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Article

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MARKETING | REVIEW ARTICLE

Social networks and consumer technology usage: A systematic literature review and future research directions

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Abstract: Prior research on social networks and consumer technology usage has used diverse theoretical frameworks to study the extent to which social networks, in their various forms, are related to consumer technology usage. However, the adoption and utilization of these theoretical frameworks has led to fragmentation of findings, and a lack of consistency in the conceptualization and operationalization of key social network constructs. There is, therefore, a need for a comprehensive systematic review of studies on the interrelations between social networks and consumer technology usage, with a view to identifying the common areas of focus, major weaknesses, emerging trends, and directions for future research. Using the Population, Intervention, Comparison, Outcomes (PICO) framework, this paper relies on five research questions to examine the various frameworks that have been used to study social networks in relation to consumer technology usage, as well as their shortcomings in terms of consistency in conceptual frameworks, the research contexts commonly studied, areas of study focus as well as emerging trends. The paper concludes by proposing future areas of research, which include: the development of a theoretical framework to guide the study of the relationship between social networks and consumer technology usage;

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PUBLIC INTEREST STATEMENT

This paper systematically reviews existing research on the relationship between social networks and consumer technology usage. Literature published between 2010 and 2020 was reviewed. The findings bring out a growing interest in this research area and highlights existing challenges due to the use of diverse theoretical frameworks leading to fragmentation of findings and, a lack of consistency in the conceptualization and operationalization of key social network constructs. The findings are significant in guiding future research in this area, to support the growing consumer technology usage in every sphere of consumers' lifestyles. As firms continue to invest in technology driven products and services, research findings that are generalizable will provide insights on how to tailor their marketing efforts towards social networks where social interactions and free exchange of information shape perceptions that in turn influence the behavior of the consumers within the social networks and drive the extent of consumer technology usage.

the moderating roles of consumer demographic characteristics; the mediating role of consumer behavioral characteristics; and the influence of technology-enabled social networks in conditioning consumer attitude towards technology and consumer technology usage in different contexts.

Subjects: Technoculture; Attitudes & Persuasion; Intergroup Behavior; Consumer Behaviour

Keywords: social networks; social interactions; consumer technology usage; systematic literature review; marketing research

1. Introduction

Consumer technology usage has increasingly been viewed as a critical indicator of information systems success (Petter et al., 2012). This realization has led to a growing interest among scholars in explaining the determinants of consumer technology usage (Baccarella et al., 2020; Gursoy et al., 2019; Venkatesh et al., 2003). Consumer technology usage is often conceptualized as a behavioral manifestation and has therefore attracted scholarly attention from behavioral scientists as well as information systems researchers. According to Ajzen and Fishbein (1980), behavior can be explained by a person's attitude towards the specified behavior. Hawkins et al. (1998) similarly opined that consumer attitude refers to the way one thinks, feels and acts towards a given aspect of the environment, and suggests that attitudes are influenced by external and internal environment factors. From this behavioral perspective, a growing body of empirical studies has linked consumer attitudes to consumer technology usage (Cho & Chan, 2021; Granić & Marangunić, 2019; Wedajo, Belissa, Jilito et al., 2019; Wessels & Drennan, 2010)

The technology acceptance model (TAM) is the dominant theoretical framework often used to predict consumer technology usage (Camilleri & Falzon, 2020; Davis, 1989; Kamal et al., 2020; Kulviwat, Bruner, Kumar, Nasco, Clark et al., 2007). TAM uses two key variables, perceived usefulness (PU) and perceived ease of use (PEOU), to measure consumer attitudes. While PU is defined as the extent to which an individual believes that using a system will enhance performance, PEOU explains the extent to which an individual believes that using the system will be relatively free of effort. TAM's popularity has also been attributed to its parsimony, meaning that the theory provides a simple explanation for technology acceptance. Secondly, as an information systems-specific theory, TAM provides adequate explanation of usage across a wide spectrum of users and a variety of technologies across cultures and geographies. Thirdly, TAM has a strong theoretical base with widely researched and validated psychometric measures which are generalizable and, finally, the theory has strong empirical evidence for its overall prediction power (Ahmad, 2018; Sitorus et al., 2017)

Despite its popularity in predicting technology usage, TAM has been criticized for excluding subjective norm as a predictor of technology usage (Gupta & Yadav, 2017; Schepers & Wetzels, 2007). The argument has been that social norms are integrated in the outcomes and therefore cannot be treated as individual variables (Davis, 1989). Technology usage studies using TAM have largely focused on organizational settings to predict user acceptance of technology where the decision to use such technology is mandatory for employees (Joo et al., 2018; Schepers & Wetzels, 2007; Shamsi et al., 2021). Additionally, TAM is conceptualized largely as a framework for explaining decision-making by individual persons, yet decisions relating to technology usage are often collaborative with other people or groups (Bagozzi, 2007; Rogers, 1995). A key shortcoming of TAM, therefore, is its omission of social variables. Scholars have argued that human behavior is best characterized by a person acting as part of social structures, but not independently and in isolation (Bagozzi, 2007; Shirley & Todd, 1995; Venkatesh et al., 2003).

Scholars have argued that social structures are important in decision-making because the individual acts as a member of a social group and their interactions can lead to consumer engagement and

increase loyalty (Bagozzi, 2007; Gebsumbut et al., 2019). Furthermore, social networks promote interactions and exchange of information among actors in a network (Isa & Himmelboim, 2018; Murendo, Wollni, De Brauw, Mugabi et al., 2018; Wedajo, Belissa, Jilito et al., 2019). Studies on the influence of social interactions through social networks have been used to explain various behavioral outcomes in areas such as job performance (Park et al., 2020), employee turnover (Porter et al., 2019), innovation (Agyapong et al., 2017), unethical behavior (Ramakrishna Velamuri et al., 2017), entrepreneurship trends (Awa, Ukoha, Eke et al., 2016; Boso, Story, Cadogan et al., 2013) and consumer technology usage (Wedajo, Belissa, Jilito et al., 2019).

