Exploring Digital Insurance Solutions: A Systematic Literature Review and Future Research Agenda

Anni Wei, Yurita Yakimin Abdul Talib*, Zakiyah Sharif
Tunku Puteri Intan Safinaz School of Accountancy College of Business, Universiti Utara Malaysia, Sintok, Malaysia

***Abstract*—The purpose of this study is to explore the antecedents for the adoption of digital insurance solutions and to present current research trends and future research agendas based on a systematic literature review. The findings revealed key motivators for the adoption of digital insurance solutions, such as trust, perceived usefulness, ease of use, performance and effort expectancy, social influence, subjective norms, self-efficacy, system quality, and attitudes. Meanwhile, the key inhibitors include perceived risk, privacy concerns, complexity, and technology anxiety. The study shows that current research themes primarily focus on the online insurance sector, while lack of attention to emerging technologies. Although the Technology Acceptance Model (TAM) being the most widely applied theory in digital insurance adoption studies, its explanatory power needs to be enhanced by introducing new theories. Moreover, most research samples consist of insurance consumers, with less attention paid to user groups excluded from financial services. Questionnaires and Structural Equation Modeling (SEM) are commonly used methods, but still have limitations when dealing with large samples and complex behavioral changes. This study provides guidance for governments in promoting the implementation of digital insurance solutions, alongside strategic support for insurers to optimise user experience and enhance industry competitiveness.**

***Keywords*—Digital insurance; Technology Acceptance Model; antecedents of adoption; systematic literature review; future research agenda**

I. Introduction

As an important pillar of socio-economic and personal well-being, the insurance industry has been at the forefront of technological innovation and digital transformation. With the rapid development of information and communication technology (ICT), insurance companies are actively utilising various digital tools to enhance service quality and market competitiveness [1]. Digital insurance has excelled in areas such as risk assessment, claims processing, and customer interaction. Digital insurance, which refers to the development, delivery, and management of insurance products and services based on digital technology [2], encompasses a variety of digital solutions such as online policy administration, mobile insurance platforms, blockchain-based insurance contracts, and risk assessment powered by artificial intelligence. Nowadays, technology-enabled insurance is an emerging force that drives industry transformation and enhances insurers competitiveness.

At present, the promotion and application of digital insurance still encounter many challenges. Although digital technology has injected innovation into the insurance industry, its development is susceptible to the rapid iteration of new technologies and environmental changes. On the one hand, for the existing user base, consumers experienced difficulties in comparing products or services in previous insurance transactions. The situation has changed with the rapid development of technology. Nowadays, consumers can use digital platforms to compare prices and information anytime and anywhere to make smarter and better choices. Consumers' demand for convenience and real-time interaction is also on the rise, thus increasing the pressure on insurers [3]. Failure to deliver a superior digital customer experience may cause customers to turn to competitors who can better meet their needs. Therefore, for insurers that are seeking rapid growth, deep insights into consumer behavior and preferences as they respond to technological change and evolving needs are key to competitively winning the market. On the other hand, many potential user groups are less receptive to digital insurance solutions, still preferring traditional offline services or transactions through insurance agents [4]. Especially in less-developed regions, the lack of financial inclusion makes it difficult for some groups to access the insurance market. In some emerging markets or remote areas, while digital insurance solutions can overcome geographical constraints, the lack of digital infrastructure is a critical barrier to their further penetration [5]. Thus, the resistance and potential opportunities for digital insurance adoption should be explored in depth.

A systematic literature review (SLR) is necessary in order to address the challenges encountered in the diffusion and adoption of digital insurance solutions. The SLR approach not only provides a comprehensive overview of research trends in the insurance field but also offers strategic reference for the practice of the field. In contrast, singular studies are usually incapable of covering the multidimensional aspects of the field comprehensively. Digital insurance-related research has been ongoing for over a decade. However, there are limited SLRs on the adoption of digital insurance solutions. In addition, emerging technologies such as blockchain, artificial intelligence, and Internet of Things (IoT) are changing the research priorities and directions in the insurance industry [6]. Hence, improving users' acceptance and user experience towards digital insurance solutions remains a priority that needs to be addressed. The authors sorted out and analysed the antecedents of digital insurance solutions adoption through a SLR, aiming to determine the factors influencing consumer acceptance. This study performing topic searches and article screening in mainstream academic databases (i.e., Web of Science and Scopus). A systematic review of relevant literature was conducted to answer the following research questions (RQs):

*Corresponding Author

RQ1: What is the extent of research done to date pertaining to the adoption of digital insurance solutions?

RQ2: What are the key antecedents of the adoption of digital insurance solutions?

RQ3: What is the current research landscape related to the adoption of digital insurance solutions?

RQ4: What are the future research directions in areas related to the adoption of digital insurance solutions?

This study helps to provide a concrete theoretical basis and strategic decision for academics, policymakers, and insurers for deepening their understanding of digital insurance adoption behaviors. The authors believe that this study could inspire more researchers to focus on and explore the different preferences and choices consumers have in relation to digital insurance solutions.

This study is organised into five parts. Section II introduces the literature review methodology; Section III summarises the key results of the literature review; Section IV discusses the findings and proposes a future research agenda; and finally, Section V concludes this study.

II. Methodology

A. Review Method

The SLR is a rigorous research methodology that enables a comprehensive analysis and summary of existing research in a structured and transparent manner [7]. It is regarded as one of the most informative and scientifically sound types of literature review methods. Therefore, this study adopted the SLR approach to review the literature in the field of digital insurance adoption.

B. Review Process and Database Search

The authors searched the articles published from 2000 to 2024, a critical period during which the insurance sector was impacted by technological innovation and digital development. To ensure the quality and representativeness of the articles, the authors focused the searches on Web of Science and Scopus databases. These two databases cover many subject areas and are famous for their high-quality peer-reviewed research articles [8]. The database search for this study was conducted in December 2024.

The literature screening process strictly followed the guidelines of the PRISMA model. This model is widely used in SLR studies due to its advantages in terms of transparency, reproducibility, and methodological consistency [9]. The authors constructed keyword strings based on expert opinions in related fields. Subsequently, articles related to digital insurance adoption were screened by combining synonyms and related terms using Boolean logic operators. Fig. 1 presents the screening process used according to the PRISMA model, alongside the explicit inclusion and exclusion criteria set during the search process. Eventually, the authors obtained 28 articles that fit the study topic.

