovation performance and competitive advantage [26].

Firms that strategically cultivate these elements position themselves as industry leaders, capable of responding swiftly to emerging opportunities and challenges, thus securing long-term sustainability and market dominance [51].

3.5   Application of Absorptive Capacity Theory in Explaining mHealth Utilization for Adverse Drug Reaction Reporting

The reporting of Adverse Drug Reactions is a critical component of pharmacovigilance that ensures drug safety and efficacy [52]. Globally, the state of ADR reporting is varied, with well-established systems in developed countries but significant gaps in developing regions [53]. To address these issues, there have been efforts to develop regional pharmacovigilance centers and integrate ADR reporting into existing healthcare frameworks, although progress is slow and uneven across the continent [54] [55]. In Uganda, the process of reporting Adverse Drug Reactions begins with the reporter, who may be a healthcare professional such as a doctor, nurse, pharmacist, or other health worker, identifying and documenting a suspected ADR using the National Drug Authority (NDA)-ADR reporting form. The reporter has three submission options, first, the report is submitted to the Regional Pharmacovigilance Centre, usually located in the pharmacy section of the regional referral hospital. These centres serve as the first point of technical verification and support, ensuring that reports are complete before forwarding them to the NDA. Secondly, the report may be collected by NDA Regional Officers, who either pick reports

directly from health facilities or receive notifications from facility-based pharmacovigilance focal persons. This ensures coverage in districts and facilities that lack regional centres. Lastly, the report goes directly to the NDA Head Office in Kampala, where it is received, acknowledged, and reviewed by pharmacovigilance experts. The head office provides feedback to the reporter and integrates the information into the national ADR database for further causality assessment and regulatory action. Additionally, reporters can submit ADRs directly through digital platforms such as WhatsApp, the NDA online portal, the Med Safety mobile app, or email, enhancing real-time data transmission. These multiple pathways and feedback loops between reporters, regional centres, NDA regional officers, and the NDA Head Office reflect a decentralized yet coordinated pharmacovigilance system, ensuring efficient ADR detection, validation, and response across Uganda's healthcare network.

Relating Uganda's Adverse Drug Reaction reporting process to the three levels of analysis of Absorptive Capacity, individual, organizational, and team, demonstrates how knowledge identification, assimilation, transformation, and exploitation occur across different actors and structures in the national pharmacovigilance system. At the individual level, absorptive capacity manifests through the healthcare professionals (reporters) who identify and document ADRs. Their ability to recognize potential drug reactions depends on individual knowledge, prior experience, and professional judgment. This stage aligns with ACAP's knowledge acquisition and assimilation dimensions, where the healthcare worker must interpret clinical symptoms, determine causality, and utilize available digital tools such as the Med Safety mobile app or online reporting portal. Enhancing individual ACAP through continuous professional training, digital literacy, and pharmacovigilance awareness ensures that frontline reporters can effectively detect and communicate ADRs using mobile technologies.

At the organizational level, absorptive capacity is represented by the NDA, which institutionalizes systems for collecting, validating, and analyzing ADR reports nationally. NDA's organizational ACAP involves the transformation of individual and team knowledge into national pharmacovigilance intelligence through databases such as VigiBase and policy feedback mechanisms. It encompasses processes like knowledge transformation and exploitation, where lessons from ADR data inform regulatory decisions, safety alerts, and health system learning.

At the team level, absorptive capacity emerges through collaboration within and between healthcare facility teams, such as regional hospitals and district health offices. These teams collectively verify, harmonize, and transmit ADR reports to ensure data accuracy and completeness. This collaborative process reflects [46] meso-level ACAP, emphasizing identification, harmonization, improvisation, and consummation. For instance, team members identify key knowledge sources (ADR reporting technologies), harmonize interpretations through peer review, improvise when digital systems or internet access fail, and consummate the process by submitting validated reports to NDA. Team-level absorptive capacity is therefore critical in enabling adaptive learning and ensuring consistent knowledge flow between health facilities and regional centres.

We therefore Shall develop and adopt a multi-level analytical theoretical approach that integrates the individual, organizational and team levels as key lenses to understand and explain the utilization of mHealth for ADR. This is driven by the observations that the Ugandan pharmacovigilance system relies on cross-functional collaboration between individuals, facility teams, and organizational structures, operating in resource-limited and dynamic environments.