This systematic literature review examines existing studies on the relationship between social networks and consumer technology usage. The study reviews theoretical frameworks that have been used in the selected studies, as well as constructs that have been used to measure social networks, study contexts, and the research findings with a view to identifying research gaps and opportunities for future research. The study is guided by the Population, Intervention, Comparison, Outcomes (PICO), which is widely used in evidenced based medical research. According to Lockwood et al. (2015) in a qualitative systematic literature review which seeks to understand the meaning of phenomena and their relationships, a revised PICO, which an adapted framework from the original PICO is used to guide the development of clear and meaningful research questions. In this study, PICO was used to formulate the following research questions;

- (1) What theoretical frameworks are commonly used to explain social networks as a predictor of consumer technology usage?
- (2) Is there consistency in the operationalization of key social network constructs ?
- (3) What are the research contexts used in the reviewed studies?
- (4) Are there common research streams and emerging trends for future research?

The choice of the 10-year period between 2010 and 2020 was informed by the intention to focus on the most recent literature that reflects evolving consumer behavior and social network interactions that are influenced by recent factors such as technological developments. The paper is organized as follows: the second section discusses the growing research interest on social networks as a determinant of consumer technology usage and highlights the fragmented approach in theoretical foundations used. The third section explains the research method that was used to identify, select, analyze and synthesize studies on social networks and consumer technology usage published within the defined timeframe of the study. The fourth section covers the results of the 69 studies selected and analysed and provides the findings based on the guiding research questions. The fifth section is a discussion of the findings. The final section provides a conclusion and proposed areas of future research

2. Social networks as a determinant of consumer technology usage

Social networks as a determinant of consumer technology usage has become a growing area of scholarly interest. According to Kate et al. (2010), an individual's trust, opinions and behavior are influenced by their social networks. Studies have established that perceptions and beliefs that are communicated during social interactions have an influence on usage behavior (Chang et al., 2017; L. Hossain & de Silva, 2009; Di Pietro & Pantano, 2012). However, existing literature reveals that theoretical foundations, definitions, conceptualizations, and measurements of social networks have been varying, resulting in mixed and contradicting results, which limit the ability to generalize such findings (K. Z. K. Zhang & Benyoucef, 2016)

Social network theory, a common theory in social network studies, has been operationalized differently for different studies, thereby showing a lack of consistency. Fang et al. (2013) assessed the probability that a social entity in a social network would adopt a product, service or opinion. The study was underpinned by social network theory and the Social Information Processing Model (SIPM). To predict adoption decision among actors in a social network, the study measured social

influence, structural equivalence, entity similarity and confounding factors. Findings from the study revealed that social influence only offered limited predictive power and that confounding factors (unobserved factors) were critical in adoption probability prediction.

On the other hand, Gong, Liu, Wu et al., (2018) used social network theory to analyze the relationship between network structure and adoption decisions, and operationalized social networks using imitation, leadership, lock-in, similarity, recency and team-size effects.

Using data from online open-source software and behavior link panel data, the study concluded that a person's decision to adopt a technology was strongly influenced by the actions of connected others in the network.

In yet another study that used social network theory, Okello Candiya Bongomin et al. (2018) studied the moderating role of social networks in the relationship between mobile money usage and financial inclusion in sub-Saharan Africa. The study measured social networks using strength of network ties operationalized by node centrality, network density, robustness, and transitivity to explain their effect on the level of information flow and exchange within social networks. The study concluded that existence of strong and weak social network ties among mobile money users promoted financial inclusion. The forgoing studies' approaches and findings demonstrate the absence of standard measures for social network theory resulting in diverse measures and outcomes, which make it difficult to generalize empirical findings.

Social network analysis (SNA) has also been used as a theoretical framework in social network studies. In the study of how the adoption of mobile technologies leverages social networks, Reyhav, n.d.icu, Wu et al., (2016) used social network analysis and measured eigenvector centrality and network reciprocity. Using a controlled field experiment involving 327 participants, the study found that, by leveraging social networks in a mobile platform, participants were able to positively heighten their collaborative knowledge acquisition process; this was through enhanced group interactions and enjoyment. Ludlow and Heydari (2014), in another study, compared strategies for selecting seed adopters of a new technology in scale-free networks. The study aimed at explaining the factors that maximize technology adoption within a social network. Using social network analysis, the study compared diffusion of technology between random actors, actors with the highest degree and actors with the highest betweenness. The foregoing arguments demonstrate the divergent approaches that empirical studies have taken in operationalizing social network analysis.

Similarly, social capital theory has been popular in studying social networks. The theory defines social capital as resources that are embedded in trust, norms and networks among people (Coleman, 1988). The theory uses bonding capital, bridging capital and linking capital as constructs to explain the influence of social networks on consumer technology usage (Szreter & Woolcock, 2004). Lee and Katz (2015) studied how Korean immigrants' use of mobile communication configured their social networks. The study used the theory of bounded solidarity, social network theory and tie strength theory. The social network theory was operationalized using social capital, network size, diversity and centrality. Social capital, which was measured using bonding capital, revealed that social network services (SNS) can be used to increase bonding social capital. The study, however, did not consider the other constructs of social capital: linking capital and bridging capital. In addition, social capital was applied as a construct of social network theory and not a theoretical framework, further demonstrating the existing confusion in studying social networks as an important predictor of consumer technology usage.

