Eduvest – Journal of Universal Studies
Volume 6 Number 7, July, 2025
p- ISSN 2775-3735- e-ISSN 2775-3727

A Systematic Literature Review on Knowledge Retention for Mitigating Knowledge Loss in Startups: Trend, Technologies, and Framework

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Keywords:
Employee Turnover; Knowledge Loss, Knowledge Retention, Domain, Technologies.

ABSTRACT

Employee turnover is a critical challenge in startups, as valuable knowledge is often lost when employees leave the organization. This loss occurs due to the lack of effective knowledge retention practices, particularly in converting tacit knowledge into explicit knowledge. This study investigated knowledge retention in startup environments through a Systematic Literature Review (SLR) following PRISMA 2020 guidelines, including study identification, selection, data extraction, and synthesis. 21 relevant studies published between 2020 and 2025 were analyzed with Atlas.ti to identify key technologies and domains shaping knowledge retention frameworks. Four major technology groups are identified: Data Analytics & Intelligence Technologies, Cloud-Based Knowledge Management Systems, Knowledge Sharing and Collaboration Platforms, and Knowledge Repositories, in addition, 14 subdomains within the people, process, and technology domains were synthesized into a conceptual framework, highlighting knowledge retention as a socio-technical process. This research contributes by addressing the lack of research on knowledge retention in startup contexts and offers a conceptual foundation to support startups in developing knowledge retention strategies.

INTRODUCTION

In Indonesia, approximately 90% startup fail to survive (Harlianto et al., 2024). According to Rozas & Mahendrawathi (2024) there are twelve internal and external factors that contribute to startup failure, one of them is lack of knowledge among team members. That knowledge lacks often influence by some organizational problems, including key employee turnover (Budiman et al., 2022). Employee turnover has become a global problem for organizations, as it directly affects strategic planning and limit opportunities to gain competitive advantages(Kanchana & Jayathilaka, 2023), The tacit knowledge that held by resigned employees frequently was not converted into explicit knowledge, resulting in significant knowledge loss (Budiman et al., 2022). Knowledge loss hinders performance and growth of startup (Budiman et al., 2022). That issue can be mitigated by implemented knowledge retention to preserving critical knowledge within company.

Startup companies are generally defined as newly established, innovation-driven ventures operating under high levels of uncertainty, resource constraints, and rapid growth ambitions (Seppänen, 2020; Trideria & Ardi, 2020). Studies that explicitly discuss knowledge

retention in the context of startups remain limited, with most of the existing studies focusing on large enterprises. However, startups have different characteristics compared to large enterprises, **l**arge enterprises typically possess formal structures and abundant resources (Sima et al., 2022; van Zyl et al., 2022)**.** Thus, the implementation of knowledge retention in large companies needs to be adjusted to suit startup environment. This indicates a need for studies that specifically examine knowledge retention within the startup context.

To address the gap, this study conducted a systematic review **t**o obtain a comprehensive understanding of how knowledge retention operates in startups. Such understanding is expected to serve as a foundation for addressing knowledge loss issues caused by employee turnover in startup environments. The review aims to synthesize technologies and domain that form knowledge retention framework, so they can be effectively applied in startups. Due to limited study of startup context, this review includes Small and Medium Enterprises (SMEs). SMEs are considered relevant to this study because they share similar characteristics with startup, both operate with limited resources and have flexible, adaptive environments (Abraham, 2021; Fessl et al., 2020)

Based on the background, the research questions that formulated for this study are: (1) *What are the research trends on the topic of knowledge retention in startups from 2020 to2025?* (2) *What technologies are used in the knowledge retention process to mitigate knowledge loss in startups? (3) What domains form a knowledge retention framework to address knowledge loss in startups?*

The benefits of this research are both theoretical and practical. Theoretically, this study contributes to Knowledge Management literature by providing a comprehensive synthesis of knowledge retention practices in startup contexts, enriching understanding of socio-technical approaches to address knowledge loss from employee turnover, and offering a conceptual framework integrating technological and organizational dimensions. Practically, this research benefits startup founders and managers in developing knowledge retention strategies, human resource practitioners in designing retention programs, technology developers in understanding startup knowledge retention needs, and future researchers as a foundation for empirical studies.

METHOD

This research was conducted through systematic literature review (SLR) to synthesize findings relevant to knowledge retention as a way in mitigating knowledge loss in the context of startups, with the focus on the aspects of technology and frameworks that support it. The focus in this study is formulated through the PICOC (Population, Intervention, Comparison, Outcome, and Context) model as shown in Table 1 below.