III. Results

A. Most Cited Studies

The citation rate is a key indicator of a study's impact, and a higher number of citations usually indicates that the study has greater influence and visibility in the academic community [10]. To assess the core literature on digital insurance adoption, this study identified the five most highly cited studies by analysing the number of citations. To further quantify the academic impact of the literature, the authors calculated the average number of citations by dividing the total number of citations of a study by the number of years it has been published as a measure of the frequency of citations per year. The review process shows that Heinze et al. [11], is the most cited study in terms of the number and frequency of citations. Table I lists the top five studies with the highest number of citations. The authors believe these studies can serve as a basis for future research in digital insurance.

TABLE I. Five Most Cited Studies in the Field of Adoption of Digital Insurance Solutions from 2000 to 2024

Authors	Total citations	Citation per year
Heinze et al. [11]	96	13.71
Gebert-Persson et al. [12]	50	10
Khare et al. [13]	38	3.17
Gowanit et al. [14]	37	4.63
Wang and Lu [15]	34	3.4

Source: Based on Google Scholar as of December 2024.

B. Geographical Location of Previous Studies

Significant geographical differences exist in global research on the adoption of digital insurance solutions, as shown in Fig. 2. Asia, encompassing ten countries or regions such as India, China, and Taiwan, has the leading research concentration. Europe, covering six countries including Spain, Finland, and Germany, has the next highest number of studies. Fewer studies were conducted in Africa and North America. Among the countries or regions, India and Spain have the highest number of studies (n=4). These studies demonstrate the exploration of the insurance industry's digitisation in different regions of the world.

C. Antecedents of Digital Insurance Solutions Adoption

This study systematically sorted out the antecedents of user acceptance of digital insurance solutions and categorised them into two categories: motivators and inhibitors. While motivators are positive forces that drive users to accept or use digital solutions, inhibitors are negative factors that prevent users from adopting such technology.

1) Motivators: Table II presents the top 10 positive factors influencing the acceptance of digital insurance solutions based on the frequency of occurrence. The factors are trust, perceived usefulness, perceived ease of use, performance expectancy, effort expectancy, social influence, subjective norms, self-efficacy, system quality, and attitude.

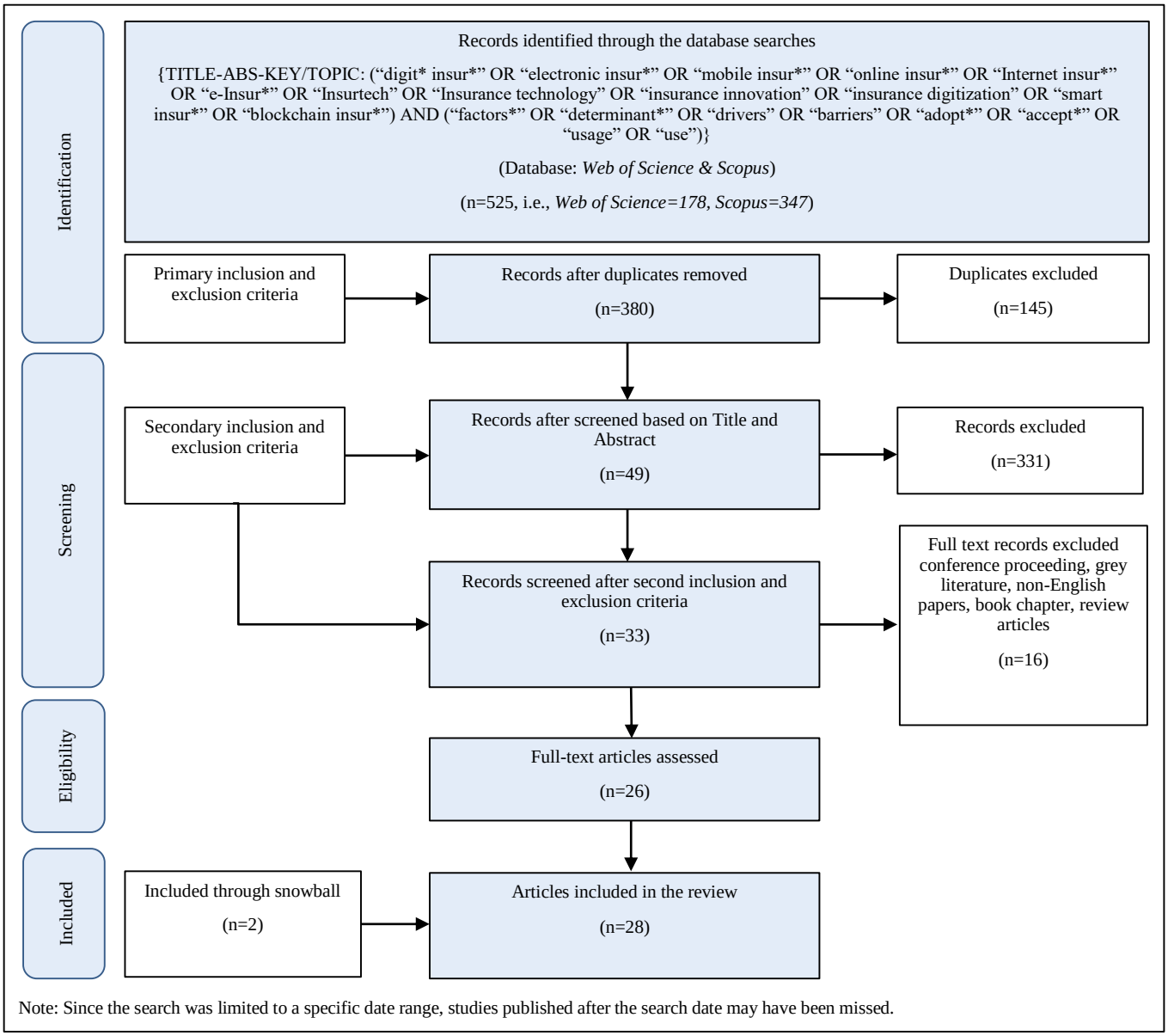

Fig. 1. PRISMA flowchart.

Fig. 2. Geographical locations of the reviewed studies.