4   Discussion

The results of this systematic review provide a comprehensive understanding of how Absorptive Capacity has evolved conceptually and empirically within the Information Systems (IS) literature and how this framework can be applied to understand the enablers of mobile technology utilization for Adverse Drug Reaction reporting in Uganda's public healthcare system. Across the reviewed studies, the findings reveal that ACAP has transitioned from a narrowly defined organizational process to a multilevel, dynamic capability encompassing individual, team, and organizational dimensions. This reconceptualization not only broadens theoretical understanding but also has direct implications for how health systems, particularly in low-resource settings, adopt and utilize digital innovations such as mHealth technologies.

The review confirms that ACAP remains grounded in the foundational work of [24], who introduced it as a firm's ability to identify, assimilate, and exploit external knowledge for innovation and performance improvement. However, subsequent research, including studies by [25] [56], has expanded ACAP into a multidimensional construct comprising four interrelated processes: acquisition, assimilation, transformation, and exploitation. This dynamic perspective, adopted by 72% of reviewed studies, frames ACAP as an evolving

organizational capability rather than a static asset. It highlights the continuous nature of learning and adaptation required to integrate external knowledge into internal practices. The findings also reveal a distinction between Potential ACAP (the ability to acquire and assimilate knowledge) and Realized ACAP (the ability to transform and apply knowledge). This differentiation is particularly relevant in public healthcare contexts like Uganda, where the gap between potential and realized ACAP can determine the success of technology-enabled pharmacovigilance systems.

A smaller but growing body of research (20%) positions ACAP as a facilitator of organizational learning and technological adaptation, emphasizing leadership, organizational culture, and resource allocation as enablers of knowledge utilization. This orientation aligns closely with healthcare environments, where the introduction of mHealth technologies for ADR reporting requires behavioral and cultural change alongside technical adoption. Finally, a subset of studies (8%) views ACAP through the lens of dynamic capabilities and strategic resilience, framing it as an adaptive mechanism that allows organizations to withstand environmental turbulence, regulatory change, and technological disruption. This is particularly salient for Uganda's public healthcare system, which operates under resource constraints and shifting health priorities. Here, ACAP enables organizations to respond adaptively by leveraging both internal and external knowledge for sustainable innovation.

The review identifies four levels of ACAP analysis, individual, group, organizational, and team each offering distinct but interconnected insights into how knowledge absorption occurs. The individual level (44%) highlights the importance of personal learning, professional expertise, and cognitive ability in identifying and interpreting new knowledge. In the context of Uganda's ADR reporting, this corresponds to the healthcare workers (doctors, nurses, and pharmacists) who recognize and document suspected drug reactions. Their ability to utilize mHealth tools such as the Med Safety app depends on their digital literacy, motivation, and previous exposure to pharmacovigilance training. Strengthening individual-level ACAP through continuous capacity building and digital awareness is therefore fundamental for effective ADR surveillance.

The group level (16%) represents collective learning within departments or functional units, focusing on internal communication, collaboration, and shared routines. While this level enhances intra-organizational coordination, the results indicate that its role remains under-theorized and less developed in the ACAP literature. Most studies treat groups as intermediaries between individuals and the organization, emphasizing formalized processes rather than adaptive behavior. In contrast, the organizational level (85%) is the most established domain, viewing ACAP as a structured set of routines that allow organizations to scan environments, absorb knowledge, and institutionalize innovations. Within Uganda's pharmacovigilance system, the National Drug Authority (NDA) exemplifies organizational-level ACAP through its established procedures for collecting, validating, and analyzing ADR reports. These processes translate individual and team-level knowledge into institutional intelligence that informs policy decisions, regulatory actions, and system-wide learning.

However, a notable development in recent scholarly work is the recognition of the team level (16%), as advanced by [46]. This framework introduces a meso-level perspective, conceptualizing teams as adaptive, learning-oriented entities that bridge micro-level individual actions and macro-level organizational structures. Unlike traditional group-level approaches that emphasize stability and formal routines, [46] highlight behavioral, interactive, and improvisational dynamics that enable teams to absorb and apply knowledge in fluid, real-time contexts. The four new dimensions proposed identification, harmonization, improvisation, and consummation, capture the lived realities of teams operating in complex and uncertain environments, such as Uganda's regional pharmacovigilance centres. These teams often function under time constraints, resource limitations, and infrastructural challenges, making adaptability and improvisation central to their absorptive processes. The [46] framework, therefore, fills a theoretical gap by explaining how collective learning and innovation occur through interaction and contextual adaptation rather than solely through predefined routines.