Table 1. PICOC Mapping

Population	Employees of Startups/SMEs
Intervention	Knowledge retention technologies and frameworks.
Comparison	-
Outcome	Mitigating knowledge loss caused by employee turnover
Context	Startups/SMEs environments experiencing employee turnover and organizational change.

Source: Authors' elaboration based on PICOC framework for systematic literature review (2026)

Studies used in this literature review is limited to studies that are published within the range of 2020 to 2025. This literature review will only include journal or conference articles written in English. The SLR process refers to the PRISMA 2020 guide. All references are managed with Mendeley.

1. Study Identification

This literature review uses 6 academic databases with the search strings adjusted with the syntax of each database. The search database, search string, and keywords can be seen in Table 2 below.

Table 2. Search String

Database	Search String
Scopus	TITLE-ABS-KEY (("knowledge management" OR “knowledge retention” OR “knowledge loss”) AND ("startup" OR "SME" OR “small medium enterprises”) AND ("framework" OR "model" OR “dimension” OR “domain”))
Science Direct	("knowledge management" OR "knowledge retention" OR "knowledge loss") AND ("startup" OR "SME") AND ("framework" OR "model" OR “dimension” OR “domain”))))
ACM Digital Library	("knowledge management" OR "knowledge loss") AND ("startup" OR "SME" OR “small medium enterprises”) AND ("framework" OR "model"))
IEEE Xplore	("All Metadata":"knowledge management" OR "All Metadata":"knowledge retention" OR "All Metadata":"knowledge loss") AND ("All Metadata":"startup" OR "All Metadata":"SME" OR "All Metadata":"small medium enterprises") AND ("All Metadata":"framework" OR "All Metadata":"model" OR "All Metadata":"dimension" OR "All Metadata":"domain")
ProQuest	ALL("knowledge management" OR "knowledge retention" OR "knowledge loss" OR "km") AND ALL("startup" OR "SME" OR "small medium enterprises") AND ALL("framework" OR "model" OR "dimension" OR "domain")

Source: Authors' elaboration based on search strategy for systematic literature review (2026)

2. Study Selection

Selection is done through 3 steps according to PRISMA:

1. Title & Abstract: Filtering topic relevance through the keywords in title & abstract (KM/knowledge retention/knowledge retention on startups/SMEs; shows model/framework/dimension/domain)
2. Full Text: Verifying the relevance of the studies
3. Quality Assessment: Studies were assessed using the criteria in Table 3, with a score of 1 or 0 assigned to each of the seven criteria (M1–M7). Only studies scoring at least 5 out of 7 were included.

Table 3. Quality Assessment Criteria

ID	Checklist Statement
M1	Does it include a problem and is the solution stated clearly?
M2	Is the purpose of the study stated clearly?
M3	Does it include the identification of knowledge retention processes that relates to organizational performance?
M4	Is the significance of knowledge retention processes and its relation with organizational

ID	Checklist Statement
	performance elaborated and discussed?
M5	Is the study results presented clearly?
M6	Does the result of the research provide ambiguously?
M7	Does the conclusion of the research answer the research question?

Source: Authors' elaboration based on quality assessment criteria adapted from systematic literature review guidelines (2026)

Through the 3 steps mentioned above, the total amount of articles that will be used in this literature review is presented in table V below.

Table 4. Article Selection Results

Source	Init	Step 1	Step 2	Step 3
Scopus	157	88	5	4
Science Direct	52	14	7	4
ACM Digital Library	78	5	2	1
IEEE Xplore	20	7	3	3
ProQuest	282	37	27	9
Total				**21**

Source: Authors' compilation based on PRISMA 2020 screening process (2026)

From the five databases, 21 articles were retained with ProQuest contributing the most (9). We can see the full process of the screening through the diagram in Fig. 1 below.

