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A Review Study on the Influence and Effect of Knowledge Management in Small and Medium Enterprises

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Abstract. Knowledge Management (KM) in Small and Medium Enterprises (SMEs) is a crucial aspect of enhancing competitiveness, innovation, and sustainability in these businesses. SMEs, often characterized by limited resources and tight budgets, can benefit significantly from effective KM practices. This article reviews innovation strategies and digital transformation (DT) of knowledge management in SMEs with artificial intelligence (AI) in Kerala. Initially, it explores the evolution of KM practices and models, highlighting the dimensions and classifications of KM processes, and shedding light on the barriers and tasks confronted by SMEs in implementing effective knowledge management systems. The review provides the position of KM in SMEs, especially in the background of technologically driven enterprises. This study explores how KM serves as a strategic necessity in the contemporary business environment, facilitating data-driven decision-making and enhancing competitiveness in SMEs. Various KM strategies are dissected to illustrate how they empower SMEs to harness their intellectual capital for growth. The paper investigates the integration of AI technologies that are revolutionizing KM in SMEs. It explores AI-powered collaboration tools that facilitate knowledge sharing (KS), AI-enabled chatbots that streamline information reclamation, and AI-enhanced search mechanisms that improve knowledge access. Additionally, Blockchain technology is examined for its potential to bolster knowledge discovery and empower decision-makers within SMEs. Digital transformation, a pivotal aspect of SMEs' growth, is closely examined in the setting of KM. The study delves into how KM strategies drive data-driven DT, support knowledge sharing in virtual teams, and foster customer-centric initiatives. Moreover, it highlights the significance of cybersecurity in safeguarding the knowledge that fuels DT efforts. A particular focus of this review is on the state of SMEs in Kerala, India, and their acceptance of open innovation (OI) strategies. It investigates cross-cultural aspects of SME KM in Kerala and explores open innovation platforms designed to enhance knowledge sharing within SME clusters. The review also unveils the open innovation approaches that facilitate knowledge transfer and absorption in Kerala's SMEs. In essence, this review paper delivers an inclusive and insightful overview of the current state of KM in SMEs, including the transformative impact of AI and the dangerous role of KM in driving digital transformation and open innovation strategies, particularly within the unique context of SMEs in Kerala, India.

Keywords: Blockchain Technology, Digital Transformation, Kerala, Artificial Intelligence, Knowledge Management, Open Innovation Strategies, Small and Medium Enterprises.

1. INTRODUCTION TO KNOWLEDGE MANAGEMENT(KM)

Organisations utilise KM a strategic discipline, to analytically store, generate, capture, organise, and disseminate knowledge assets to boost their competitiveness and spur innovation. To navigate the complex landscape of knowledge management effectively, various models and frameworks have been developed over time, each offering a structured approach to managing information in a group. Despite the extensive fiction on Knowledge Management (KM) in Lesser and Average Initiatives (SMEs), there remains a research gap regarding the specific application and impact of AI technologies, such as AI-powered collaboration tools, chatbots, and enhanced search mechanisms, in facilitating knowledge sharing and digital transformation (DT) within SMEs, mainly in the situation of Kerala, India. Though some reviews have explored KM strategies and innovation in SMEs, there is limited research that delves into the integration of AI technologies and their role in driving data-driven decision-making and open innovation (OI) initiatives in SMEs in Kerala. This study's unique contribution lies in its comprehensive examination of how AI technologies, including AI-powered collaboration tools, chatbots, and enhanced search mechanisms, are revolutionizing KM and facilitating DT in SMEs in Kerala, India. By exploring the specific challenges, opportunities, and outcomes associated with AI-enabled KM practices in the situation of SMEs, this research aims to fill the existing research gap and afford valued visions into leveraging AI for enhancing competitiveness, innovation, and sustainability in SMEs, especially within the unique socio-cultural and economic landscape of Kerala. One prominent knowledge management model is the SECI model, introduced by Takeuchi and Nonaka in the 1990s. The SECI model categorizes knowledge into two main types: explicit and tacit (Di Vaio *et al.* 2021). It emphasizes the dynamic conversion of knowledge between these forms through four sequential processes: Socialization (the process through which tacit information is transferred to tacit knowledge through common experiences), Externalization (changing tacit data into explicit knowledge (EK), often through articulation and documentation), Combination (combining explicit knowledge to create new explicit knowledge), and Internalization (transforming explicit knowledge into tacit knowledge through learning and practice). This model underlines the consequences of social engagement and knowledge sharing among employees to facilitate knowledge creation (KC) and dissemination within an organization (Zaim *et al.* 2020). Another influential knowledge management model is the Nonaka-Takeuchi Knowledge Spiral. This model builds on the SECI model and represents information-making as a continuous spiral, emphasizing the iterative nature of data management processes. It recognizes that organizations must continually cycle through the SECI processes to nurture creativity and adjust to varying environments effectively (Antunes *et al.*, 2020). The Nonaka-Takeuchi

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Knowledge Spiral underscores the notion that successful knowledge management requires not only the conversion of knowledge but also the ability to sustain and evolve it over time.

1.1. Evolution of Knowledge Management and its Practices

The evolution of knowledge management (KM) and its practices has been a dynamic journey driven by technological advancements, changing business landscapes, and a growing recognition of the critical role knowledge plays in organizational success. Initially, KM was primarily an informal and implicit process, with knowledge residing in the attentions of employees and passed down through word-of-mouth. As organizations expanded and globalization took hold, the need to formalize KM practices became evident (Abbas *et al*., 2020). In the 1990s, KM started gaining momentum as organizations began to understand the potential of codifying, storing, and sharing knowledge steadily. This led to the expansion of KM tools and technologies, such as intranets and databases, which enabled easier knowledge access and dissemination. As the internet and digital technologies continued to evolve, KM expanded beyond organizational boundaries, allowing for global collaboration and the sharing of expertise on a broader scale. Today, with the arrival of machine learning, artificial intelligence, and big data analytics, KM is undergoing yet another transformation, where organizations are harnessing advanced technologies to mine, analyse, and leverage vast amounts of data and evidence for developed decision-making, innovation, and competitiveness (Asada *et al* 2020).

Contemporary KM practices encompass an extensive variety of strategies and tools, including knowledge repositories, collaborative platforms, populations of practice, and expertise location systems. These practices are designed to facilitate knowledge creation, capture, dissemination, and application throughout an organization. Furthermore, KM has evolved to embrace a culture of continuous learning (CCL) and adaptability, reassuring workers to share their insights and experiences freely (Li *et al.* 2020). It also recognizes the moment of tacit knowledge, which is often embedded in individuals' experiences and expertise, and seeks to capture and transfer this valuable resource. Overall, the evolution of KM and its practices reflects the growing realization that in today's knowledge-driven economy, the effective management and utilization of organizational knowledge are essential for long-term competitiveness and sustainability.

1.2. Dimensions and Classification of Knowledge Management Process

Knowledge management (KM) processes encompass a series of activities aimed at routinely managing a company's intellectual property to increase performance and competitiveness. These processes can be considered in some dimensions, each playing a unique role in the overall KM framework. One common dimension is the process classification based on the landscape of knowledge. Here, KM processes are divided into obvious and implicit knowledge management. Explicit knowledge refers to formalized and codified information, such as documents, databases, and manuals Ghahtarani *et al. (2020).* Tacit knowledge, Consequently, is experiential and resides in personalities' attention. KM processes targeting explicit knowledge include document management, content creation, and data analytics, while those focusing on tacit knowledge involve activities like mentoring, knowledge sharing, and expertise profiling.