In a study that focused on how technology is adopted by farmers in Ethiopia through community social networks, Micheels and Nolan (2016) used social capital theory to explain how bonding capital, bridging capital and linking capital influenced diffusion of agricultural technology among rural farmers. The study found that local community networks had more power to influence their

members' decision-making, values and practices. Relatedly, in a study that used social capital theory to explain the impact of social capital on tourism technology adoption for destination marketing, Lee (2015) operationalized the theory using bonding capital and bridging capital and extended this with network size, tie strength, trust and norms. The study concluded that, apart from tie strength and trust, other constructs used to operationalize social capital in the study exerted significant effects on the destination marketing organization's level of technology adoption. Social capital was used as a construct in a different study to examine its effects in relation to absorptive capacity on the adoption of agricultural innovations in the Canadian prairies (Micheels & Nolan, 2016). In the study, social capital was measured using social interaction, trust, shared vision and involvement in local institutions. The foregoing demonstrates the fragmentation that exists in using social capital as a theory and sometimes as a construct of a social network theory.

Social learning theory has likewise been used in the study of social networks' influence on consumer technology usage. The theory posits that social interactions between actors in a social network facilitate change in understanding beyond an individual and become situated within wider social units (Vishnu, Gupta, Subash et al., 2019). According to DiMaggio and Garip (2012), learning from interactions in a network influences behavior among the actors. In a study explaining the use of mobile money in social networks, Kiconco et al. (2020) compared residents in rural and urban set-ups in Uganda. Social learning theory was used to anchor the study and was operationalized using observation, imitation, hands-on experience and direct technology support of actors within social networks. The study concluded that learning is better explained by social network characteristics, as compared to attributes of the individual.

In a different study that used Social learning theory, Vishnu, Gupta, Subash et al., (2019) explored how social networks of farmers influence acquisition of information on vital livestock technology. The study findings revealed that social learning was influenced by the existence of a skilled ego in the network, followed by homogenous peer groups who facilitated information sharing on technology. Yet another study by Murendo, Wollni, De Brauw, Mugabi et al., (2018) focused on the role of social networks in the adoption of mobile money in Uganda using social learning theory. The theory was operationalized using strong tie and weak tie constructs from the strength of weak ties theory (Granovetter, 1983) and constructs from the social resources theory (Lin, 1999). The findings concluded that learning within social networks helped disseminate information about mobile money and enhanced its usage. The foregoing divergent approaches in the operationalization of constructs and measures for social learning theory, including extending social learning theory with constructs from other theories, is a testament of the struggles that confront researchers in developing standardized theoretical and conceptual frameworks to study social networks.

From the foregoing discussion, there is evidence that existing literature is fragmented and leads to confusion due to a lack of consistency in the conceptualization and operationalization of constructs and the measurement items and scales. There is therefore a need to carry out a systematic literature review of studies on social networks and consumer technology usage, with a view to identifying the existing weaknesses and common areas of focus that could pave way for future studies on streamlining the focus on social networks as an important construct in the study of determinants of consumer technology usage.

3. Method

We conducted a systematic literature review to examine the relationship between social networks and consumer technology usage. A systematic literature review is a planned and structured approach to reviewing existing empirical research using organized and replicable methods to identify, gather, select, critically assess, analyze, interpret and present the results (Fisch & Block, 2018). Systematic reviews are rigorous and in depth, and give details about the methods and approaches used in a given study (Cronin et al., 2008). Further, as they respond to specific research questions, they allow for reasonable conclusions to be arrived at (Thomé et al., 2016). To this end, our steps were as follows:

First, in line with the objectives of the study and research questions, the research set out to identify the relationship between social networks and consumer technology usage among individual consumers. In particular, the study aimed at identifying studies that focused on the role that social networks play in driving consumer technology usage. The search process for existing literature started with identification of search terms based on the topic of the study and limited to a 10-year period between 2010 and 2020. The period was found to be appropriate as it contained recent studies which reflected evolving trends in consumer technology usage due to prevailing factors such as technology; which is increasingly influencing consumer behavior including social network interactions.

3.1. Planning

The search terms used included “social networks”, “technology usage” and “individual consumers”. The term “technology adoption” was included because of the observed tendency to interchange the terms technology usage and technology adoption. During the analysis of actual selected papers, the research ensured that only studies that measured actual consumer technology usage were retained in the selected journal papers, regardless of whether they used technology usage or technology adoption in their body of research.

3.2. Literature search

The search process was conducted in two stages. The first search was conducted on Google Scholar using the following search terms, “social networks and technology usage”, “social networks and technology usage among individual consumers”, “social networks and technology adoption”, “social networks and technology adoption among individual consumers”, “social networking and technology usage”, “social networking and technology usage among individual consumers”, “social networking and technology adoption”, and, finally, “social networking and technology adoption among individual consumers”. The purpose of varying the search terms was to ensure that the process reached a saturation point where no additional articles were found. Google Scholar was found to be a useful first step because it brings together a wide array of scholarly work in different databases. From the Google scholar, we identified the databases with the highest frequency of relevant journal articles by title which helped to narrow down to the most important individual databases for in-depth review. The search produced numerous results that had multiple overlaps. The search results are shown Table 1:

3.3. Search in relevant databases identified from google scholar

Search results from the first stage paved way for the second search stage. Key databases were identified that carried the highest frequency of journal papers. They were JSTOR, Taylor and Francis, Wiley Online, Sage, Springer and Science Direct. A search was repeated following the

Table 1. Google scholar search results

Search term	Results
Social networks and technology usage	17,800
Social networks and technology usage by individual consumers	18,200
Social networks and technology adoption	18,200
Social networks and technology adoption by individual consumers	18,900
Social networking and technology usage	17,800
Social networking and technology usage by individual consumers	18,200
Social networking and technology adoption	18,200
Social networking and technology adoption by individual consumers	18,900

above search terms in each of the identified databases. The results were further evaluated and filtered in the following order: Using study title to identify the relevance of the study constructs. Those that passed this stage were evaluated using abstracts to further identify the research papers that were focused on the relationship between social networks and consumer technology usage. Any papers that did not focus on individual consumers as the unit of analysis were excluded from the study. These included studies that focused on firms as the unit of analysis. Similarly, only studies that measured actual usage of technology were retained during the filtering process.