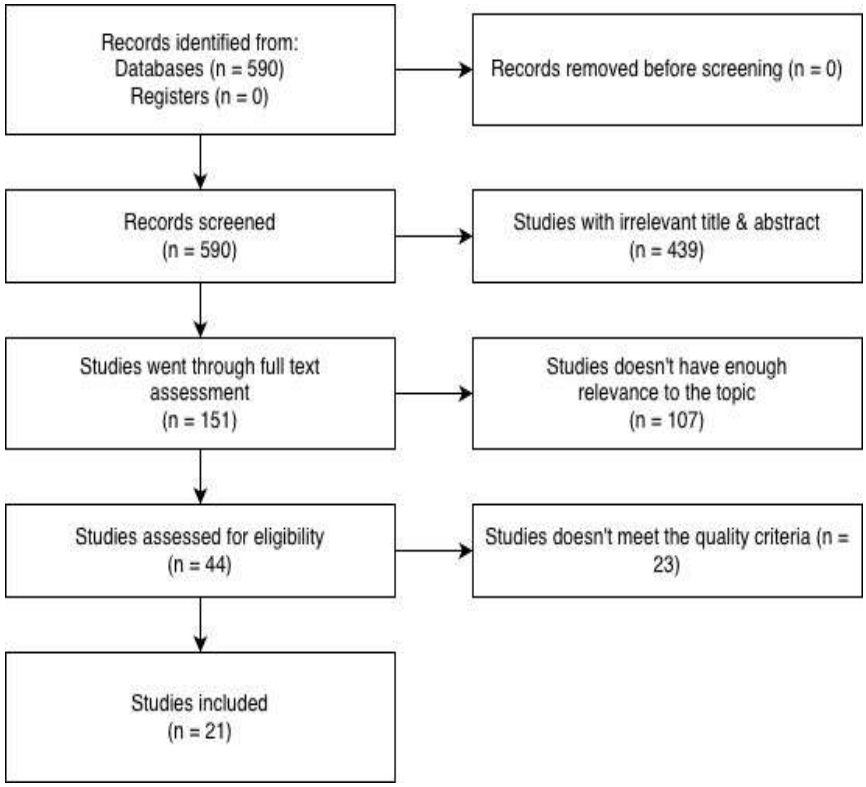

Figure 1. PRISMA Diagram

Source: Authors' elaboration based on PRISMA 2020 flow diagram for systematic literature review (2026)

3. Data Extraction & synthesis

Data were extracted to identify the research context, research objectives, methodologies, and main contributions of the selected studies. The studies then analyzed using open coding and axial coding techniques with the support of Atlas.ti software. The findings from this analysis are presented in next section.

RESULT AND DISCUSSION

4. Research Trend

Descriptive statistical analysis was conducted to identify research trends in knowledge retention within startup environments. The analysis described the distribution of selected studies based on publication year trends, research methodologies, and regional. Figure 2 presents the distribution of selected articles by publication year. 7 of the 22 articles were published in 2025, followed by 5 in 2024 and 4 in 2020. Publications from 2021–2023 contributed 2 articles each.

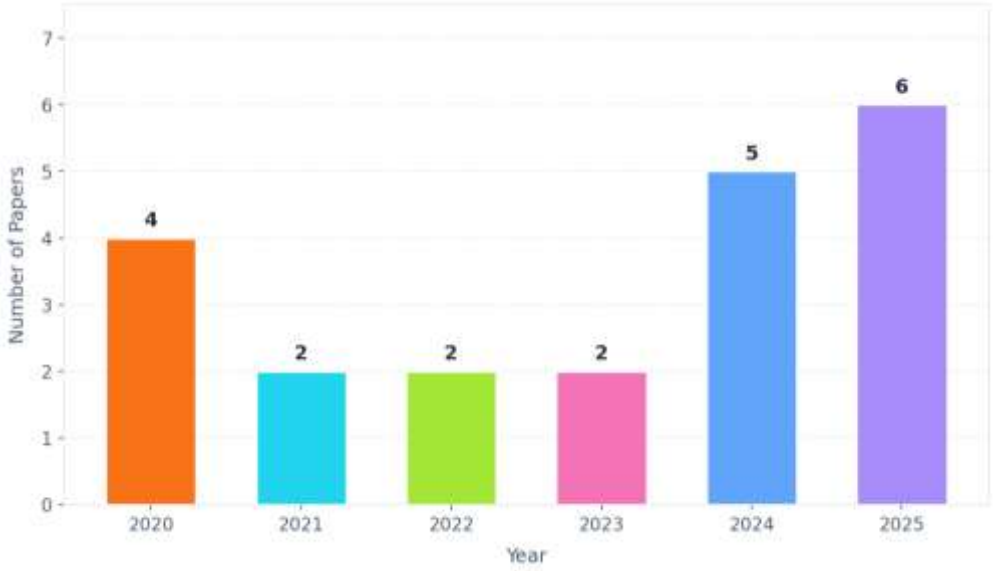

Figure 2. Publication Year Trend of Selected Studies

Source: Authors' elaboration based on descriptive analysis of selected articles (2026)

Figure 3 illustrates the proportion of research methodologies employed across the 21 selected studies. Quantitative approaches were the most prevalent, accounting for 47.6% of the articles, followed by qualitative methods at 28.6% and mixed methods at 23.8%.