An additional important dimension for classifying KM processes is their position within the knowledge cycle. In this context, KM processes can be considered knowledge formation, knowledge detention, knowledge storage, knowledge distribution, and knowledge claim. Knowledge creation involves the growth of new insights and expertise, often through research, brainstorming, and innovation (Ganguly *et al*., 2020). Knowledge capture focuses on capturing knowledge from numerous bases, such as employees, customers, and external partners. Knowledge storage pertains to the organization's methods for storing and organizing knowledge, including databases, intranets, and repositories. Knowledge dissemination involves sharing knowledge across the organization, often through communication tools, training, and collaborative platforms (Ode*et al*., 2020). Finally, knowledge application refers to using knowledge to make knowledgeable results, explain difficulties, and drive innovation. By classifying KM processes along these dimensions, organizations can better tailor their KM strategies to their specific needs and goals, ultimately improving their ability to harness knowledge for competitive advantage and growth.

1.3. KM in Small and Medium Enterprises

Knowledge management (KM) holds significant potential for SMEs as it can help them effectively leverage their intellectual assets and adapt to the ever-altering business environment. SMEs often operate in highly competitive markets where innovation and efficient decision-making are critical for survival and growth. KM practices can empower SMEs to capture and leverage their employees' collective expertise, tacit knowledge, and external information resources (Singh *et al*., 2021). This can result in improved product and service quality, enhanced problem-solving capabilities, and better customer relationships. Moreover, KM can aid SMEs in reducing the risk of information harm due to employee turnover and in stimulating a culture of incessant learning and knowledge sharing, which is crucial for long-term success. For SMEs, successful KM implementation does not necessarily require large investments in technology or complex systems. Instead, it can be a gradual process that starts with simple practices such as documenting standard operating procedures, encouraging open

communication, and creating a centralized repository for important documents and information (Akbar *et al*., 2020). Collaborative platforms and social media can also play a valuable role in connecting employees and facilitating knowledge sharing within smaller teams. By adopting KM principles tailored to their specific needs and resources, SMEs can enhance their competitiveness, promote innovation, and create a more resilient business ecosystem that can adapt to tasks and chances in today's fast-paced business world.

1.4. Barriers and Challenges Faced by KM Knowledge Management

KM is undeniably valuable for organizations, but it comes with its fair share of barriers and challenges. One of the primary obstacles is the difficulty in capturing and codifying tacit knowledge – the knowledge residing in individuals' concentrations and experiences. This kind of information is often hard to solemnize and transfer, making it a challenge to create comprehensive knowledge repositories (Iivari *et al*., 2020). Additionally, resistance to knowledge sharing among employees can hinder KM efforts. People may be reluctant to share their expertise due to concerns about job security, competitive advantage, or a lack of incentives. Disabling these fences entails encouraging a society of faith and collaboration within the organization, along with effective incentives and recognition systems that encourage knowledge sharing (Morrison-Smith *et al*., 2020). Another contest in KM is the swift evolution of technology and information overload. The absolute capacity of data and material available today can overwhelm organizations, making it challenging to filter and identify valuable knowledge (Oliva *et al*., 2020). Furthermore, keeping KM systems up-to-date and relevant in the expression of constantly changing technology can be resource-intensive. Additionally, isolation and safety concerns related to the sharing and storage of sensitive knowledge can pose substantial barriers, particularly in industries with strict regulatory requirements. Overcoming these challenges necessitates a planned method for KM, incorporating progressive technologies like machine learning and artificial intelligence to help filter, organize, and secure knowledge. It also needs an obligation to ongoing training and development to ensure employees can effectively navigate the evolving KM landscape and maximize the benefits of their data properties.

2. NEED AND IMPORTANCE OF KM IN SMEs

SEM involves dealing with multifaceted and dynamic environmental challenges, including regulatory compliance, sustainability goals, and the essential to mitigate environmental risks. KM helps in organizing, synthesizing, and disseminating the knowledge necessary to understand these complexities. It enables SEM professionals to access up-to-date information, research findings, and best practices, which are essential for making informed decisions and designing effective environmental strategies (Arsawan *et al*., 2022). In SEM, decisions can have far-reaching consequences for the environment, public health, and an organization's reputation. KM facilitates data-driven decision-making by giving admittance to historical data, case studies, and expert knowledge. This, in turn, helps SEM professionals identify potential environmental impacts, assess risks, and choose the most environmentally responsible courses of action. Environmental regulations are continually evolving, becoming stricter, and more complex (Yao *et al*., 2020). SEM requires staying current with these regulations to avoid legal issues and financial penalties. KM implements and helps organizations track and interpret regulatory changes, ensuring compliance and minimizing legal and financial risks. KM encourages the distribution of lessons and best practices within an organization.

This knowledge-sharing fosters innovation in SEM strategies and processes. SEM professionals can learn from past successes and failures, leading to more effective approaches and continuous improvement in environmental performance. SEM often involves engaging with various stakeholders, including government agencies, communities, environmental groups, and industry partners. KM helps in managing and sharing knowledge about stakeholder expectations, concerns, and engagement strategies. This promotes transparency, collaboration, and effective communication, which are necessary for building positive relationships and addressing environmental issues collectively. Many organizations have sustainability as a core value or strategic goal (Games *et al*., 2020). KM supports the achievement of sustainability objectives by facilitating the tracking of key presentation indicators, sharing sustainability-related best practices, and ensuring that environmental knowledge is combined into the organization's overall strategy. KM is indispensable in SEM because it provides the tools and processes needed to manage the vast amount of knowledge and information required to address environmental challenges effectively. It empowers organizations to make learned resolutions, adapt to changing environmental conditions, engage stakeholders, innovate in their approaches, and work toward long-term sustainability and environmental responsibility.

2.1. Knowledge Management for High Technological SMEs

KM is a dangerous discipline for SMEs operating in high-technology sectors, as it empowers these businesses to harness their intellectual assets and stay competitive in rapidly evolving markets. However, high-tech SMEs often face unique challenges in knowledge management due to the fast pace of technological advancements, dynamic market conditions, and the requirement to continually adapt to emerging trends, making the effective management of knowledge resources a pressing concern. Hock (Doepgen *et al*., 2021) investigated how in modern years, the situation has transformed and that, rather than more cutting-edge digital expertise, which is also

affordable and simple to use, questioned SMEs make extra BMI is affected by external and internal KM competencies and how these belongings are affected by BMI's risk-taking tolerance. Through the custom of structural equation modelling (SEM) and fuzzy-set qualitative comparative analysis, the study experimentally analysed a sample of 197 SMEs. The SEM findings show that external KM capabilities boost BMI. Companies with a great tolerance for risk-benefit from this relationship. (Centobelli *et al.*, 2020) Introduced a 3D fuzzy sense technique to evaluate the usefulness and efficiency of KM schemes approved by SMEs and identified a categorization bringing together the behaviour of SMEs while adopting KMSs. The suggested methodology was first tested on a single SME before being applied to a model of SMEs. The conclusions show that there are many different behaviours according to the type of information and the KMSs being utilised. Castagna *et al.* 2020 examined how digital technologies assist SMEs working in the creative industries with their customer KM strategies. To do this, a survey including 73 handicraft and/or trade SMEs active in the luxury jewellery sector was conducted. The survey's findings revealed that, penetrating use of older technologies subsidiary consumer data management processes.