The results identify a range of determinants that shape ACAP across levels, with organizational resources and routines (80%) emerging as the most frequently cited factor. These include formalized knowledge management systems, institutional processes, and learning infrastructures that enable consistent knowledge flow. In Uganda, the NDA's national ADR reporting system and digital reporting platforms represent such institutional mechanisms that support knowledge acquisition and exploitation. Knowledge acquisition (76%), assimilation (68%), and transformation (60%) remain core functional determinants that directly influence innovation outcomes. These processes depend heavily on prior knowledge bases, R&D investments, and cross-functional collaboration, all areas that can be strengthened through deliberate policy and capacity interventions in Uganda's healthcare sector.

The review also emphasizes team-level capabilities (52%) such as identification, improvisation, and integration of diverse perspectives as crucial micro-foundations of ACAP. These findings reinforce the importance of [46]

behavioral model, which positions teams as active agents of knowledge absorption rather than passive implementers of organizational strategies. In resource-constrained settings, where improvisation and creativity are necessary for problem-solving, team-level absorptive capacity determines how effectively mobile technologies are adopted and used for ADR reporting. Additional determinants such as leadership and culture (44%), external networks (48%), and contextual factors (44%) highlight that absorptive capacity is deeply embedded in both social and institutional contexts. Transformational leadership and an innovation-oriented culture foster trust and openness to external ideas, which are prerequisites for successful knowledge assimilation. External partnerships with international regulatory bodies and academic institutions further enrich the knowledge base and enhance collective learning. Applying the absorptive capacity framework to Uganda's ADR reporting process in future studies shall illustrate how knowledge absorption and utilization occur across individual, team, and organizational levels.

5   Conclusion

This systematic review set out to explore how Absorptive Capacity has been defined, conceptualized, and applied within the Information Systems literature, to identify its levels of analysis, key determinants, and potential application as a theoretical lens for understanding the enablers of mobile technology utilization in Adverse Drug Reaction reporting within Uganda's public healthcare system. The findings offer several important conclusions that contribute both to theory and to practice.

First, the review confirms that Absorptive Capacity has evolved into a multidimensional and dynamic construct that extends beyond its original economic interpretation by [24]. Literature overwhelmingly supports the view of ACAP as a process-oriented capability comprising interlinked stages of acquisition, assimilation, transformation, and exploitation of knowledge, which together enable continuous learning, innovation, and adaptability. This dynamic and developmental nature of ACAP allows organizations and systems, such as Uganda's pharmacovigilance infrastructure, to remain responsive to technological change and external knowledge flows. The distinction between Potential and Realized ACAP adds theoretical clarity by illustrating how organizations progress from recognizing valuable knowledge to applying it in ways that generate measurable performance outcomes.

Second, the results show that ACAP operates at multiple, interdependent levels: individual, team, and organizational, each contributing uniquely to the knowledge absorption process. At the individual level, ACAP manifests through healthcare workers' cognitive ability, expertise, and motivation to recognize and report ADRs using mobile tools. At the team level, it is reflected in the collaborative dynamics among health facility teams, regional pharmacovigilance centres, and district health officers, who collectively verify, harmonize, and transmit ADR data. At the organizational level, it is expressed through the institutional structures and learning systems of the National Drug Authority, which transform and exploit aggregated knowledge for regulatory and public health decision-making. These multilevel interactions underscore that ACAP is not confined to organizational structures alone but emerges from the continuous interplay between people, teams, and institutions, a perspective that traditional single-level models fail to capture.

Third, the review identifies several determinants that shape the development and strength of absorptive capacity. The most influential are organizational resources and routines, which provide the structural foundation for knowledge management, alongside leadership, culture, and external partnerships, which create an enabling environment for learning. Equally important are team-level capabilities such as improvisation, harmonization, and collective problem-solving, especially in settings characterized by uncertainty and resource limitations. These determinants affirm that ACAP is both a structural and behavioral construct, dependent on how well knowledge systems are supported institutionally and enacted socially within and across organizations. The findings also demonstrate that absorptive capacity is context-sensitive, shaped by environmental turbulence, resource constraints, and institutional maturity, all of which are prominent features of Uganda's healthcare environment.

Fourth, the study establishes that Absorptive Capacity offers a robust theoretical lens for analyzing and strengthening digital health adoption and innovation. It bridges the gap between technological readiness and behavioral adaptability by emphasizing learning as a continuous, iterative process. In conclusion, Absorptive Capacity serves as both a diagnostic and prescriptive framework for enhancing digital innovation in healthcare.

Future research should examine how individual, team, and organizational absorptive capacities interact to shape sustained mHealth utilization for ADR reporting in the public healthcare system, with particular emphasis on the

meso-level dynamics of team learning and coordination. Investigating these multi-level interactions will provide deeper insights into how layered knowledge processes support effective pharmacovigilance in resource-constrained settings.

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