Figure 3. Research Methodology Proportion of Selected Studies
Source: Authors' elaboration based on descriptive analysis of selected articles (2026)

Figure 4 displays the region distribution of the selected studies. Europe contributed the largest number of articles, with 7 studies, followed by Southeast Asia with 5 studies and the Middle East with 4 studies. East Asia and Africa each contributed 2 studies, while South Asia contributed 1 study. The contribution from Southeast Asia is relevant to the Indonesian startup context addressed in this study.

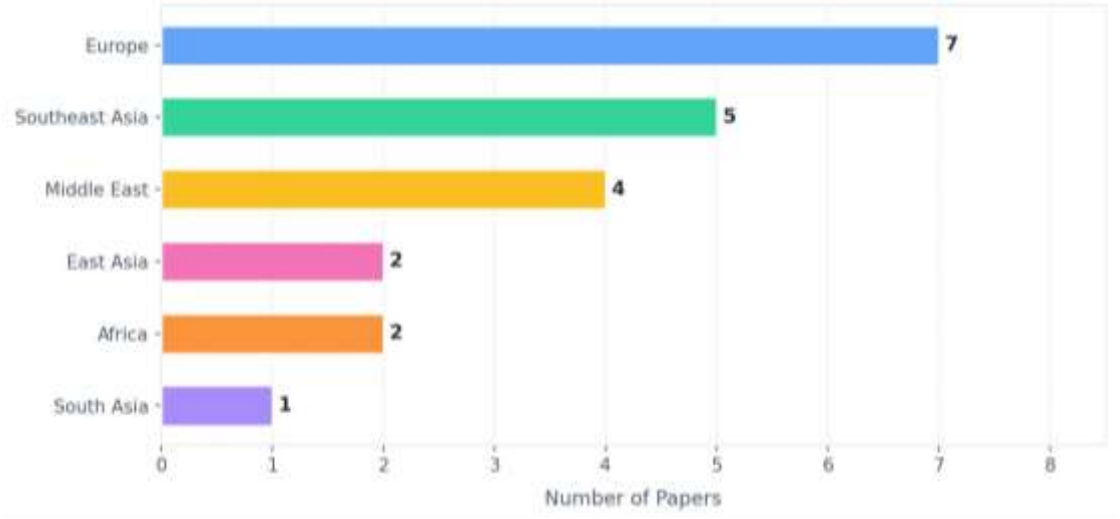

Figure 4. Distribution of Selected Studies by Region
Source: Authors' elaboration based on descriptive analysis of selected articles (2026)

5. Technology Used in Knowledge Retention Startup

From the 21 selected articles, we can see that knowledge retention implementation on startups and SMEs depends on the support of technologies. Those technologies do not only function as a storage for explicit knowledge, but also facilitate creation, sharing, as well as utilization of knowledge. Through iterative reading and coding of the technology aspect in each study, four main classifications of the technologies were found namely Data Analytics & Intelligence Technologies, Cloud-Based Knowledge Management Systems (KMS), Social & Collaboration Platforms, and Knowledge Repositories. Fig. II illustrates the distribution of knowledge retention technologies identified.