2.2. Strategic Necessity for SMEs in the Modern Business Landscape

In the quickly developing modern business landscape, SMEs face an ever-increasing need to adapt and strategize to remain competitive. This necessitates a thorough understanding of the strategic imperatives and challenges that SMEs encounter, as they play an energetic role in driving innovation, economic growth, and employment opportunities in today's global economy. (Rahman *et al.*, 2022) Presented an integrated framework by investigating the inspiration of strategic tools (i.e., firms' capacity for business agility, marketing operational efficiency, optimisation of innovation capability, managing employees' satisfaction, and rethinking customers' experience) on the survival strategies of SMEs in the appearance of the pandemic. In addition, this study used an asymmetrical technique (fuzzy sets qualitative comparative analysis, or fsQCA) to examine causal relationships and analyse the prerequisite circumstances to pinpoint the elements needed to produce the desired results. Results from fsQCA using the same data set demonstrate that OIC and company business agility are prerequisites for SMEs' existence approaches. The outcome of the fsQCA also suggests some requirements for the COVID-19 pandemic survival strategies of SMEs to be successful. Using a quantitative method, (Adebisi *et al.*, 2020) examined the survival tactics and sustainability of SME businesses in a turbulent organisational environment. 350 defendants from minor and medium-sized businesses in Nigeria, were given the data via a survey. The outcomes demonstrate that survival strategies in Nigeria are significantly and favourably related. To improve SMEs' digital transformation, (Fachrunnisa *et al.* 2020) looked at the importance of supply management and strategic adaptability. As ASEAN community representatives, 539 SMEs in Malaysia and Indonesia provided the data for this study, which was conducted expending Smart PLS 3. There were 519 valid surveys in total. Data testing results demonstrated that effective guidance is essential for implementing digital transformation. The advance of digitalization in small and medium enterprises(SMEs) is also influenced by strategic flexibility, which results from workforce alteration and dynamic capabilities.

2.3. Knowledge Management Strategies for Enhanced Decision-Making in SMEs

In today's swiftly growing business landscape, SMEs face increasing pressure to acclimate and flourish. The difficult lies in the statistic that SMEs frequently function with partial resources and may underrate the worth of efficiently handling their interior data assets. This oversight can delay their skill to create knowledgeable choices, return to arcade changes, and leverage their intellectual capital effectively. The goal of (Anand *et al.*, 2021) was to regularly synthesise the existing literature on knowledge sharing (KS) and knowledge transfer (KT) in the environment of SMEs and to contribute with forecasts of new issues. The analysis demonstrates the planned standing of KT and KS within the circumstance of SME. Particular conclusions consist of 1) KT and KS remain complicated in strengthening SMEs' strategic focus on human resources, including organisational learning, customer relations, innovation, higher profit, and good properties on operative procedures and decision-making. Knowledge management practises (KMP) relative to the OP and ABDA were explored by (Shabbir *et al.*, 2020). The outcomes showed that OP was significantly and favourably affected by the ABDA. The connection between OP and ABDA in SMEs was also largely mediated by KMP. Results highlight planned and concrete implications for senior management with organisational decision-making, particularly in emerging nations. Yogyakarta, Indonesia, one of the provinces with the most significant growth in the creative industries and tourism in Indonesia, is home to SMEs that were the subject of research (Helmy *et al.*, 2019). Purposive sampling was applied in the study's quantitative methodology. 500 staff members from 50 SMEs representing a variety of industries received questionnaires. Smart Fractional Least Squares essential equation displaying was employed to conduct the statistical analysis. According to the findings, spiritual authorization in its three forms capability (β=.05, $p<.01$), connotation (β=.09, $p<.05$), and self-purpose (β=.10, $p<.01$), was completely connected with innovative work behaviour. Further research revealed that information sharing only slightly mediated the association between meaning (β=.13, $p<.05$) and self-determination (β=.15, $p<.05$) to innovative work behaviour, but fully mediated the relationship for the power aspect (β=.07, $p<.01$).

3. INFLUENCE OF ARTIFICIAL INTELLIGENCE ON KNOWLEDGE MANAGEMENT IN SMES

Artificial Intelligence (AI) has emerged as a transformational power in the business world, offering novel opportunities and challenges for information managing practices. In the situation of SMEs, the influence of AI on information management is a subject of growing importance, as these businesses seek to harness AI's capabilities to optimize knowledge processes while navigating the unique constraints and opportunities inherent to their smaller scale and resources. The factors influencing the acceptance of block chain technology among SMEs with the usage of artificial intelligence (AI) were examined by (Polas *et al.*, 2022) through the arbitrating lens of risk-taking behaviour. This cross-sectional study used a stratified random sample. Through the usage of structural equation modelling, the combined impact of exterior and interior variables influencing the intention to use BT is investigated. The outcomes demonstrate that (1) understanding artificial intelligence has an optimistic and substantial influence on the acceptance of blockchain technology and (2) the applicable advantage of artificial intelligence has a confident and significant influence on the approval of blockchain knowledge. (Bencsik *et al.*, 2021) created a framework that, establishment with the business model and utilizing the interaction of KM and AI, summaries a method to forecast the achievement of upcoming inventions while safeguarding the strategy's viability over the benefit of the appropriate managerial decisions. The research's output is a model for anticipating successful innovation that, when used in the knowledge development stage of knowledge management with artificial intelligence support, offers the foundation for making the best managerial decisions to guarantee the accomplishment of strategic goals. The usage of AI according to (Wong *et al.*, 2022), allows supply chains (SCs) to energetically react to volatile settings and relieves potentially expensive decision-making for small-medium companies (SMEs).

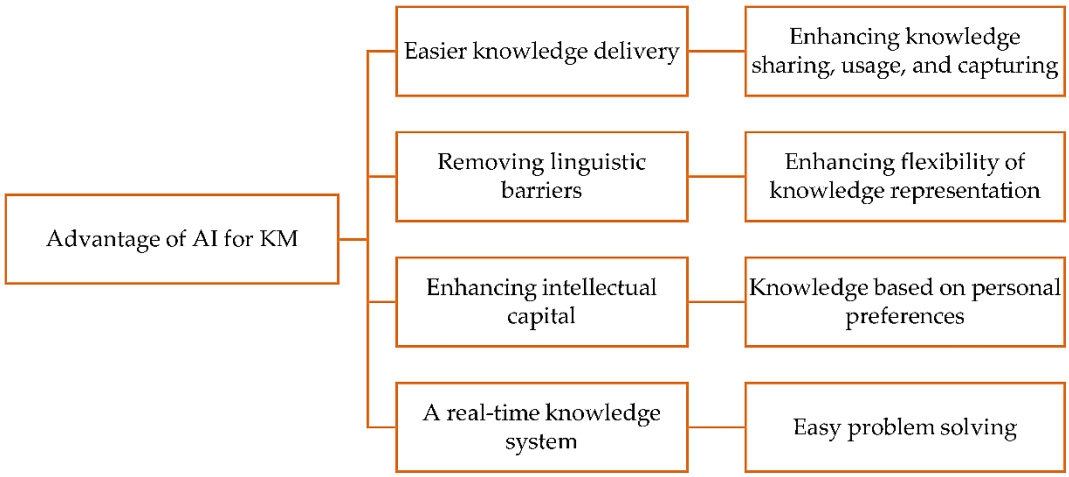

Figure 1: Significance of AI in Knowledge Management.

Figure 1 illustrates the status of Artificial intelligent in knowledge management in addition to some of its benefits. Based on information gathered from managers, executives, and senior managers of SMEs, a structural model was created and tested that included capabilities for AI risk management (RM), SC reengineering, and supply chain agility (SCA). The findings showed that the presentation of AI for risk management affects SC re-engineering agility and capability. Agility is additionally influenced and mediated by reengineering capabilities. The conclusions of the valuation among PLS-SEM and ANN showed model consistency.