2) Inhibitors: The factors that negatively affect the acceptance of digital insurance solutions are shown in Table III. Compared to motivators, inhibitors have been less researched and only mentioned in some studies. Therefore, this study lists the top four factors that occur with the highest frequencies, namely, perceived risk, privacy concerns, perceived complexity, and technology anxiety.

D. Profiles of Studies

1) Themes of reviewed studies: Based on the literature review, the authors identified the main trend of research themes in the field of digital insurance adoption, as shown in Fig. 3. Existing research focuses on areas such as online insurance, Chatbot-based insurance, e-insurance, and mobile insurance. However, the research on technologies such as telematics and wearable devices in digital insurance are still relatively less explored.

TABLE II. MOTIVATORS OF DIGITAL INSURANCE ADOPTION

Factors	Definition	Citation
Trust	The degree to which an individual perceives and believes in the reliability, integrity and trustworthiness of another person, organization, or system.	[12], [14], [15], [16], [17], [18], [19], [20], [21], [22], [23]
Perceived usefulness	An individual's subjective evaluation of whether the use of a particular object, service or technology is perceived as having real value and benefit.	[12], [14], [18], [19], [22], [24], [25], [26]
Perceived ease of use	An individual's subjective assessment of how easy or effortless it is to use a particular technology, product, or system.	[12], [14], [18], [19], [22], [25], [26], [27]
Performance expectancy	The benefits or performance that an individual expects from the use of a technology or service.	[17], [20], [23], [28], [29], [30]
Effort expectancy	The degree to which an individual expects effort to be required to complete a task when using a particular technology, system or service.	[17], [20], [23], [28], [29], [30]
Social influence	The impact that the words, attitudes, and behavior of others have on an individual's perceptions, decisions, and behavior.	[17], [20], [23], [28], [29], [30]
Attitude	An Individual's positive or negative evaluations of the use of a technology or service.	[12], [16], [19], [22], [26], [31]
Subjective norm	An individual's perceived social pressure, i.e. the extent to which others expect them to engage or not engage in a behavior.	[14], [18], [22], [26], [27]
Self-efficacy	An individual's understanding and beliefs in his or her skills and capability to perform a task given.	[14], [18], [29], [32]
System quality	The overall technical level and performance of an information system in terms of functionality, reliability, usability, and responsiveness.	[15], [28], [29], [33]

TABLE III. INHIBITORS OF DIGITAL INSURANCE ADOPTION

Factors	Definition	Citation
Perceived risk	An individual's subjective perception or awareness of the potential risks associated with a behavior, decision, or product.	[22], [23], [24], [28], [29], [32]
Privacy concern	The potential threats and harm that an individual or organization may face when processing, collecting, storing, and sharing personal information.	[14], [21], [30], [33]
Perceived complexity	An individual's perceived level of complexity in relation to a thing, concept, or task.	[15], [27]
Technology anxiety	The nervousness, anxiety or worry that individuals feel when faced with new technologies.	[21], [27]

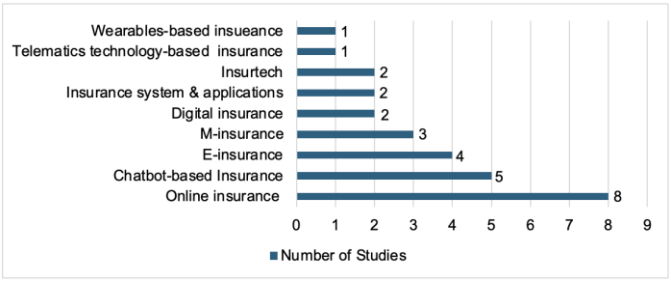

Fig. 3. Themes of previous studies

Source: Compiled by authors

2) Theories and models: Based on the literature review, the authors found that 18 of the 28 studies used a theoretical framework or model, as shown in Fig. 4. One of the most used is Technology Acceptance Model (TAM). TAM, a model proposed by Davis et al. is used to explain user acceptance behavior towards new technologies through two core variables: perceived usefulness and perceived ease of use [34]. In addition, the Unified Theory of Acceptance and Use of Technology (UTAUT) proposed by Venkatesh et al. is the second most used theory or model. The UTAUT model integrates multiple technology acceptance theories and emphasises the joint impact of performance expectancy, effort expectancy, social influences, and facilitating conditions on user behavior [35]. DeLone and McLean's Information Systems Success Model (D&M Model) is this field's third most-used theoretical model. The D&M Model, which includes system quality, information quality, and service quality, provides a tool for measuring users' usage of the system and user satisfaction [36]. However, not all studies used existing theoretical frameworks. Some studies did not

cite traditional models, and other studies developed new models based on research needs.

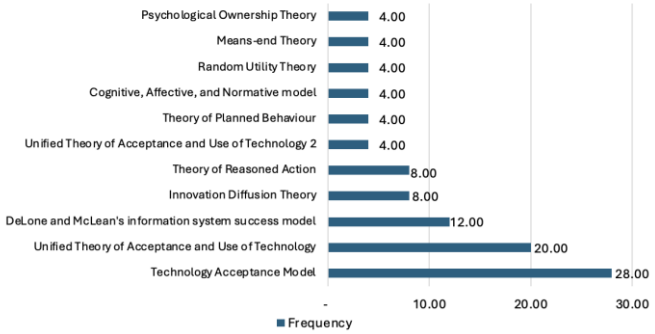

Fig. 4. Theories and models used in past studies.

Source: Compiled by authors

3) Methodology Overview

a) Statistical data analysis tools and techniques: This study also reviewed the tools and techniques used for statistical analysis in the literature, as shown in Table IV. Structural Equation Modeling (SEM), Partial Least Squares Structural Equation Modeling (PLS-SEM), and Multinomial Logistic Regression are the main data analysis techniques used in the field of digital insurance.