Table 2 shows the process which reduced the pool of publications to 69 research papers that met the research objectives. Similarly, Figure 1 demonstrates the selection process flow for the systematic review.

The next step was to extract data from the selected papers that had passed the abstract review stage. Data extraction and collation was carried out using a template customized by the researcher, which included: (a) title of the journal paper, author(s), date of publication and publisher, (b) research problem, (c) research context, (d) definition of social networks and study constructs, (e) definition of consumer technology usage and study constructs, (f) theoretical foundations, (g) methodology used, (h) findings and (i) research gaps identified.

4. Review findings

Research question 1: What theoretical frameworks are commonly used to explain social networks as a predictor of consumer technology usage?

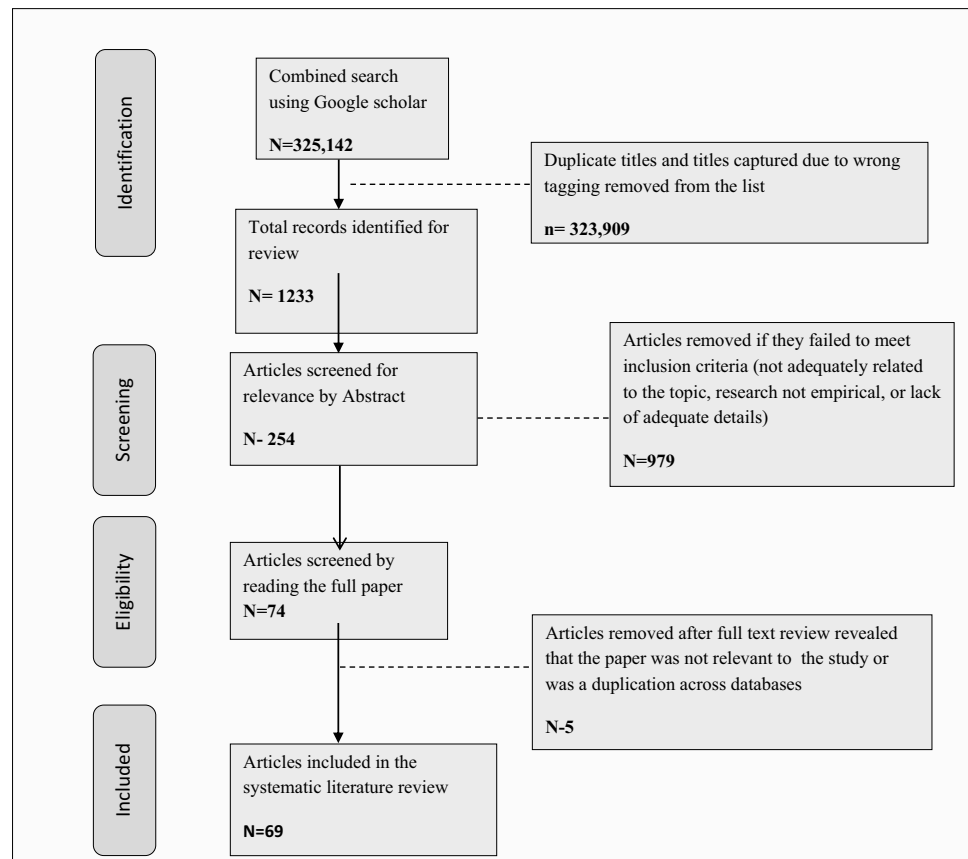
4.1. Fragmentation of theoretical frameworks

From the selected papers, it was evident that the social network as a construct was underpinned by different theories with different assumptions, constructs and measurement items. The fragmentation of theoretical frameworks led to conflicting findings and an inability to generalize the findings. Studies explaining consumer technology usage were based on behavioral studies as well as information systems theories such as diffusion of information theory (Bale et al., 2013; D Iacobucci & S.Hoeffler, 2016; Larosiliere, Carter, Meske et al., 2017), technology acceptance model (TAM; Jayasingh & Wright, 2019; Larosiliere, Carter, Meske et al., 2017; J. Lee et al., 2019), theory of planned behavior (TPB; Larosiliere, Carter, Meske et al., 2017) and unified theory of acceptance (Verma, 2015). Table Appendix 1 summarize the various theories and demonstrates the fragmented approach. Table Appendix 2 shows the diversity of theories used to explain social networks and the variety of theoretical assumptions advanced in the studies as shown in Table 3.

Table 2. Summary of search term results

Databases searched	Search results by key terms	Articles screened by study title	Articles screened by abstract	Articles screened by full text	Final number of papers for inclusion in the systematic review
Springer	1402	11	9	7	7
Taylor & Francis	71,679	477	82	18	17
Wiley Online	77,500	83	29	10	10
Sage Publications	80,235	197	45	10	9
JSTOR	29101	259	43	14	14
Science Direct	65,225	206	46	15	12
Totals	325,142	1, 233	254	74	69

Figure 1. PRISMA flowchart for the selection process of the systematic literature review.



5. Research question 2: Is there consistency in the operationalization of social network constructs?

The literature review revealed that prior research studies had used varied constructs and conceptual frameworks to support the relationships studied. For instance, in a study of the relationship between online social networks and technology adoption, Peng & Mu, (2011) used social network theory and measured the role of lock-in effect, imitation effect, similarity and leadership effects. In a study of the interaction between social media networks and political protests, Jost, Barberá, Bonneau, Langer, Metzger, Nagler, Sterling, Tucker et al., (2018) operationalized social networks using information exchange, motivational content and coordination of protest activities as the study constructs, while, in a study of the relationship between social network interactions and talent management, Nayak, Bhatnagar, Budhwar et al., (2018) anchored the study on social capital theory and measured talent retention, talent management and organizational branding. In yet another study on the role of social networks in developing radically new products in firms, Iacobucci and D. Iacobucci & S.Hoeffler (2016) used the Bass diffusion model and focused on strength of network ties operationalized social networks using betweenness, closeness and centrality as the study constructs.