3.1. Enhancing Knowledge Sharing with AI-Powered Collaboration Tools in SMEs

SMEs struggle to successfully harness and share knowledge among their staff in today's fast-paced business environment. To address this issue, integrating AI-powered collaboration tools into SME workflows presents a promising solution, offering the potential to streamline knowledge sharing, foster innovation, and improve whole efficiency. (Younis *et al.*, 2020) Looked into the connections between knowledge-sharing qualities (KSQ), creativity-oriented HRM (CHRM), and artificial intelligence strategies (AIS). Results obtained using the PLS-SEM methodology showed that AIS has a favourable and substantial effect on KSQ and CHRM. CHRM has a good and considerable impact on KSQ and IIWB. KSQ has a good and considerable impact on OEP and IIWB. However, the important positive indirect association via KSQ was maintained despite the substantial positive direct AIS-OEP relationship not being supported.

3.2. Role of AI-Enabled Chatbots in SME Knowledge Management

In the quickly developing landscape of SMEs, knowledge management is paramount for preserving attractiveness and fostering growth. The emergence of AI-enabled chatbots presents a capable resolution to address the contests related to efficiently harnessing and disseminating knowledge within SMEs. However, their implementation and integration raise important questions and anxieties that are essential to be explored to

maximize their potential in SME knowledge management. Wei *et al* 2022 study looked into how SMEs may use AI platforms to incorporate AI technologies. The findings go into more detail about the confounding variables that relate to these interactions, such as knowledge (operational, functional, and technological knowledge), organisational procedures, and accessibility to external data. To examine the underlying phenomena, Kumar *et al*., 2023 used a mixed-method approach. This study looked at how medical service in India acquired AI-enabled CRM skills and improved service innovation using dynamic capability theory, resource-based theory, and the model of production paradox. By employing a case study, we were able to identify the different aspects of AI-allowed CRM abilities and create a framework for service innovation and AI-enabled CRM capability. To close the knowledge gap and guide creative recital in healthcare, which is a crucial requirement to persist in an unpredictable environment, this paper describes the construction of AI-enabled CRM skills. The difficulties faced by SMEs, according to Selamat *et al*., 2021, explain why there is a gap in their implementation of chatbots. This review determines to recognize the appearances of SMEs and their clients that chatbot features and components should fit with. According to the findings, the featured chatbot prototype has a higher anthropomorphism, reported enjoyment, and perceived utility than the typical chatbot. Additionally, we discover that customers' intentions to use the chatbot and shop are both positively influenced by their perceptions of the chatbot's fun and usefulness. Anthropomorphism, however, merely influences SMEs' customers' intention to shop.

3.3. AI-Enhanced Search and Retrieval for Improving SME Knowledge Access

Effective information management is essential for SMEs to remain competitive and adaptable in the fast-paced business environment of today. One emerging solution to enhance SME information management is the integration of AI-enabled chatbots and advanced search and repossession systems, which offer the potential to streamline knowledge access, improve efficiency, and facilitate informed decision-making within these smaller organizations. However, SMEs often face challenges related to limited resources, including time and personnel, when it comes to managing their knowledge effectively (Descour *et al*., 2021). Implementing AI-enhanced chatbots and search systems can help overcome these limitations, but it also raises concerns regarding the integration process, user adoption, and data security. These challenges need to be carefully addressed to join the full probable of AI-driven knowledge management solutions in the small and medium companies sector. Using artificial intelligence (AI), Behrooz *et al*. (2023) suggested a computerized system to find prospective sustainability projects for funding services. The suggested approach searches the Internet using text mining tools and wed crawlers, such as Natural Language Processing, analyses text data, quantifies the evaluation of the information, and identifies possible sustainability initiatives for funding services. The outcomes of this work will assist financial professionals and decision-makers in making effective use of the data readily obtainable on the Internet to enhance the current approaches for identifying suitable projects for supporting services.

4. KNOWLEDGE MANAGEMENT FOR DIGITAL TRANSFORMATION IN SMES

In the rapidly evolving digital landscape, SMEs face a pressing need for effective knowledge management to navigate the trials and occasions brought about by digital transformation. This transformation is considered by the addition of numerical skills into all aspects of business operations, and the ability to manage knowledge efficiently is fundamental to SMEs' ability to join the full impending of this paradigm shift. Crupi *et al*. 2020 study sought to explore the European digital innovation hubs (DIHs), which serve as knowledge brokers (KBs) and can encourage open innovation (OI) practises to assist SMEs with their digital transformation. The results display that Italian DIHs function not only as knowledge bases (KBs) apart from a information bases that create a numerical printing method that might influence the SMEs of DX. Complete the value of the economic benefit as an intermediary, (Wijaya *et al*., 2020) examined the effect of information organization on the act of silver skills SMEs. Quantitative methodologies with SEM-PLS analysis techniques are used in this study. The study's sample included 146 silver skills SMEs, representing the population of silver skills SMEs in Indonesia. According to this study, knowledge management does not directly have a major impact on business performance, but it does have a favourable and significant impact on the commercial act of silver craft SMEs through competitive advantage. To assess and facilitate the selection of entrepreneurial SMEs' digital transformation solutions, Yang *et al*., 2021 presented a new information error-driven T-sphere called the fuzzy cloud method. The results establish that the suggested T-SFC may incorporate three forms of heterogeneous opinions namely, support, renunciation, and opposition into a context for investigation, representing these perspectives in the skilled assessment and making it informal to participate in data from several heterogeneous evaluations.

4.1. Knowledge Management Strategies for Data-Driven Digitalization in SMEs

SMEs are increasingly realising the need for data-driven digital transformation in today's quickly changing digital ecosystem to remain competitive and relevant. To embark on this transformative journey, SMEs must implement effective Knowledge Management Strategies that enable them to attach the power of data, unlocking valuable insights and innovation potential. However, these organizations frequently face exclusive experiments and obstacles in developing and executing such strategies, necessitating a closer examination of the issues at hand (Wang *et al*., 2023). The problem lies in the fact that many SMEs lack the resources, expertise, and structured

approaches needed to effectively manage and utilize the vast amount of data at their disposal for meaningful digital transformation. (Verma *et al.*, 2021) aims to propose that BD can improve HR functions, especially of SMEs, thereby yielding them a competitive edge. This study analyzed unstructured data from 41 journal papers, based on which, a conceptual framework was developed. Furthermore, 148 SMEs in India provided replies that helped this framework be validated. Improved BD value is required to improve HR practises, Human Resource Service Quality and the innovative capability of SMEs, according to bibliometric study and the outcomes of fractional minimum squares approaches.

4.2. Knowledge Sharing in Virtual Teams for Enabling Digitalization in SMEs

During the period of digitalization, SMEs are increasingly turning to virtual teams to drive innovation, efficiency, and global competitiveness. However, a critical challenge they face is the effective sharing of knowledge within these virtual teams, as geographical dispersion and digital communication barriers often hinder the seamless exchange of vital information and expertise, which are essential for harnessing the complete probability of digitalization creativities. (Azevedo *et al.* (2021) provided the structure and content of this training programme that was specially tailored to the needs of decision-makers in SMEs. The outcome reveals that since the course's online introduction, more than 770 participants have enrolled. The potential that the project offered is highlighted by the high level of participation. The participants, who are SMEs, represent more than 500 businesses from various industries. (Li *et al.*, 2021) created and conceptualised information technologies/systems (IT/IS) positive competence and socialization-codification knowledge process that generates a business conversion procedure in the digital-based era. The data show one outcome of the mediation role that is fully supported by proactive IT/IS capacity. Greater company support for the enterprise IT/IS strategy, strong potential for codifying knowledge practises to enhance digital conducts to transmute the enterprise business process. (Chan *et al.*, 2019) examined how IT and knowledge co-evolve in the background of MSEs, manipulating a firm's suppleness. An eight-firm multiple case study was utilised to investigate connections between industries by applying the source-created sight of the firm and dynamic capabilities. The definitions show that an MSE's commercial scheme shapes its IT and data approaches and is likewise formed by those strategies; additionally, the outcomes display that the firm's agility is shaped by both IT and data abilities and is coevolving with them. By emphasising the significant precursors of small business agility and outlining essential connections between agility.