TABLE IV. DATA ANALYSIS TOOLS AND TECHNIQUES USED

Methods	Citations
Structural Equation Modeling (SEM)	[12], [15], [16], [19], [22], [24], [26], [29], [33]
Partial Least Squares Structural Equation Modeling (PLS-SEM)	[17], [18], [20], [23], [28], [31]
Structural Equation Modeling-Artificial Neural Network (SEN-ANN)	[27]
Structural Equation Modeling (SEM)	[37]
Partial Least Squares Structural Equation Modeling (PLS-SEM)	[25], [32], [38]
Logistic Regression	[13], [30]
Multinomial Logistic Regression	[38]
Multiple Regression	[32]
Bivariate Probit regression	[32]
Ordinal Logistic Regression	[13], [39]
Poisson Regression	[40]
ANOVA	[41]
Triangulation	[11]
Pearson Chi-square	[38]
Laddering Interviewing Technique	[12], [15], [16], [19], [22], [24], [26], [29], [33]
Kendall's Coefficient of Concordance	[17], [18], [20], [23], [28], [31]

b) Data collection technique and sample size: The data collection methods and sample size distributions of the studies are shown in Fig. 5 and Fig. 6, respectively. As shown in Fig. 5, questionnaires are the preferred data collection method in this field of research. A small number of studies used interviews and mixed methods. Focused group discussions and experimental research had relatively limited use in this study field. The distribution of sample sizes in Fig. 6 shows that studies with sample sizes of 201 to 300 people are the most numerous, followed by studies with sample sizes of 301 to 400 and 101 to 200. Studies with sample sizes of 1 to 100 people mainly focused on qualitative research methods, such as interviews and focus group discussions. Studies with sample sizes greater than 600 people are rarer. The authors conclude that the existing research primarily relies on questionnaire-based methods conducted on medium-sized samples.

c) Profile of respondents: The characteristics of the respondents are shown in Fig. 7. In these studies, insurance consumers were the most frequently investigated target group, followed by policyholders. Mobile users were also included in some studies. In addition, specific groups such as students, car buyers, university staff, disabled persons, farmers, and athletes were mentioned in a limited number of studies.

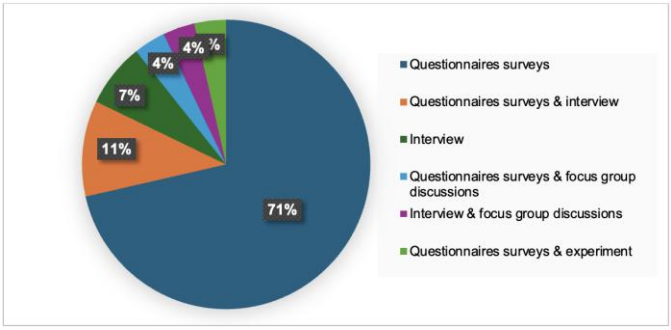

Fig. 5. Data collection method. Source: Compiled by authors

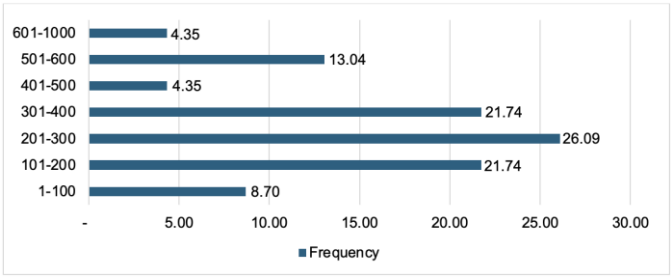

Fig. 6. Sample size used in previous research. Source: Compiled by authors

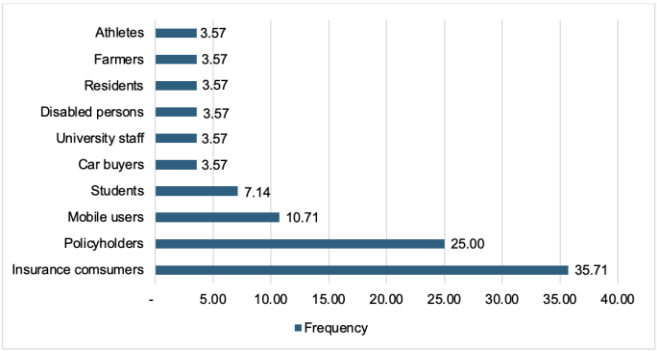

Fig. 7. Profile of respondents. Source: Compiled by authors

d) Comparison of research methods: To present the similarities and differences in research methodology of the included literature, 28 studies related to the adoption of digital insurance solutions were categorised. As shown in Table V, the data collection methods, analysis methods and sample characteristics used in each study are summarised.

TABLE V. COMPARISON OF RESEARCH METHODS IN THE REVIEWED LITERATURE

Authors	Themes of Reviewed Studies	Data Collection Methods	Data Analysis Methods	Respondents and Sample Size
Heinze et al. [11]	M-insurance	Interview	Laddering interviewing technique	N=23, Policy holders
Gebert-Persson et al. [12]	Online insurance	Interview	SEM	N=322, Insurance consumers
Khare et al. [13]	Online insurance	Questionnaire	ANOVA; multiple regression	N=192, Insurance consumers
Gowanit et al. [14]	M-insurance	Interview and focused group	N/A	N=177, Insurance consumers
Wang and Lu [15]	Online insurance	Questionnaire	SEM	N=270, Insurance consumers
Bharti et al. [16]	Insurtech	Questionnaire	PLS-SEM	N=268, Insurance consumers
de Andrés-Sánchez and Gené-Albesa [17]	Chatbot-based insurance	Questionnaire	PLS-SEM	N=226, Policy holders
de Andrés-Sánchez and Gené-Albesa [18]	Chatbot-based insurance	Interview and questionnaire	PLS-SEM	N=119, University staff
de Andrés-Sánchez and Gené-Albesa [19]	Chatbot-based insurance	Questionnaire	SEM	N=226, Policy holders
de Andrés-Sánchez and Gené-Albesa [20]	Chatbot-based insurance	Questionnaire	PLS-SEM	N=177, Policy holders
Dekkal et al. [21]	Chatbot-based insurance	Questionnaire and experiment	N/A	N=430, Mobile users
Huang et al. [22]	Online insurance	Questionnaire	SEM	N=540, Residents
Jiang et al. [23]	Online insurance	Questionnaire	PLS-SEM	N=315, Insurance consumers
Bromideh [24]	E-insurance	Questionnaire	SEM	N=218, Policy holders
Morgan et al. [25]	M-insurance	Questionnaire	Multinomial logistic regression	N=951, Students
Toukabri and Ettis [26]	E-Insurance	Questionnaire	SEM	N=280, Policy holders
Gupta et al. [27]	Digital insurance	Questionnaire	SEM-ANN	N=323, Disabled persons
Hassan et al. [28]	Insurtech	Questionnaire	PLS-SEM	N=350, Insurance consumers
Kim and Kim [29]	Digital insurance	Questionnaire	SEM	N=249, Mobile users
Milanović et al. [30]	Telematics technology-based insurance	Interview and questionnaire	Multiple regression	N=502, Car buyers
Ettis and Haddad [31]	E-insurance	Questionnaire	PLS-SEM	N=200, Insurance consumers
Nasrin and Dahana [32]	Online insurance	Questionnaire	Poisson regression; ordinal logistic regression; multinomial logistic regression	N=509, Insurance consumers
Luo et al. [33]	Online Insurance	Questionnaire	SEM	N=332, Policy holders
Saliba et al. [37]	Wearables-based insurance	Questionnaire	Logistic regression	N=537, Athletes
Mensah et al. [38]	Insurance system	Focused group and questionnaire	Multinomial logistic regression; bivariate probit regression; Kendall's coefficient of concordance	N=140, Farmers
Nsour et al. [39]	E-insurance	Questionnaire	ANOVA	N=187, Mobile users
Salonen et al. [40]	Insurance applications	Interview	Triangulation	N=62, Students
Pranav and Dharmalingam [41]	Online insurance	Questionnaire	Pearson Chi- square	N=168, Insurance consumers