A major challenge identified was the propensity of prior research to study multiple constructs and their interrelations, which led to increased fragmentation of findings, thus making it difficult to generalize findings. Interestingly, limited scholarly efforts have been made to integrate these prior studies in order to come up with an operational framework that would support generalization of findings regarding the relationships between social network and consumer technology usage constructs. Table Appendix 3 presents a summary of some of the studies reviewed, focusing on the key constructs, theoretical foundations, study contexts and key findings.

Table 3. Research contexts studied

Research context	Number of studies
Usage of Online social networking sites	20
Education	6
Entrepreneurship	6
Migrants	4
Marketing	4
Consumer behaviour	4
Mobile phone usage	4
Healthcare	3
Political participation	3
Social participation	3
Job performance	3
Disaster recovery	1
Hospitality	1
Customer satisfaction	1
Social work	1
Insurance	1
Agriculture	1
Environmental innovation	1
Product development	1
Communication	1
Total	69

6. Research question 3: What are the research contexts used in the reviewed studies?

From the studies reviewed, it was evident that there is a growing research interest on the role of social networks in conditioning consumer technology usage. Common research contexts included education, entrepreneurship insurance, job performance, mobile phone usage agriculture and healthcare. Studies of the use of technology in enhancing social networks online through social network sites also emerged as a growing area of interest. Table 3 shows the spread of research contexts reviewed.

Research question 4: Are there common research streams in the studies reviewed and emerging trends for future research?

The review established that there are three main streams of research focus.

6.1. Research stream one: Social network structures' influence on consumer technology usage

The first stream explained social networks from a structural perspective: this stream focused on how the structure of social networks determined consumer technology usage and mainly relied on social network analysis theories. Social network analysis (SNA) is a theoretical framework that conceptualizes the structure of social networks by focusing on the characteristics of the ties connecting members rather than the characteristics of the individual (Otte & Rousseau, 2002). SNA uses mathematical models to determine the structural relationships between nodes in a social network and how their connectivity influences behavior using constructs such as degree of centrality, betweenness, network centrality, eigenvector centrality, structural equivalence and network centrality.

In a study on the process of selecting influential individuals for marketing of a new product through social networks, Ludlow and Heydari (2014) used mathematical computational techniques

to measure the impact of degree of centrality and betweenness within social networks. The study concluded that nodes with the highest degree of centrality were the strongest in influencing product adoption within social networks. Reychav, n.d.icu, Wu et al., (2016) studied how social networks influenced mobile technology usage for collaboration by consumers. In a controlled field experiment using 327 people, the study applied social network analysis to measure eigenvector centrality and network reciprocity among the nodes in the social network. Eigenvector centrality measures a node's performance while giving consideration to the importance of its neighbors. Results indicated that leveraging social networks in a mobile technology platform can positively heighten the nodes' knowledge acquisition process through collaboration.

In another study, Hinz et al. (2014) studied how social networks influenced consumers' purchase decisions and used 300 students as the study sample. Using degree of centrality (number of social connections a consumer has within a network) among the nodes in the work, the study applied mathematical graph theory and concluded that structural equivalence drove product adoption.

6.2. Research stream two: Social network interactions and their influence on consumer technology usage

The second stream of research entailed the influence of network interactions and relationships among actors in influencing consumer technology usage. Common theories used included social network theory, social learning theories, social capital theory and tie strength theory. Some of the common measures used to explain the relationships included degree of intimacy, frequency of contact, level of trust and level of similarity (homophily). Studies that focused on the nature of relationships within social networks argued that perceptions and beliefs that were communicated during social interactions had an influence on usage behavior (L. Hossain & de Silva, 2009).

6.3. Research stream three: Social networking sites and their influence on consumer usage of technology

The third stream revealed an emerging and dominating study of social networks facilitated by the growth of internet-based Social Networking Sites (SNS). The stream also responded to research question three on the emerging trends research trends. Social networking sites is a phenomenon that is gaining popularity in research and entails examining how consumers use social networking sites to interact, exchange information and influence each other's decision-making. The reviewed literature identified a growing interest and concentration of studies on the impact technology has had on social networks through the emergence of technology-led Social networking sites (SNS). The studies revealed the extent to which technology has become embedded in the daily lives of consumers and how social networking sites influence consumer technology usage.

Similar findings of other literature reviewed in this study, this stream of studies demonstrated similar trends in fragmentation of theoretical frameworks, and conceptualization of constructs and findings. Katona, Zubcsek, Sarvary et al., (2011) used diffusion theory, and measured degree effect, and density of connections and degree of betweenness; while Gong, Liu, Wu et al., (2018) used social role theory and measured system quality, social ties, perceived satisfaction and reputation; and Peng & Mu, (2011) used social network theory and measured lock-in effect, imitation effect, similarity effect, leadership effect and recency effect. The findings were as varied as the theoretical frameworks and constructs used in the studies.

Katona, Zubcsek, Sarvary et al., (2011) concluded that influential power is greater the more the actors occupy a "brokering" position among their contacts and that consumers' technology usage was influenced by the degree effect and clustering effect. Gong, Liu, Wu et al., (2018) argued that social ties and reputation had a dominant effect on trust among males which in turn influenced consumer technology usage, while Peng & Mu, (2011) found that a person's decision to use a type of technology was strongly influenced by the reactions of others in their social networking group, and concluded that dissemination of knowledge within a social networking site was powerful and efficient.

7. Discussion

This study aimed at providing a systematic literature review of existing studies on the relationship between social networks and technology usage by consumers. A total of 69 empirical studies were selected for this study.

Research questions were used to guide the systematic literature review. The study revealed a growing interest in empirical studies on the relationship between social networks and consumer technology usage. The growing literature demonstrated fragmentations occasioned by the use of diverse theoretical frameworks used to explain the relationship between social networks and consumer technology usage. Variables used, operationalisation and measurement of constructs as well as the findings revealed fragmentations which makes it difficult to generalise the findings of the various studies reviewed. Furthermore, this limitation poses a challenge in the application of the findings by practitioners seeking to use the insights in their product development and marketing efforts using social network as an important driver of consumer technology usage.