4.3. Cybersecurity and Knowledge Protection: Safeguarding digitalization in SMEs

In today's digitally-driven business landscape, SMEs are increasingly embracing digital transformation to remain competitive and efficient. However, this fast shift towards digitalization brings forth a critical challenge - the need to ensure robust cybersecurity and knowledge protection measures. As SMEs add numerical skills to their procedures, they become more susceptible to cyber threats and data breaches. Balancing the advantages of digital transformation with the imperative to safeguard sensitive information and knowledge assets presents a difficult problem that requires innovative solutions to protect SMEs from cyber risks while enabling their growth and adaptability in the numerical period. (Rupeika-Apoga *et al.*, 2022) Examine how digital capacity and orientation affect digital transformation along with how it mediates the influence of digitalization on SMEs and revenue models throughout the pandemic. The results display that both digital competence business and digital orientation have immediate favourable properties on digitalization. Additionally, we discovered that digitalization has a favourable mediating influence on income and trade models from both digital capacity and digital orientation. The result of numerical technique on the business practises of developed SMEs in the Apulia Region of South Italy was examined by (Garzoni *et al.*, 2020). The article examines Industry 4.0 enablers in a regional context characterised by delays in investigation and growth and innovation performances where the companies' competitiveness is based on limited knowledge and technological resources because SMEs play an acute part in the method value creation of industries and nations.

Figure 2: Digital Transformation Model.

The digital transformation model for SMEs is displayed in Figure 2. The digitalization of network administrations has created a need to fundamentally alter and improve the productivity of current organisations. The findings outline a four-level strategy for SMEs' use of numerical equipment, including digital understanding, digital necessities, digital partnership, and digital transformation. (Li *et al.*, 2023) investigation on the inner workings of the industrial internet platforms' (IIP) support for SMEs' digital transformation showed their inner workings. The outcome demonstrates that information management (driving, sharing, and knowledge integration) plays a significant intermediate role between the authorization of business internet stages and the digitalization of SMEs.

5. STUDY ON OPEN INNOVATION STRATEGIES AND KNOWLEDGE MANAGEMENT OF SMES IN KERALA

Open innovation strategies and knowledge management are two critical components that influence the development and continuity of SMEs. In the background of Kerala, a region known for its vibrant entrepreneurial ecosystem, studying how SMEs employ these strategies to harness knowledge for innovation and competitiveness becomes particularly relevant and timely. (Saratchandra *et al.*, 2020) observed how SMEs' emphasis on knowledge exploitation inhibits innovation, a problem that cloud computing can solve by generating numerous ambidextrous knowledge opportunities. This research represents the pioneering effort to measure the consequences of a time delay in the K-AMB practices, which contribute to enhancing employee-driven innovation within the domains of cloud computation and knowledge versatility. The findings drastically alter perceptions of cloud computing's revelatory value in promoting K-AMB in SMEs. According to (Chakraborty *et al.*, 2023) knowledge-sharing platforms facilitate academic-industry collaboration by fostering the sharing of ideas, experience, opinions, and expertise, which boosts collective intelligence in a collaborative learning ecosystem and speeds up decision-making. The study's findings show that, while evaluating suppliers, the manufacturer gave financial transparency by companies a high priority, followed by suppliers' cost management, quality control, and manufacturing skills. (Ferreira *et al.*, 2022) Demonstrate how KM supports human resource development by ongoing analysis of the empirical literature from the past 20 years (2000 to 2019). The outcomes display that six KM procedures have varying degrees of influence on seven HRD parameters. The main benefits of KM are to personal and occupational HRD. The two most important KM procedures in this affection are knowledge production and knowledge exchange.

5.1. Cross-Cultural SME Knowledge Management in Kerala

Cross-cultural knowledge management is a critical concern for SMEs operating in Kerala, a state in India known for its rich cultural diversity. The unique blend of cultures, languages, and business practices in Kerala presents SMEs with the challenge of effectively managing knowledge across diverse teams and fostering collaboration amidst cultural differences, which is vital for their growth and success in an increasingly globalized world. (Dhanabhakyam *et al.*, 2021) Studied the degree of cultural intelligence among 150 employees of particular IT companies in Kerala. According to the survey's findings, employees' levels of cultural intelligence are almost average, and this has a big impact on how engaged they are at work. The study's conclusions highlight the

necessity of fostering cultural intelligence in workplaces with a diverse range of cultures. Through a survey, (Dinesh *et al.*, 2021) studied the traders' propensity to sell their coir goods online. The technology acceptance model (TAM) served as the study's model, and SEM was used to examine the data. According to the report, traders are willing to switch to online selling if they believe it to be more advantageous than traditional selling. This would enable them to develop cutting-edge strategies for online product sales and revive a sagging sector. Paul *et al.*'s 2022 study looked at how caretakers of people with probable dementia manage difficulties and the psychological and financial effects that caregiving has on them. The design was mixed-method. The Addenbrooke's Cognitive Examination Malayalam Version (ACE-m) was used to identify those who likely had dementia in a standard review of 123 senior citizens in a resource-limited located in Kerala, India. The results specify that the effect of care on the mind and wallet was mitigated by the support systems. While this arises at the expense of older persons with cognitive impairment having less-than-optimal access to healthcare, misrepresenting the disease's nature for instance, by thinking it a usual portion of old also appears to have unintentionally assisted in handling with care.

5.2. Open Innovation Platforms for Knowledge Sharing in Kerala's SME Clusters

The growth of these SMEs is highly dependent on the knowledge and experience shared and exchanged among them. Knowledge sharing in Kerala's SME clusters provides a much-needed boost to the progress of these enterprises. It also helps in the progress of new innovative solutions and strategies to address the ever-changing market needs. Knowledge-sharing among SMEs in Kerala helps them to revenue benefit from the collective experiences, resources, and technologies of the cluster. The exchange of knowledge and ideas helps the SMEs to understand the latest trends and technologies in their sector. This helps them to keep up with the varying market circumstances and develop better strategies for their growth. The distribution of knowledge also helps the SMEs to improve their production processes and improve the value of products. However, this has been a main task in the state, several reasons contribute to the absence of knowledge sharing among SMEs in Kerala. Firstly, the geographical spread of the state makes it difficult for businesses to gain access to information. This is primarily due to the deficiency of infrastructure and connectivity in many rural parts of the state. (Anjaly *et al.*, 2022) Hypothesised the effects of export promotion on Kerala's SMES merchandise export performance. Because of this, regulars around the world are demanding higher-quality goods and services as the global market becomes more competitive. In the General Engineering Cluster in the Malappuram district, (Sreekala *et al.*, 2022) discussed the idea of an industrial cluster and also examined how unit owners perceived the advantages of industrial clustering. These findings demonstrate that unions are further expected to examine the success of investments through channels that are a part of collective bargaining procedures.