IV. FINDINGS, DISCUSSIONS, AND FUTURE RESEARCH AGENDA

To answer the first research question (RQ1), we screened 28 empirical studies related to the adoption of digital insurance solutions from the existing literature. The studies are mainly concentrated in Asia and focus on user adoption of e-insurance, mobile insurance, and online insurance. Europe has the second-highest number of studies, focusing on technology-based insurance and user adoption. Unlike Asia, European studies focus more on cutting-edge technologies, such as chatbots, telematics, and wearable devices, suggesting that the European region is more focused on using advanced technologies in the digital insurance industry. In this region, Spain has the highest number of studies, focusing mainly on the practical application of chatbots in insurance. This finding reflects Spain's prominent role in chatbot technology research within the insurance sector. While the number of studies in India and

Spain is comparable, the exploration of insurance digitisation in India is still in the internet-enabled stage.

The second research question (RQ2) was answered using the literature review results. User adoption behavior towards digital insurance solutions is influenced by motivators and inhibitors. Among the motivators, trust, perceived usefulness, perceived ease of use, performance expectancy, effort expectancy, social influence, subjective norms, self-efficacy, system quality, and attitude were mentioned several times as the key drivers of users' willingness to accept the technology. Specifically, users' trust in digital insurance and positive evaluations of the usefulness of service features contribute to the attractiveness of the technology; perceived ease of use and reasonable effort expectancy reduce the psychological burden of using the technology, thus enhancing adoption intentions. In addition, social influences and subjective norms positively shape user perceptions through external pressures or recommendations, self-efficacy enhances user confidence in the use of the technology, and system quality ensures the reliability of the technology. Moreover, positive user attitudes towards digital insurance further drive their willingness to adopt digital solutions.

On the contrary, perceived risk, privacy concerns, perceived complexity, and technology anxiety are the repeatedly mentioned inhibitors to user adoption in existing studies. Users' negative perceptions of digital insurance technologies' potential risks directly reduce their usage willingness. In addition, doubts about privacy security, concerns about technological complexity, and technological anxiety may further increase user resistance and impede the diffusion of digital insurance solutions. These findings highlight the need to focus on and alleviate user concerns, besides enhancing the positive influences when promoting digital insurance technologies.

The authors answered the third research question (RQ3) by sorting the research topic trends, theoretical frameworks, data analysis techniques, data collection methods, and sample distribution. First, all studies were conducted in different contexts of digital insurance solutions, with online insurance being one of the most popular research areas. Although Insurtech and innovation-based insurance are considered future research directions, the number of related studies is relatively small. The authors find that the existing research themes are mainly focused on the application of early digital insurance solutions (e.g., online insurance and mobile insurance). However, with the rapid development of Industry 4.0 technologies, digital insurance has integrated emerging technologies such as blockchain, artificial intelligence, and wearable devices, which offer greater potential for insurance innovation [6]. This scenario indicates that research on digital insurance adoption still has research gaps, especially in the application of cutting-edge insurance technologies and user behavior analysis. Thus, there is an urgent need to explore these areas in depth in future research.

The existing research on digital insurance adoption has relied heavily on classical theoretical frameworks such as TAM, UTAUT, and D&M models, which have broad applicability in explaining user behavior. However, with the evolving technological environment and user needs, classical theories have limitations in explaining complex and dynamic user behaviors. For example, some previously under-attended theoretical frameworks, such as the cognitive-affective-normative (CAN) model, have also been applied to digital insurance-related research [27]. The CAN model provides a multidimensional perspective of users' decisions and behaviors. This suggests that introducing new research variables or developing new framework structures based on existing theories can help explain user behavior in specific contexts.

The commonly used statistical techniques as data analysis tools in existing studies include SEM, PLS-SEM, and logistic regression. SEM is the most popular technique due to its ability to model complex causal relationships, enabling it to offer a significant advantage in the analysis of multivariate interactions [42]. However, these most used methods also have limitations. For example, SEM and PLS-SEM are highly dependent on model assumptions, which may affect the stability of the analysis results when the data quality is insufficient or the sample size is small [43]. Logistic regression has relatively limited performance in dealing with nonlinear relationships and thus may not be able to reveal the interactions between complex variables comprehensively. Based on these limitations, the authors suggest that future research explore emerging analytical techniques to reveal complex indicators and more accurately predict user behaviors.

Questionnaires were the most used instrument for data collection in these studies. The use of questionnaires corresponds to the distribution of research sample sizes, with medium sample sizes of 201 to 400 people being the most common. While studies with small sample sizes were usually conducted using qualitative analysis methods, large sample sizes were less commonly used due to higher resource requirements. It is worth noting that while the findings of insurance consumer and policyholder studies are highly applicable for most user groups, these studies lack in-depth investigations of specific occupational groups (e.g., farmers, athletes) and special populations (e.g., students, disabled people). These limitations may lead to an inadequate understanding of specific groups' behavioral patterns and needs, thus limiting the accuracy of the research results. Therefore, more attention should be paid to the specific groups in the future to explore their unique behavioral patterns and needs in depth.