8. Definition of social networks

From the literature reviewed, there was evidence of a consensus in the definition of social networks. Social networks can be viewed as made up of individuals or organizations (Larosiliere, Carter, Meske et al., 2017; Martins, 2016). Actors in social networks are interconnected through relationships and ties that facilitate interactions and exchange (Brass et al., 1998; Hoang & Antoncic, 2003; Larosiliere, Carter, Meske et al., 2017; Martins, 2016) through which they seek information that influences their behavior (Kang & Namkung, 2016; Komito, 2011).

9. Conceptualization of social networks

There was diversity in the conceptualization of social networks mainly due to lack of a consensus on common theories that explain the social network construct. Different studies used different theories that were relevant to their research areas and study discipline, as shown in Appendix 2. This inconsistent approach revealed confusion which led to varied findings and fragmentation. However, the increased interest in this area of study and the fragmentation identified indicate the growing recognition of social networks as an important predictor of consumer technology usage. There is therefore an urgent need to streamline this study area by developing conceptual and theoretical frameworks that will guide the advancement of future research.

10. Relationship between social networks and consumer technology usage

Extant literature reviewed revealed a convergence of authors' views on the role of social networks in explaining variation in consumer technology usage, as summarized in Table 4.

Table 4. Importance of social networks in influencing consumer behavior

Promotes interactions and exchange of information among actors in a network (Candogan et al., 2012; Isa & Himelboim, 2018; Komito, 2011; Murendo, Wollni, De Brauw, Mugabi et al., 2018; Wedajo, Belissa, Jilito et al., 2019).

Increases connectedness and cohesion which promotes group-oriented behavior by reducing information asymmetry (Deepak et al., 2016; R. B. Lee et al., 2017) Murendo, Wollni, De Brauw, Mugabi et al., 2018; Wheatley & Buglass, 2019).

Interaction among actors in a network helps to building social capital (Xhema, 2019).

Social networks help in mobilization and collaboration towards a common purpose or a common behavior (Bagchi, 2001; Jost, Barberá, Bonneau, Langer, Metzger, Nagler, Sterling, Tucker et al., 2018; Quinton & Fennemore, 2013; Verma, 2015; Wedajo, Belissa, Jilito et al., 2019).

Social networks provide benefits of information, influence, trust, solidarity and exchange, which in turn helps actors in decision making (Cho & Chan, 2019; Hinz et al., 2014; Voelker & Pentina, 2011; Zhang & Venkatesh, 2013).

Social networks among entrepreneurs help in the discovery of new business opportunities, mobilization of resources and growth of businesses (Batjargal et al., 2013).

11. Definitions of consumer technology usage

Literature revealed that scholars have not arrived at a standard definition of consumer technology usage. According to Dillon and Morris (1996), technology usage refers to a situation when a user group demonstrates willingness to use technology for the purpose it was meant for; the authors argued that consumer technology usage was an outcome of a process through which users made decisions about a technology. Davis, (1989), on the other hand, described consumer technology usage as a key indicator of success in any information system. Other scholars have referred to consumer technology usage as technology adoption. For example, Rogers (1976) defined it as the number of steps that a consumer followed from initial awareness of an innovation, attitude formation, and decision-making about using the technology.

From the extant literature, consumer technology usage by individuals, groups or organizations is a key construct in information systems research (Straub et al., 1995). However, according to Goodhue and Thompson (1995), there exists a wide variation of system usage measures, making it hard for scholars to compare various research findings. System usage measures have broadly been categorized into two: objective computer-recorded measures and subjective self-reported measures (Straub et al., 1995). Literature reviewed showed fragmentation occasioned by the various theoretical foundations used and the contextual approach in the definition of consumer technology usage, conceptualization and measurement approaches. However, a common factor in the definitions was the acknowledgement of influences of consumer attitudes on technology towards technology usage by factors such as social interactions and individual and group perceptions. Table 5 provides the various theories, definitions of consumer technology usage, and measurement items.

12. Theoretical foundations for social networks

The systematic literature review revealed the lack of a key theory or theories with consistent and empirically tested constructs, and measurement items that could be used to explain the influence of social networks on consumer technology usage. Table 6 contains the various theories used in the reviewed literature and their key assumptions. A summary of the cross-cutting assumptions that were found in the various theories is also provided. It was evident that there was an urgent need for future studies to focus on developing a conceptual framework to anchor empirical studies on social networks and consumer technology usage. Such a framework would support the advancement of theoretical foundations in the study of social networks. It would also pave the way for future studies that would advance new theories to support the growing interest in the study of the interaction between social networks and consumer technology usage.

13. Operationalization of social networks

Multiple constructs were used to operationalize social networks. The lack of a standard measurement scale resulted in mixed and contradicting findings from the studies (Hoang & Antoncic, 2003). For instance, B. C. Lee (2015) and Wedajo, Belissa, Jilito et al., (2019) both used social capital theory but with varying constructs. While Lee (2015) found that tie strength was not a significant predictor of consumer technology usage, Wedajo, Belissa, Jilito et al., (2019), in contrast, found that social network ties significantly influenced consumer technology usage. Similarly, Magni, Angst, Agarwal et al., (2012) argued that strong ties had a higher influence on consumer technology usage than weak ties, while Vishnu, Gupta, Subash et al., (2019) found that weak ties had a stronger influence on consumer technology usage than strong ties, and Katona, Zubcsek, Sarvary et al., (2011) argued that bridging ties/brokering position was more influential towards consumer technology usage. Appendix 3 shows the various items used to measure social networks in the various studies reviewed.