5.3. Open Innovation Approach for Knowledge Transfer and Absorption in Kerala's SMEs

The open innovation approach encourages SMEs to actively seek out and compete with investors from both the private and public sectors. This could include networking with potential partners, leveraging research and development activities, and collaborating with universities and research institutions. By doing this, SMEs can access a range of data and skills that can benefit them in developing services and new products and improving their existing offerings. Additionally, open innovation can assist SMEs in gaining access to new markets, besides building relationships with potential customers. This could include encouraging employees to come up with creative solutions to problems and to think critically about their work. It could also include introducing new skills and processes to improve the effectiveness and efficiency of their operations. (Ibrahim *et al.*, 2023) Proposed that the function of process and product revolution as an arbitrator among financing and SME performance. The results suggest the firm's choice regarding innovation by emphasizing the influence of invention origination on the achievement of SMEs. (Azuma *et al.*, 2023) presented for the Strategic Management on Competitive Advantage. This review is an outcome of the stretched investigation on competition and provides a device to quantity the secure ability to be competitive in MSMEs. Table 1 illustrates the art of survey related to information management in SMEs.

Table 1: Art of Survey Based on Data Management in SME.

References	Objective	Case Area	Performance	Limitation	Suggestion
Bogdan Wierzbiński *et al.*, 2023	Investigate the person of knowledge management orientation in SMEs' competitive position, with mediation by customer orientation and international network participation.	SMEs in the aviation industry (South-eastern Poland)	KMO is the strongest determinant of competitive position. Customer orientation and international network involvement mediate the effect.	The study found differences in larger vs. smaller firms in the link between network benefits and competitive position.	Focus on strengthening KM orientation and cooperation with the supply chain for business advantages.
Fatma Lehyani *et al.*, 2023	Examine the impacts of knowledge management in conjunction with comprehensive quality management.	Tunisian SMEs	Positive impact on staff effectiveness and productivity.	Limited to SMEs in Tunisia, may not be generalizable.	More investigation is required to explore resources and training for effective knowledge management in different-sized municipalities.
Andrea Cajková *et al.*, 2021	Analyze the perception, application, and barriers of knowledge management	Municipalities in Slovakia	Systematic knowledge management is weak in self-governments. Lack of importance on knowledge sharing.	Need for education and training in innovative tools of self-government.	Strengthen education and training for knowledge management in self-governments.
Dr. M. Dhanabhakyam *et al.*, 2023	Study the role of E-learning portals in talent and knowledge management among students.	College students	Positive impact on knowledge development, satisfaction, and learning outcomes.	Lack of feedback collection from students about session quality.	Gather feedback from students, improve information transfer, and ensure timely assignments with creativity.
Pijar Puan Bakaritantri, *et al.*, 2021	Study the role of improvement in influencing MSMEs' performance.	MSMEs in Semarang City	Knowledge management positively influences business performance directly and indirectly through innovation.	Optimization of information management procedures is recommended.	Encourage knowledge sharing among workers to create new knowledge for future needs.
M. Fadhli Nursal *et al.*, 2022	Explore the interceding role of innovation connecting market alignment, and commercial alignment.	Culinary SMEs in North Bekasi	Innovation intercedes the association between market alignment, commercial alignment, and knowledge management with performance.	Organizational learning does not affect performance mediated by innovation.	Consider additional variables like social media or technology orientation in future research.
Saputri *et al.*, 2023	Investigate the employment of data management for MSMEs in Bandung.	MSMEs in Bandung	Many MSMEs in Bandung are in a low-competitiveness cluster.	Implementation of data management in MSMEs is challenging due to limited resources.	MSMEs should focus on implementing knowledge management personalized to their exact conditions and needs.
Narayanan *et al.*, 2023	Classify and authorize the experiences and results of the KMP in Malaysian SMEs.	Malaysian SMEs	Internal partnership and IT support significantly influence KMP. The association between KMP and organisational performance is mediated by innovation pace.	Potential common method variance due to single respondent surveys. Cross-sectional nature of the study. Suggest longitudinal studies for long-term understanding of KMP. Consider qualitative and quantitative approaches in future research.	Future exploration must consider longitudinal studies and triangulation of grade and measurable approaches to enhance understanding of KMP, innovation speed, and organizational performance.

6. COMPARATIVE ANALYSIS OF DATA MANAGEMENT IN SME

Comparative analysis of Data management in SMEs is important to comprehend how these businesses harness and leverage knowledge to increase their performance and competitiveness. SMEs often rely on innovation and creativity to compete, and KM plays a dynamic role in fostering these aspects. Large organizations may need to put more effort into encouraging innovation within their established structures. The following comparisons represent the analyzed results from Data management from various SME models.

6.1. Reliability and Validity Comparative Analysis

Validity and reliability are both concerned with the rate of a measurement method. Reliability pertains to the constancy of a measurement, specifically whether the consequences may be replicated under similar conditions. Additionally, validity deals with the correctness of a measurement determining whether the outcomes truly signify the intended concept or characteristic.

Table 2: Comparative analysis of reliability test results.

References	Construct	CR	AVE	Item	Loading
Abbas, *et al.* 2020	KM	0.84	0.66	KM1	0.88
		-	-	KM2	0.86
		-	-	KM3	0.77
		-	-	KM4	0.68
		-	-	KM5	0.82
	OI	0.88	0.74	OI1	0.90
		-	-	OI2	0.76
		-	-	OI3	0.84
	OL	0.92	0.58	OL1	0.92
		-	-	OL2	0.84
		-	-	OL3	0.82
		-	-	OL4	0.78
Müller, *et al.* 2021	Absorptive Capacity (AC)	0.853	0.526	AC1	0.725
		-	-	AC2	0.785
		-	-	AC3	0.770
		-	-	AC4	0.688
		-	-	AC5	0.572
		-	-	AC6	0.634
	Innovation Strategy (IS)	0.871	0.533	IS1	0.798
		-	-	IS2	0.574
		-	-	IS3	0.749
		-	-	IS4	0.796
		-	-	IS5	0.676
		-	-	IS6	0.742
	Business Model Design (BM)	0.893	0.512	BM1	0.692
		-	-	BM2	0.760
		-	-	BM3	0.757
		-	-	BM4	0.711
		-	-	BM5	0.654
		-	-	BM6	0.619
		-	-	BM7	0.726
		-	-	BM8	0.727
		-	-	BM11	0.664

The reliability test results for the different works are compared with the existing works from (Abbas, *et al.*, 2020) and Müller, *et al.*, 2021 are presented in Table 2. The KM constructed in (Abbas, *et al.*, 2020), the composite reliability (CR) is 0.84, and the average variance extracted (AVE) is 0.66. This suggests that the measurement items related to Knowledge Management in this study are reasonably reliable and valid. Additionally, the item loadings (e.g., KM1, KM2, and KM3) provide information about the strength of the relationship between each item and the Knowledge Management construct. Similarly, (Müller, *et al.*, 2021) provided information for other constructs in absorptive capacity, innovation strategy, business model design, allowing researchers and to assess the quality of the measurement instruments used in these studies and the reliability and validity of the constructs they represent. These measurements are essential for ensuring the robustness and credibility of research findings in various fields, including business studies.

6.2. Correlation Analysis

Correlation analysis serves as a statistical tool for gauging the degree of association among numerous variables. In essence, this analytical approach uncovers underlying patterns among the various data points within a dataset. In practical terms, it helps detect these data patterns. When a positive correlation is identified, it signifies that both variables tend to rise simultaneously, while a negative correlation indicates that when one variable declines, the other tends to rise.