For the fourth research question (RQ4), the next section provides the answers by discussion of the future research agenda. Applying the TCM framework is comprehensive and instructive, thus providing a clear direction to researchers [44]. The authors propose a future research direction through the TCM framework to bridge the current research gap.

A. Future Research Agenda on Theory

Future research should explore and introduce new theoretical models to better understand the complexity and diversity of the digital insurance sector. Although traditional theories (e.g., TAM and UTAUT) are important in explaining technology adoption behavior, they may be difficult to fully adapt to the contextual needs in the field of digital insurance.

Alternatively, the CAN model provides a comprehensive framework for understanding individuals' intentions to adopt new products; however, it is rarely applied in the insurance industry. Future research could further validate the new model's applicability in the field of digital insurance.

As the insurance industry's digital transformation accelerates, users' perceptions of technology are becoming more complex, and research models need to be more inclusive and multidimensional. Researchers can enrich the explanatory power of existing models by extending the traditional theoretical framework to include insurance industry-specific factors (e.g., insurance literacy, perceived cost, product portfolio, etc.). Also, the key role of inhibiting factors in influencing user behavior should be explored more in future studies. In addition, the authors encourage future scholars to incorporate moderating or mediating factors into the models they develop.

Moreover, future research could integrate interdisciplinary theoretical frameworks, for example, by combining TAM, TPB, UTAUT, and some finance theories. The authors strongly recommend that future research create an Insurtech acceptance model. The interdisciplinary model can cover multiple dimensions, such as technological features, personal psychology, and social environment. Through interdisciplinary integration, digital insurance research will not only provide more accurate behavioral predictions but also offer a more guiding theoretical basis for industry practice by different stakeholders (e.g., policymakers and insurers).

B. Future Research Agenda on Context

Future research should strengthen the studies on specific regions and groups. The existing studies mostly focus on Asian and European regions, leaving less developed regions such as Africa relatively less explored. Due to the low insurance coverage of low-income groups and underdeveloped regions, these groups have become important targets for promoting digital insurance solutions. However, these populations are still understudied in the existing literature in this field. Future research should focus on differences in user acceptance behaviors across cultures (e.g., collectivist and individualist cultures) and social contexts (e.g., rural and urban). An in-depth analysis of these differences will help policymakers and insurers to develop targeted promotional strategies.

In addition, future research should focus on the potential negative impact of digital insurance solutions. Although cutting-edge technologies show great potential in optimising insurance services, research on the related negative effects is still insufficient. For example, while technologies such as blockchain and artificial intelligence enhance transparency and efficiency, risks such as data breaches and algorithmic discrimination may erode users' trust in technologies. Future research should analyse the potential negative antecedents in depth and propose effective countermeasures to optimise user experience and promote a widespread adoption of digital insurance technologies.

Moreover, future research could explore cross-scenario applications of digital insurance solutions, especially by integrating sustainability themes which have received less mention in previous research, such as carbon emission and technology fairness. In addition, future studies are advised to focus on the application of digital insurance in the healthcare industry, an area that is still under-researched. Currently, technologies such as blockchain and artificial intelligence are used for data sharing and health risk assessment in the insurance and healthcare industries [45]. Future research could further explore user acceptance of these technologies.

C. Future Research Agenda on Methods

Future research can employ longitudinal research methods. The promotion of digital insurance and user behavior may be affected by dynamic changes in policies and regulations. Longitudinal studies can reveal the time-series characteristics of behavioral changes by tracking user behavior in stages, such as initial acceptance, continued use, and potential exit [46]. For example, researchers can design multi-year data collection programs that can be used to analyse how policy interventions affect users' willingness to accept digital insurance. However, cross-sectional studies face difficulties to capture these long-term trends and changes. Existing studies on digital insurance are mostly based on cross-sectional analysis; the authors suggest that future researchers explore longitudinal studies more in order to grasp the dynamic changes in consumer behavior.

Another research agenda is to explore the emerging analytical approaches, such as integrating SEM with artificial neural networks (ANN) to cope with the complexity of user behavior studies. Existing analytical methods have limitations in revealing nonlinear relationships, and SEM-ANN approaches can simultaneously leverage the strengths of SEM in causal inference and the capabilities of ANN in nonlinear pattern recognition. For example, SEM-ANN can analyse digital insurance users' willingness to accept at different times and reveal potentially complex behavioral paths. In addition, social network analysis (SNA) is another method worth exploring to reveal users' relationship patterns and behavioral decisions [47].

Future research should also focus on applying machine learning methods in large-scale data processing and behavioral pattern prediction. Machine learning algorithms (e.g., decision trees, random forests, and deep learning) can efficiently process complex user data and mine hidden behavioral patterns from the data [48]. For example, machine learning allows researchers to predict the acceptance willingness of different groups towards digital insurance solutions and identify possible behavioral differences.

V. CONCLUSION

Digital insurance solutions provide convenient services to people, especially those who have difficulty accessing the insurance market. In the literature analysis, the authors found that digital insurance research themes focused on insurance sector-related technologies in the early digital transformation era, with less exploration on Insurtech, which incorporates emerging technologies. Among the theoretical frameworks, TAM, UTAUT, and D&M models are widely used, but their limitations suggest the need to introduce new theoretical frameworks to explain user behavior more comprehensively. In

terms of research groups, existing studies focused on insurance consumers in general, with a significant lack of research on consumers from low-income groups or less developed regions. The results show that trust, perceived ease of use, perceived usefulness, performance expectancy, effort expectancy, social influence, subjective norms, self-efficacy, system quality, and attitude are the most frequently cited motivational factors. However, the main inhibitors include perceived risk, privacy concerns, perceived complexity, and technology anxiety.