14. Technology-led evolution of social networks

The study revealed a growing interest in the evolution of social networks as a result of technological advancements. According to Jayasingh and Wright (2019), near-ubiquitous access to the internet has made the world increasingly connected. With the advancement of Web 2.0, virtual

Table 5. Various definitions, conceptualizations and measurements of consumer technology usage

Study	Theory used	Definition of consumer technology usage	Measurement items
Lee, Park, Na, Kim et al. (2016) A comparative study on the relationship between social networking site usage and social capital among Australian and Korean youth	Social capital	Time spent interacting and network building on social networking sites by users	<ul style="list-style-type: none"> • Usage type (shopping, information sharing, networking, entertainment) • Level of usage (high/low) • Frequency of usage
Larosiliere, Carter, Meske et al., (2017)	<ul style="list-style-type: none"> • Diffusion of information theory • Theory of Planned Behavior • Technology Acceptance Model 	Overall use of virtual social networks (Facebook, Twitter, LinkedIn, etc.) for both personal and professional communication	<ul style="list-style-type: none"> • Extent of usage
Wessels & Drennan, (2010)	<ul style="list-style-type: none"> • Attitudinal Theory 	Consumers' utilization of M-banking services	<ul style="list-style-type: none"> • Ease of use • Usefulness • Cost • Perceived risk • Compatibility
Uz Zaman et al. (2020)	<ul style="list-style-type: none"> • Complex Adaptive System (CAS) based theory • Social capital 	Time spent socializing and networking in online social networks by consumers	<ul style="list-style-type: none"> • Frequency of use • Increase in level of socialization • Extent of usage • Increase in religious knowledge • Increase in level of trust in social network sites
Nayak, Bhatnagar, Budhwar et al., (2018)	<ul style="list-style-type: none"> • Social capital theory • Social networking theory • Grounded theory 	Utilization of Social Networking Sites (SNS) as part of the organizational Human Resource strategy for employer branding, talent sourcing, acquisition and retention, and reinforcing stronger relationship with their employers	<ul style="list-style-type: none"> • Usage type (talent acquisition, employer branding, employee engagement) • Extent of usage
Cho and Chan (2021)	<ul style="list-style-type: none"> • Elaboration Likelihood model • Social influence theory 	Consumer behavior that results from informational social influence and normative social influence which in turn influence consumers' decision to use online review sites	<ul style="list-style-type: none"> • Frequency of usage • Tenure on online review sites • Level of information adoption (high/low)

(Continued)

Table 5. (Continued)

Study	Theory used	Definition of consumer technology usage	Measurement items
Wedajo, Belissa, Jilito et al., 2019)	<ul style="list-style-type: none"> • Social capital theory 	The action that results from interactions among a wide range of actors who form a system of mutually reinforcing activities and relationships which in turn influence the actors' attitudes, decisions, adoption and usage of the technology	<ul style="list-style-type: none"> • Improved crop variety • Extent of collective adoption of technology by farmers • Increased level of trust in the technology • Extent of enhanced rural livelihoods
Magni, Angst, Agarwal et al., 2012)	<ul style="list-style-type: none"> • TAM • Social network theory 	The way through which individuals interact with a system	<ul style="list-style-type: none"> • Depth of usage • Scope of usage • Intensity of usage • Perceived ease of use • Perceived usefulness

communities have emerged in which individuals are able to interact, network, express their views and influence others (Cho & Chan, 2019; Xhema, 2019). Using online Word of mouth (WOM), members of an online community (social networking sites) can, without any cost, submit their opinions and reviews of a certain product, topic or community, which results in a significant influence on consumers' purchase intentions. Consequently, social interactions have now become a substantial part of consumers' online activities, with more than 500 million users sharing opinions, experiences, reviews and pictures with their networks online (Toker-Yildiz et al., 2017).

As of 2022, 60% of the world population was using the internet. As a result of high penetration of the internet, SNS have become a significant force, particularly in shaping consumers' information-sharing and decision-making behaviors (Kang & Namkung, 2016). Users have moved beyond using SNS for leisure and social life to significant use in health care, government and business, hence transforming the nature of interactions among the global populace (Issa & Kommes, 2013). One study found that more than 90% of physicians used social media for personal activities whereas 65% used social media for professional use (Xhema, 2019).

The study revealed that the advent of technology has revolutionized the way people interact, communicate, seek information, get help and achieve collective action (Castells & Cardos, 2005; Komito, 2011; Verma, 2015). A great benefit that technology had brought to social interactions is network externalities. Network externality is defined as an increase in the utility of a product or a service due to an increase in the number of people using a similar product (C. P. Lin & Bhattacharjee, 2008; K. Y. Lin & Lu, 2011). Network externalities determine which technologies are adapted and used (K. Y. Lin & Lu, 2011). Online social network members are drawn together by common causes such as healthcare, poverty, housing, faith, education and environment as well as political participation (Quinton & Fennemore, 2013). Social Networking Sites are also supporting teaching and learning. Literature revealed an emergence of teaching networks, and joint project groups' dissemination and sharing of information materials.

Table 6. Summary of theories commonly used to explain social networks

Theories commonly used in the reviewed studies	Assumptions	Common assumptions across the theories used
Social network theory	<ul style="list-style-type: none"> Actors are embedded within networks of interconnected relationships that provide opportunities for and constraints on behavior (Burt, 1997) 	<ul style="list-style-type: none"> Interconnectedness Strength of ties Relationships among actors Interactions Exchange of resources Information flow Influence in decision making Influence on behavior Trust Reinforcement Network structure Network size Frequency of interactions
Social capital theory	<ul style="list-style-type: none"> Individual networks and connections accrue shared norms and values, exchanges and obligations that can potentially provide access to different resources such as emotional, informational or instrumental support (Bourdieu, 2011) 	
Social learning theory	<ul style="list-style-type: none"> Social interactions between actors in a social network facilitate change in understanding beyond an individual and become situated within wider social units (Vishnu, Gupta, Subash et al., 2019) Learning from interactions in a network influences behavior among the actors (DiMaggio & Garip, 2012) Individuals tend to turn to more experienced individuals for information and support 	
Diffusion of information theory (DIT)	<ul style="list-style-type: none"> A theory that seeks to explain how, why and at what rate new ideas and technology spread through a specific population or social system. The five factors that determine the rate of adoption of technology are: relative advantage, compatibility, complexity, trialability and observability (Rogers, 1976) 	