Table 3: Comparative Analysis of Reliability Test Results.

Abbas, *et al.*, 2020								
Construct	**KM**		**OI**	**OL**		**RA**		**RE**
KM	0.82							
OI	0.52		0.78					
OL	0.66		0.46	0.76				
Age	-0.12		-0.02	-0.24		1		
Education	0.12		0.14	0.19		0.01		1
Ahmad, *et al*., 2019								
		AIS			Knowledge Management		Organization Performance	
AIS		1						
Knowledge Management		0.918**			1			
Organization Performance		0.861**			0.985**		1	
Cardoni, *et al*., 2020								
	ROI	ET	EX	DIA	INT	DIA*ET	INT*EX	Sales
ROI	1							
ET	0.22	1						
EX	0.34	0.34	1					
DIA	0.07	0.23	0.36	1				
INT	0.15	0.22	0.33	0.77	1			
DIA*ET	0.39	0.19	-0.01	0.04	0.07	1		
INT*EX	0.60	0.07	0.08	-0.11	-0.03	0.32	1	
Sales	0.02	-0.07	0.11	-0.02	0.00	-0.11	-0.03	1

Table 3 provides reliability test results between different variables or constructs in various research studies. It contains a correlation coefficient that quantifies the strength and direction of the relationship between two variables. Abbas, *et al*., 2020 display correlations between five constructs: KM (Knowledge Management), OI (Organizational Innovation), OL (Organizational Learning), RA (Resource Availability), and RE (Resource Efficiency). The correlation coefficient provided for the correlation between KM and OI is 0.52, indicating a positive relationship between KM and OI. A higher positive value suggests a stronger relationship. However, Ahmad, *et al*., 2019 represent correlations between three constructs: AIS, knowledge management, and organization performance. The correlation coefficient values are provided for pairs of constructs. The correlation between AIS and Knowledge Management is marked as 0.918**. In Cardoni, *et al*., 2020, this table illustrates correlations between various constructs, including ROI (Return on Investment), ET (Employee Training), EX (Employee Experience), DIA (Digital Innovation Adoption), INT (Internal Processes), and Sales. The values in this result represent the correlation coefficients. The correlation between ROI and ET is 0.22, indicating a positive relationship, albeit a relatively weak one. There are some negative correlations as well, such as the correlation between DIA*ET and Sales, which is -0.11.

6.3. Regression Analysis Comparative Results

Regression analysis constructs an equation that models the statistical association between one or extra analysts also the result variable. In statistical terms, a regression model is considered a good fit when it accurately predicts the data, meaning that the disparities between the actual observations and the anticipated values are both minimal and devoid of systematic overestimation or underestimation throughout the range of observations. In other words, unbiased signifies that the model's predictions are not consistently skewed in either a high or low direction across the entire dataset.

Table 4: Regression Test Results.

References	**Independent variables**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
	AIS	0.397*	0.471**	0.164	-
	Knowledge Management	-	-	0.480**	-
	Organization Performance	-	-	-	-
Ahmad, *et al* 2019	Adjusted R square	0.357*	0.408**	0.519***	-
	ET	0.2272***		0.1553*	-
	EX	-	0.3444***	-	0.2638***
	DIA	-	-	0.0192	-
Cardoni, *et al* 2020	INT	-	-	-	0.0855
	DIA*ET	-	-	0.3653	-
	INT*EX	-	-	-	0.5849

Table 4 reveals the regression test analysis results, which are compared with the existing research from Ahmad, *et al*. 2019 and Cardoni, *et al*. 2020. The coefficients or parameter estimates obtained from the regression models. These coefficients indicate the strength and direction of the relationship between the independent variables and the dependent variable. In model 1, for example, the coefficient for AIS is 0.397*, which suggests a positive relationship with the dependent variable. In Cardoni, *et al*. 2020, a similar structure to the first one but with different independent variables (ET, EX, DIA, INT) and interaction terms (DIA*ET, INT*EX) are

presented. Coefficients are provided for different models, indicating the relationships between these independent variables and the dependent variable(s). These regression analysis results help researchers and readers understand the relationships between various independent variables and the dependent variable(s) under different models or conditions.

7. RESEARCH PROBLEM DEFINITION AND MOTIVATION

The difficult of knowledge management (KM) in SMEs centres on the efficient acquisition, storage, dissemination, and application of critical organizational knowledge within resource-constrained environments. SMEs often struggle to harness their internal expertise and intellectual capital due to partial economic properties, inadequate technological infrastructure, and an absence of well-defined KM strategies. Consequently, these enterprises face challenges in leveraging their knowledge assets to improve decision-making, foster innovation, enhance competitiveness, and ensure long-term sustainability. Addressing this problem involves designing cost-effective KM solutions tailored to the exact requirements and constraints of SMEs to unlock their hidden potential for growth and competitiveness in a knowledge-driven economy. Effective KM in SMEs isn't impartial a substance of improving internal processes; it's about unlocking the immense potential that lies within these dynamic organizations. When SMEs harness their collective knowledge, they increase their economy, allowing them to originate, adapt to varying market situations, and thrive in today's knowledge-driven economy. By addressing the challenges of SMEs in KM, the study paves the method for increased efficiency, informed decision-making, reduced redundancy, and accelerated growth. Furthermore, this endeavour is not only about immediate gains but also about securing the long-term viability and resilience of these enterprises. It's an opportunity to empower SMEs to become knowledge-centric entities that can successfully navigate the issues of the recent trade landscape while creating a lasting impact on their industries and communities.

7.1. Opportunities and Challenges of Integrating AI into SME Knowledge Management

Integrating Artificial Intelligence (AI) into SME knowledge management presents a set of formidable challenges. Firstly, limited financial resources often restrict SMEs' ability to advance in AI technologies and expertise. Secondly, the lack of data infrastructure and quality data can hinder the training and effectiveness of AI systems. Additionally, SMEs may face resistance to change and require significant cultural shifts to embrace AI-driven KM practices. Moreover, the difficulty of AI implementation, including issues related to customization and system integration, can be intimidating for resource-constrained SMEs. Finally, ensuring the ethical and accountable use of AI, including personal data and secure concerns, remains a critical challenge. Disabling these experiments loads a thoughtful and strategic approach, tailored to the exclusive needs and constraints of SMEs, to harness the transformative potential of AI for effective KM. AI can automate tedious knowledge capture and organization tasks, saving valuable time and resources. It enables SMEs to excerpt significant visions from infinite sums of data, facilitating data-driven decision-making. AI-powered recommendation systems can enhance knowledge sharing among employees, promoting collaboration and innovation. Additionally, AI can support SMEs in recognizing developing tendencies, competitive intelligence, and market opportunities more effectively. Moreover, cost-effective cloud-based AI solutions make advanced KM tools accessible to SMEs, levelling the playing field and permitting them to enter with larger counterparts. Overall, integrating AI into KM empowers SMEs to become more agile, competitive, and responsive in a quickly developing commercial landscape.