Despite the initial results of this study in identifying the key antecedents influencing the adoption of digital insurance solutions, there are still some methodological limitations. Due to the relatively limited amount of quantifiable data in the existing literature, it is not yet able to perform meta-regression analyses based on multiple studies to systematically validate statistically the relationship between the identified antecedents and adoption. This is mainly since some of the literature adopts qualitative or mixed research methods, and the small number of quantitative studies involved in the antecedent makes it difficult to fulfil the multi-study validation conditions required for meta-analysis. Therefore, the specific impact of the antecedents proposed on the adoption of digital insurance solutions remains to be further verified through empirical data in subsequent studies. Nevertheless, this study provides practical guidance to the government for the promotion of insurance adoption. Additionally, by offering insights into user needs, this study provides strategic recommendations to insurers for enhancing market competitiveness. Academically, this study clarifies the research direction in the field of digital insurance solutions and provides support for subsequent academic exploration.

ACKNOWLEDGMENT

The authors would like to thank all researchers, participants, and others who were involved directly or indirectly during data collection and reviewed this manuscript.

REFERENCES

[1] P. Kaur and M. Singh, “Exploring the impact of InsurTech adoption in Indian life insurance industry: A customer satisfaction perspective,” *TQM J.*, 2023.

[2] J. Desikan and A. Jayanthila Devi, “Digital transformation in Indian insurance industry: A case study,” *Int. J. Case Stud. Bus. IT Educ.*, vol. 5, no. 2, pp. 184–196, 2021.

[3] G. Pisoni, “Going digital: Case study of an Italian insurance company,” *J. Bus. Strategy*, vol. 42, no. 2, pp. 106–115, 2021.

[4] F. Ding, L. Luan, H. Xu, and K. He, “Analysis and prospects of technology-enabled high-quality development of internet insurance in the context of digitalization,” 2023.

[5] I. K. Mensah, “The drivers of the behavioral adoption intention of BITCOIN payment from the perspective of Chinese citizens,” *Security Commun. Netw.*, 2022.

[6] S. Ahmad and C. Saxena, “Artificial intelligence and blockchain technology in insurance business,” in *Proc. Int. Conf. Recent Innov. Comput.*, Singapore: Springer Nature, May 2022, pp. 61–71.

[7] D. Pati and L. N. Lorusso, “How to write a systematic review of the literature,” *HERD Health Environ. Res. Des. J.*, vol. 11, no. 1, pp. 15–30, 2018.

[8] R. Pranckutė, “Web of Science (WoS) and Scopus: The titans of bibliographic information in today’s academic world,” *Publications*, vol. 9, no. 1, p. 12, 2021.

[9] M. J. Page *et al.*, “Updating guidance for reporting systematic reviews: Development of the PRISMA 2020 statement,” *J. Clin. Epidemiol.*, vol. 134, pp. 103–112, 2021.

[10] M. Bhandari, J. Busse, P. J. Devereaux, V. M. Montori, M. Swiontkowski, and P. Tornetta III, *et al.*, “Factors associated with citation rates in the orthopedic literature,” *Can. J. Surg.*, vol. 50, no. 2, p. 119, 2007.

[11] J. Heinze, M. Thomann, and P. Fischer, “Ladders to m-commerce resistance: A qualitative means-end approach,” *Comput. Hum. Behav.*, vol. 73, pp. 362–374, 2017.

[12] S. Gebert-Persson, M. Gidhagen, J. E. Sallis, and H. Lundberg, “Online insurance claims: When more than trust matters,” *Int. J. Bank Mark.*, vol. 37, no. 2, pp. 579–594, 2019.

[13] A. Khare, S. Dixit, R. Chaudhary, P. Kochhar, and S. Mishra, “Customer behavior toward online insurance services in India,” *J. Database Mark. & Customer Strategy Manag.*, vol. 19, pp. 120–133, 2012.

[14] C. Gowanit, N. Thawesaengskulthai, P. Sophatsathit, and T. Chaiyawat, “Mobile claim management adoption in emerging insurance markets: An exploratory study in Thailand,” *Int. J. Bank Mark.*, vol. 34, no. 1, pp. 110–130, 2016.

[15] W. T. Wang and C. C. Lu, “Determinants of success for online insurance web sites: The contributions from system characteristics, product complexity, and trust,” *J. Organ. Comput. Electron. Commer.*, vol. 24, no. 1, pp. 1–35, 2014.

[16] K. Bharti, R. Agarwal, and A. K. Satsangi, “The transformative service performance of InsurTech companies: using PLS-SEM and IPMA approach for examining the purchase behavior of InsurTech customers,” *J. Financial Serv. Mark.*, vol. 1, pp. 1–19, 2024.

[17] J. de Andrés-Sánchez and J. Gené-Albesa, “Explaining policyholders’ chatbot acceptance with a unified technology acceptance and use of technology-based model,” *J. Theor. Appl. Electron. Commer. Res.*, vol. 18, no. 3, pp. 1217–1237, 2023.

[18] J. de Andrés-Sánchez and J. Gené-Albesa, “Assessing attitude and behavioral intention toward chatbots in an insurance setting: A mixed method approach,” *Int. J. Hum.–Comput. Interact.*, vol. 40, no. 17, pp. 4918–4933, 2024.

[19] J. de Andrés-Sánchez and J. Gené-Albesa, “Not with the bot! The relevance of trust to explain the acceptance of chatbots by insurance customers,” *Humanit. Soc. Sci. Commun.*, vol. 11, no. 1, pp. 1–12, 2024.

[20] J. de Andrés-Sánchez and J. Gené-Albesa, “Drivers and necessary conditions for chatbot acceptance in the insurance industry: Analysis of policyholders’ and professionals’ perspectives,” *J. Organ. Comput. Electron. Commer.*, vol. 1, pp. 1–28, 2024.

[21] M. Dekkal, M. Arcand, S. Prom Tep, L. Rajaobelina, and L. Ricard, “Factors affecting user trust and intention in adopting chatbots: The moderating role of technology anxiety in InsurTech,” *J. Financial Serv. Mark.*, vol. 29, no. 3, pp. 699–728, 2024.

[22] W. S. Huang, C. T. Chang, and W. Y. Sia, “An empirical study on the consumers’ willingness to insure online,” *Pol. J. Manage. Stud.*, vol. 20, 2019.

[23] S. J. Jiang, X. Liu, N. Liu, and F. Xiang, “Online life insurance purchasing intention: Applying the unified theory of acceptance and use of technology,” *Soc. Behav. Pers.: Int. J.*, vol. 47, no. 7, pp. 1–13, 2019.