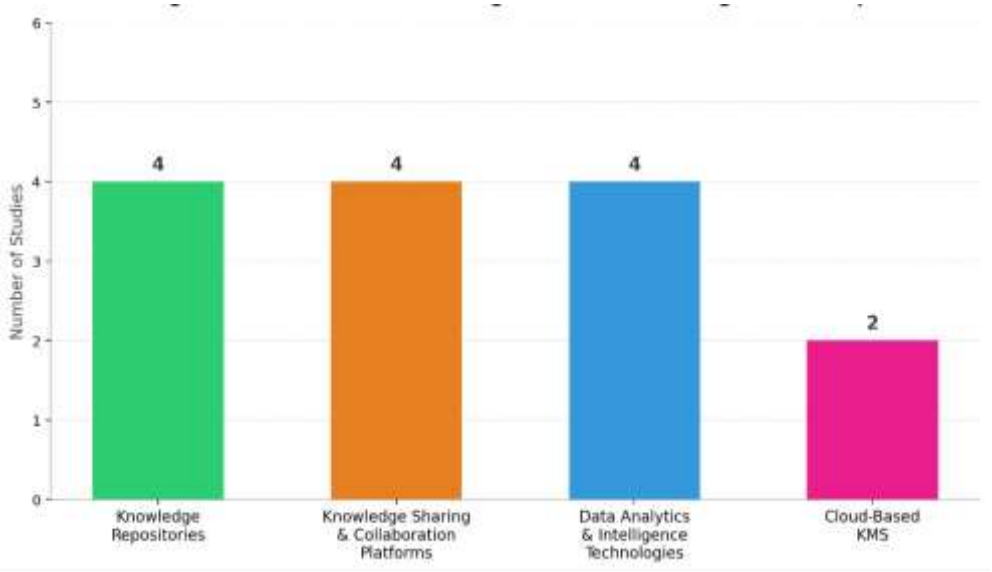

Figure 5. Distribution of Knowledge Retention Technologies in Startup

Source: Authors' synthesis based on content analysis of selected studies (2026)

Knowledge Repositories appearing in four studies. These tools retain organizational knowledge through database systems, ontology-based libraries, dedicated KM tools, and digital repositories such as Wikis, Google Drive (Abraham, 2021; Adesina A. O. & Ocholla D. N., 2024; van Zyl et al., 2022; Wielgórka, 2024).

Knowledge Sharing and Collaboration Platforms are identified in four studies. These platforms facilitate tacit knowledge exchange through social media, collaborative tools, and communication platforms such as Slack, Reddit, and WhatsApp (Achmad & Wiratmadja, 2025; Ingram & Drachen, 2020; van Zyl et al., 2022; Zeng et al., 2021).

Data Analytics and Intelligence Technologies are identified in four studies. These technologies support knowledge retention by enabling data-driven knowledge creation, AI-based knowledge exploitation, and transforming organizational data into actionable intelligence for decision-making (Alharthi, 2025; Atlas et al., 2025; Sima et al., 2022; Wang & Wang, 2020).

Cloud-Based Knowledge Management Systems (KMS) are reported in two studies. Cloud-based KMS enables SMEs to continuously store and access organizational knowledge through scalable cloud infrastructure despite resource constraints and staff turnover (van Zyl et al., 2022; Wang & Wang, 2020).

6. Domain Framework in Knowledge Retention Startup

From the literature, several domains related knowledge retention framework were synthesized. These domain frameworks were then mapped into PPT (People, Process, and Technology). The mapping results are presented in Table 5

Table 5. Knowledge Retention Domain in Startup

Domain	Subdomain	Description	Reference
Technology	**Cloud-Based Knowledge**	Systems that leverage cloud infrastructure to store, organize,	(van Zyl et al., 2022; Wang & Wang, 2020)

	Management Systems (KMS)	manage, and facilitate access to organizational knowledge across distributed teams in startups.	
	Data Analytics & Intelligence Technologies	Technologies encompassing big data analytics, artificial intelligence, machine learning, business intelligence systems, and decision support tools that extract, process, and transform organizational data into actionable knowledge.	(Alharthi, 2025; Atlas et al., 2025; Sima et al., 2022; Wang & Wang, 2020)
	Knowledge Sharing & Collaboration Platforms	Digital platforms that enable knowledge sharing, communication, and collaborative work among startup team members, including social media and collaborative tools.	(Achmad & Wiratmadja, 2025; Ingram & Drachen, 2020; van Zyl et al., 2022; Zeng et al., 2021)
	Knowledge Repositories	Structured digital storage systems including databases, wikis, and document management systems that preserve and provide access to organizational knowledge.	(Abraham, 2021; Adesina A. O. & Ocholla D. N., 2024; van Zyl et al., 2022; Wielgórka, 2024)
People	**Human Capital & Competencies**	The collective knowledge, skills, experience, and competencies of startup members, including talent acquisition, development, and succession planning to prevent knowledge loss.	(Anser et al., 2022; Sucena et al., 2025; Vale et al., 2020)
	Leadership & Management	The role of sustainable and knowledge-oriented leadership in driving knowledge retention strategies, managing change, and ensuring organizational performance in startups.	(Achmad & Inrawan Wiratmadja, 2024; Alatawi, 2025)
	Culture & Behavior	The shared values, trust, norms, and behavioral patterns within a startup that encourage knowledge sharing, collaboration, and retention as part of organizational identity.	(Larabi, 2025; Sucena et al., 2025)
	Learning & Development	Formal and informal mechanisms that support continuous individual and organizational learning, including training programs, collaborative learning, and agile practices.	(Abraham, 2023; Adesina A. O. & Ocholla D. N., 2024; Handiwibowo et al., 2024; Sima et al., 2022)
	Interaction & Collaboration	Informal and formal human interactions (discussions, storytelling, mentoring, and face-to-face communication) that facilitate tacit knowledge transfer among startup members.	(Adesina A. O. & Ocholla D. N., 2024; Ingram & Drachen, 2020)