7.2. Interoperability Challenges in Integrating Blockchain into SME Knowledge Management

Blockchain technology in SME systems presents a complex set of interoperability challenges. One significant issue is the integration of existing KM systems with Blockchain, often requiring a seamless flow of data and material between traditional databases and decentralized ledgers. Achieving this compatibility necessitates not only technical adjustments but also consensus among stakeholders on data standards and protocols. Additionally, the scalability of Blockchain solutions can be a concern for SMEs, as the technology's inherent characteristics can result in slower transaction speeds and higher costs as more data is stored on the chain. Balancing the advantages of immutability and security offered by Blockchain with the need for efficient and scalable KM systems is a key challenge in this integration process. Addressing these interoperability challenges is essential to harness the possible assistances of Blockchain in SME Knowledge Management effectively. Open Innovation, although promising for SMEs in Kerala, faces several significant barriers. Firstly, a lack of awareness and understanding of the theory of Open Innovation among SMEs hinders its adoption. Many SMEs in the region remain traditionally oriented and are yet to fully embrace collaborative practices. Second, resource constraints, both finances and skilled personnel, can be a major hurdle for SMEs when engaging in Open Innovation initiatives. Additionally, a risk-averse culture prevalent in the sector often discourages SMEs from seeking external partnerships or sharing their intellectual property. Moreover, the absence of dedicated platforms or intermediaries that can facilitate connections and collaborations between SMEs and potential innovation partners further exacerbates these challenges. Disabling these obstructions will require a concerted effort involving education, capacity building, and the growth of supportive ecosystems to foster Open Innovation practices among SMEs in Kerala. However, ensuring compliance with evolving regulatory frameworks in different industries while utilizing Blockchain for

KM necessitates cautious reflection and adaptability.

The open innovation in Kerala's SME sector is bolstered by several key enablers. Firstly, the region's robust education system and skilled workforce provide a fertile ground for knowledge exchange and collaboration. The presence of research institutions and universities acts as knowledge hubs, developing a belief in invention. Secondly, the government's support through policies, incentives, and initiatives that promote innovation and entrepreneurship plays an essential role. Access to funding and venture capital, facilitated by government-backed schemes, encourages SMEs to engage in open innovation activities. Furthermore, Kerala's vibrant start-up ecosystem and incubation centres act as catalysts for SMEs to connect with innovative startups and leverage their expertise. Finally, digital infrastructure and connectivity are crucial enablers, enabling SMEs to participate in open innovation networks, both locally and globally. These factors collectively create an ecosystem in Kerala's SME sector that is conducive to open innovation and positions it for sustained growth and competitiveness.

8. CURRENT TRENDS AND DEVELOPMENTS IN KNOWLEDGE MANAGEMENT IN SEM

SEM continues to be highly data-driven. KM in SEM involves collecting, organizing, and investigating huge quantities of information to make educated choices. The use of advanced analytics tools and artificial intelligence for data analysis is likely to have advanced further. AI and robotics algorithms are being increasingly used to optimize SEM campaigns. Knowledge management in SEM may include the expansion of AI-driven systems for keyword selection, bid management, and ad creation. The content shows a dynamic part in SEM. Managing knowledge about what type of content works best for different audiences and how to enhance it for search engines is an ongoing challenge. Content management systems (CMS) and content strategy are integral to this aspect of KM. Another significant development is the incorporation of AI and robotics into KM processes, enhancing knowledge discovery, extraction, and personalization. SMEs have also seen a growing emphasis on personal data and protection, leading to the progress of more robust KM systems that prioritize protecting sensitive information. Moreover, there's a notable shift towards a more general method to KM, where organizations recognize the value of implicit data and social learning in addition to explicit knowledge, encouraging a nation of constant development and invention. Overall, these trends and developments reflect the region's commitment to staying at the pole position of KM practices to enhance competitiveness and adjust to the changing global business landscape.

9. CONTRIBUTION OF THE RESEARCH METHODOLOGY

SMEs can establish knowledge-sharing networks with other SMEs, industry associations, research institutions, and larger companies. These networks can facilitate the exchange of ideas, best practices, and resources, contributing to the growth of the entire ecosystem. By leveraging digital platforms and open innovation strategies, SMEs can hit into innovation ecosystems that include startups, research institutions, and larger corporations. This exposure to diverse knowledge sources can fuel creativity and accelerate innovation efforts. Digital transformation enables SMEs to gather customer data, feedback, and preferences more effectively. Open innovation strategies can include consumers directly in the revolution progression, leading to the growth of goods and facilities that align closely with customer needs. Digital tools can enhance the agility of SMEs by enabling remote work, flexible project management, and swift prototyping. Open innovation strategies allow SMEs to rapidly familiarize themselves with market variations by accessing external expertise and resources when needed. Digital transformation can aid in capturing, organizing, and preserving knowledge within SMEs. Open innovation strategies can help SMEs retain external knowledge gained from collaborations and partnerships, ensuring that valued visions are not lost. However, collaborating with external partners and leveraging digital tools can help SMEs share the hazards related to innovation and market entry. By spreading the risk, SMEs can undertake more ambitious projects and explore new opportunities. Digital Transformation and Open Innovation Strategies in SMEs can revolutionize their approach to KM. It empowers SMEs to become more innovative, customer-centric, and adaptable in a rapidly shifting business setting. To maximize the contribution of these strategies, SMEs should develop a comprehensive digital transformation roadmap, substitute open innovation, and invest in the right technologies and digital tools.

10. CONCLUSION AND FUTURE SCOPE

Knowledge management holds undeniable significance in the setting of SMEs. As the discussion has revealed, SMEs face unique dares and breaks when it comes to harnessing their internal knowledge assets. Effectively implementing KM practices can empower these enterprises to unlock their hidden potential, foster innovation, enhance decision-making, and ultimately thrive in competitive markets. While challenges such as resource constraints and technology limitations are present, the profits of a well-structured KM framework tailored to SMEs are evident. By accepting the values of continuous learning, adapting to evolving technologies, and valuing their intellectual capital, SMEs can not only survive but also prosper in a knowledge-driven economy. With ongoing technological advancements, SMEs will increasingly have access to cost-effective AI-driven KM systems, facilitating the utilization of data analytics and machine learning to extract valuable insights from their knowledge repositories. Furthermore, the integration of blockchain technology offers novel avenues for securing

and sharing critical knowledge assets, ensuring data integrity and trust in collaborative endeavours. Sustainability and responsible business practices will drive the implementation of KM strategies that incorporate ecological and public attention, enhancing SMEs' competitiveness. Cultivating a knowledge-sharing culture and upskilling the workforce will become central priorities for SMEs, enabling them to thrive in dynamic markets.

This paper explores the progression, aspects, obstacles, and tactics within the setting of data management for SMEs, with a specific emphasis on the influence of AI, Digital Transformation, and Open Innovation Strategies. With an importance on its significance in the current knowledge-driven economy, the review starts with information management and its practices. The importance of KM processes in SMEs is highlighted, along with an exploration of their dimensions and classification. However, it delves into the need and prominence of KM specifically in SMEs. It recognizes KM as a deliberate necessity among small and medium enterprises(SMEs) in the current business setting, offering strategies for enhanced decision-making within these organizations. Consequently, the effect of AI on KM in small and medium enterprises (SMEs) is evaluated and it shows that AI-powered collaboration tools, chatbots, search and recovery systems, and blockchain technology can enhance knowledge sharing, access, and discovery in SMEs. Subsequently, it outlines strategies for data-driven digital transformation, data allocation in simulated teams, and customer-centric approaches while highlighting the serious role of cybersecurity in safeguarding these transformations. Consequently, the vital part of information management in SMEs, especially in the aspect of numerical transformation and open innovation. It highlights that AI technologies can amplify KM efforts and emphasizes the strategic standing of effectively managing knowledge in SMEs to remain competitive and adaptive in a speedily developing business landscape. As a result, knowledge management plays a vital part in confirming the enduring prosperity and adaptability of SMEs within the ever-changing business landscape of today. Consequently, the future of KM in SMEs holds immense potential, with innovations and strategies set to redefine how these enterprises manage and leverage their knowledge resources within the knowledge-driven economy.

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