[24] A. A. Bromideh, “Factors affecting customer e-readiness to embrace auto e-insurance in Iran,” *J. Internet Bank. Commer.*, vol. 17, no. 1, pp. 1–10, 2012.

[25] A. K. Morgan, D. Katey, M. Asori, S. U. Nachibi, E. Onyina, T. Quartey, and M. A. Aziire, “‘Digitising health protection schemes in Ghana’: An enquiry into factors associated with the use of a mobile phone-based health insurance contribution payment system among tertiary students,” *Health Serv. Insights*, vol. 17, p. 117, 2024

[26] M. T. Toukabri and S. A. Ettis, “The acceptance and behavior towards e-insurance,” *Int. J. E-Bus. Res. (IJEBR)*, vol. 17, no. 2, pp. 1–16, 2021.

[27] S. Gupta, M. Hassen, D. K. Pandey, and G. P. Sahu, “Cognitive, affective, and normative factors affecting digital insurance adoption among persons with disabilities: A two-stage SEM-ANN analysis,” *Global Finance J.*, vol. 63, p. 101048, 2024.

[28] M. S. Hassan, M. A. Islam, M. F. Yusof, and H. Nasir, "Users' fintech services acceptance: A cross-sectional study on Malaysian Insurance & takaful industry," *Heliyon*, vol. 9, no. 11, 2023.

[29] E. Kim and Y. Kim, "Determinants of user acceptance of digital insurance platform service on InsurTech: an empirical study in South Korea," *Asian J. Technol. Innov.*, vol. 1, pp. 1–31, 2024.

[30] N. Milanović, M. Milosavljević, S. Benković, D. Starčević, and Ž. Spasenić, "An acceptance approach for novel technologies in car insurance," *Sustainability*, vol. 12, no. 24, p. 10331, 2020.

[31] S. A. Ettis and M. M. Haddad, "Utilitarian and hedonic customer benefits of e-insurance: A look at the role of gender differences," *Int. J. E-Bus. Res.*, vol. 15, no. 1, pp. 109–126, 2019.

[32] M. S. Nasrin and W. D. Dahana, "Influencing factors of the extent, timing, and pattern of online insurance adoption," *Int. J. Electron. Commer. Stud.*, vol. 13, no. 3, pp. 119–146, 2022.

[33] C. Luo, Q. Chen, Y. Zhang, and Y. Xu, "The effects of trust on policyholders' purchase intentions in an online insurance platform," *Emerg. Mark. Finance Trade*, vol. 57, no. 15, pp. 4167–4184, 2021.

[34] H. Rafique, A. O. Almagrabi, A. Shamim, F. Anwar, and A. K. Bashir, "Investigating the acceptance of mobile library applications with an extended technology acceptance model (TAM)," *Computers & Education*, vol. 145, p. 103732, 2020.

[35] M. Blut, A. Y. L. Chong, Z. Tsiga, and V. Venkatesh, "Meta-analysis of the unified theory of acceptance and use of technology (UTAUT): challenging its validity and charting a research agenda in the red ocean," *Association for Information Systems*, Jan. 2022.

[36] M. Jami Pour, J. Mesrabadi, and M. Asarian, "Meta-analysis of the DeLone and McLean models in e-learning success: the moderating role of user type," *Online Information Review*, vol. 46, no. 3, pp. 590–615, 2022.

[37] B. Saliba, J. Spiteri, and D. Cortis, "Insurance and wearables as tools in managing risk in sports: Determinants of technology take-up and propensity to insure and share data," *Geneva Pap. Risk Insur. - Issues Pract.*, pp. 1–21, 2021.

[38] N. O. Mensah, J. K. Asare, E. T. D. Mensah, E. C. Amrago, F. O. Tutu, and A. Donkor, "Determinants and framework for implementing sustainable climate-smart aquaculture insurance system for fish farmers: Evidence from Ghana," *Aquaculture*, vol. 581, p. 740354, 2024.

[39] M. F. Nsour, S. A. AL-Rjoub, M. Tayeh, and H. Kokash, "Factors and issues affecting electronic insurance adoption in an emerging market," *Insur. Mark. Companies*, vol. 14, no. 1, p. 46, 2023.

[40] A. Salonen, L. Koskinen, R. Voutilainen, and H. Talonen, "Adoption of incentive-based insurance applications: The perspective of psychological ownership," *J. Financial Serv. Mark.*, vol. 28, no. 4, pp. 794–806, 2023.

[41] S. Pranav and M. Dharmalingam, "Customers' perception in insurance virtual environment: A study on online services," *Pac. Bus. Rev. Int.*, vol. 7, no. 1, 2014.

[42] N. Eisenhauer, M. A. Bowker, J. B. Grace, and J. R. Powell, "From patterns to causal understanding: Structural equation modeling (SEM) in soil ecology," *Pedobiologia*, vol. 58, no. 2–3, pp. 65–72, 2015.

[43] J. F. Hair, W. C. Black, B. J. Babin, R. E. Anderson, and R. Tatham, *Multivariate Data Analysis*, Upper Saddle River, NJ, USA: Pearson Prentice Hall, 2010.

[44] S. Bag and P. Dhamija, "Research progress on working conditions in supply chains: A comprehensive literature review and future research propositions," *TQM J.*, vol. 35, no. 8, pp. 2282–2303, 2023.

[45] D. Park and D. Ryu, "Blockchain in health insurance: Sharing medical information and preventing insurance fraud," *Korean J. Financial Stud.*, vol. 48, no. 4, pp. 417–447, 2019.

[46] A. T. Jebb, L. Tay, W. Wang, and Q. Huang, "Time series analysis for psychological research: Examining and forecasting change," *Front. Psychol.*, vol. 6, p. 727, 2015.

[47] H. Zhang, I. Palomares, Y. Dong, and W. Wang, "Managing non-cooperative behaviors in consensus-based multiple attribute group decision making: An approach based on social network analysis," *Knowl.-Based Syst.*, vol. 162, pp. 29–45, 2018.

[48] K. Kajol, R. Singh, and J. Paul, "Adoption of digital financial transactions: A review of literature and future research agenda," *Technol. Forecast. Soc. Change*, vol. 184, p. 121991, 2022.