Process	**Transfer & Sharing Knowledge**	Processes and mechanisms through which knowledge is acquired, captured, created, shared, and integrated across individuals and teams within a startup to prevent knowledge loss.	(Adesina A. O. & Ocholla D. N., 2024; Anser et al., 2022; Khraim, 2024; Vale et al., 2020; Zeng et al., 2021)
	Documentation Process	Systematic processes for codifying, mapping, and documenting both explicit and tacit knowledge into structured formats to ensure organizational knowledge is retained and accessible.	(Abraham, 2021; Adesina A. O. & Ocholla D. N., 2024; Dehghani & Ramsin, 2024; Vale et al., 2020)
	Organizational Process & Strategy	Strategic and operational processes including business process management, resource allocation, data strategy, and planning that govern how knowledge is managed and retained in startups.	(Abraham, 2023; Achmad & Inrawan Wiratmadja, 2024; Alatawi, 2025)
	Organizational Capability	The organizational-level capacity to learn, adapt, and leverage knowledge management practices to build dynamic capabilities and sustain knowledge retention over time.	(Abraham, 2023; Achmad & Inrawan Wiratmadja, 2024; Achmad & Wiratmadja, 2025; Handiwibowo et al., 2024; Khraim, 2024)
	Performance & Improvement	Continuous improvement processes, decision-making frameworks, and performance management mechanisms that utilize retained knowledge to enhance startup operational effectiveness.	(Achmad & Wiratmadja, 2025; Alharthi, 2025; Dehghani & Ramsin, 2024; Handiwibowo et al., 2024)

Source: Authors' synthesis based on content analysis of selected studies (2026)

There are 3 domains and 15 subdomains identified. People domain consists of five subdomains namely Human Capital & Competencies, Leadership & Management, Organizational Culture & Behavior, Learning & Development, and Social Interaction & Collaboration. This domain relates to knowledge retention as individuals with high competencies, collaborative culture, and supportive leadership encourage knowledge sharing behaviour that sustains organizational knowledge. Process domain consists of five subdomains: Knowledge Transfer & Sharing, Documentation Process, Organizational Process & Strategy, Organizational Capability & Learning, and Performance & Improvement. These subdomains represent knowledge management activities in startups, where documentation and knowledge transfer processes reduce dependency on single key employees and maintain operational stability during staff turnover. Technology domain consists of four subdomains: Knowledge Repositories, Social & Collaboration Platforms, Data Analytics & Intelligence Technologies, and Cloud-Based Knowledge Management Systems (KMS). These technologies provide digital infrastructure for startups to store, organize, codify, and analyze organizational knowledge across distributed teams and employee transitions.

CONCLUSION

This study addresses the problem of knowledge loss in startups caused by employee turnover and the lack of structured knowledge retention practices. Through a systematic literature review, this study identifies that knowledge retention in startups is not solely dependent on storage mechanisms, but involves broader processes of knowledge creation, transfer, and utilization. The findings highlight four groups of technologies that support these processes, namely data analytics and intelligence technologies, cloud-based knowledge management systems, knowledge sharing and collaboration platforms, and knowledge repositories. In addition, this study synthesizes 14 subdomains across domain people, process, and technology that collectively shape a conceptual knowledge retention framework in startup contexts. These results emphasize that effective knowledge retention requires a socio-technical approach rather than relying on technology alone. This study contributes to the existing literature on Knowledge Management and startups by providing a review that focuses specifically on knowledge retention in startup environments, addressing the gap where most prior research has centered on large enterprises. Moreover, this study offers a conceptual foundation to support startups in developing knowledge retention strategies. This study has several limitations. First, the literature review was conducted within a limited time range and databases, which may restrict the comprehensiveness of the identified domains and subdomains. Second, this study did not include expert validation to evaluate the proposed framework. Third, the study remains at a conceptual level without empirical validation. Therefore, future research is recommended to conduct empirical studies, particularly in startup environments, to evaluate the practical implementation and effectiveness of knowledge retention frameworks. Additionally, incorporating expert validation, extending the time span (e.g., up to ten years), and including additional databases would further strengthen the reliability and comprehensiveness of the proposed framework.

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