(Continued)

Table 6. (Continued)

Theories commonly used in the reviewed studies	Assumptions	Common assumptions across the theories used
Social network analysis	<ul style="list-style-type: none"> SNA is founded on the pre-mise that how a system is structured determines the system's behavior and outcomes (Borgatti & Ofem, 2010) 	
Social influence theory	<ul style="list-style-type: none"> The impact created through interactions among people in a social context affects individuals' adoption behaviors in a social network A person endowed with an initial opinion or behavioral assessment receives and responds to information propagated in a social network and could choose to modify an original opinion or assessment accordingly 	

14.1. Social networks as creators of social capital

Scholars have defined social capital as resources available to individuals and groups in a social network. Such networks are embedded in trust and norms among the actors (Bourdieu, 2011; Carrillo & Riera, 2017; Coleman, 1988). Szreter and Woolcock (2004) defined three types of social capital: bonding capital, bridging capital and linking capital. At the same time, Adler and Kwon (2002) defined social capital as the goodwill that is engendered by the fabric of social relations that can be mobilized to facilitate action. Although the definitions by the different scholars differ in approach, they agree on common characteristics of social capital as comprising structured networks between individuals or groups of people, and the resources that accrue from interactions among the actors. Researchers also agree that social capital facilitates action among the actors in the social networks.

According to the studies reviewed, the concept of social capital is increasingly becoming popular in the social sciences (Adler & Kwon, 2002), and has been considered an asset in social networks. Social capital informed the study on families, youth, behavior, education and schooling, public health, community life, democracy and governance, economic development and general problems of collective action, career success, finding jobs, product innovation and supplier relations, as well as turnover rates (Adler & Kwon, 2002).

14.2. Conclusion, study implications and directions for future research

From the 69 reviewed research papers, it was evident that over the years, the study of the relationship between social networks and consumer technology usage had become popular in entrepreneurship, education, social participation, marketing, health care, job performance and agriculture while in other areas such as in financial services and mobile technology was inadequate indicating an opportunity for more research in future. There was evident fragmentation in the approach to research from use of theoretical frameworks, conceptualization, operationalization of constructs, measurement scales as well as research findings.

14.3. Study implications

The findings provide empirical and managerial implications. At the empirical level, the study reveals the need for more research to develop common theoretical frameworks that would support the generalization of study findings. At the managerial level, further research will be required to provide insights to practitioners on the role of social networks in driving consumer technology usage under different situations such as cultural contexts, technology type, demographic variety among other factors that moderate consumer's attitude towards technology and consumer technology usage.

15. Areas of future research

The findings identified challenges which provide opportunities to streamline research on social networks and consumer technology usage that is increasingly drawing attention of scholars as the proliferation of technology continue to dominate human lives.

15.0.1. Development of a theoretical framework

A future study could focus on developing a common theoretical framework that encompasses the identified common assumptions with a view to having a standard theory and measurement scales for social networks. This potential area of future study would help to develop standardized measurement scales for social networks and pave way for the generalization of empirical findings of social networks as a predictor of consumer technology usage.

The Social exchange theory (SET) was not used in any of the studies reviewed. SET was advanced by behavioral theorists to explain social exchange relations within social networks informed by the concept of reinforcement (Emerson, 1976). According to Emerson (1976), SET's explanatory power is measured using rules and norms of exchange, resources exchanged in a social interaction, and the relationships emerging from such social exchanges. SET has an overarching framework that could be applied in the study of various disciplines. Future research could assess the suitability of SET as the overarching theoretical framework in the study of the relationship between social networks and consumer technology usage and ways of enhancing it to strengthen its predictive power.

Other future areas of study could include exploring how information systems theories could be integrated with behavioral theories to develop theoretical frameworks for studying the relationship between social interactions and consumer usage of technology.

The influence of technology enabled social networks in conditioning the consumer attitude towards technology and consumer technology usage

With the increased usage of technology by consumers in different aspects of daily life, social interactions are moving from conventional face-to-face interactions to technology-enabled interactions through the ever-increasing social networking sites. More empirical research on the nature of interactions in social networking sites and their impact on technology usage will help in informing policy and the practice of technology usage among consumers and social networks.

As technology continues to influence everyday life, interaction, exchange of information and influence among actors in social networks including social network sites will become important phenomena in consumer technology usage. Future research could focus on how to provide policy-makers, organizations, marketers, service sectors and political movements, among other key sectors, with information and insights on how social network interactions by consumers influence consumer attitudes and consumer behavior in different contexts such as geographical, social cultural and demographic contexts.

Moderating role of consumer demographic characteristics Studies have found that demographic factors such as age, education, occupation and gender influence behavior patterns including

adoption behavior (Al-ajam, 2013; lazerfielf and Merton 1954, katonina, zubsek 2010). For instance, Huyer (2016) stated that the rate of agriculture technology adoption among women was significantly lower than that of men while Rubzen (2020) opined that women in social networks were more likely to adopt technology as they benefitted from social capital within such networks. This area presents an opportunity to deepen empirical studies.

15.0.2. The mediating role of consumer behavioral characteristics

The studies shows that consumer behavior mediates the relationship between social network ties and consumer technology usage. As widely explained using the technology acceptance model, consumer behavior measured using consumer attitude towards technology influences is a significant predictor of consumer technology usage. This stream of research is mature and has not adequately explored how consumer behavior mediates the relationship between social networks and consumer technology usage. Scholars have argued that consumer decisions relating to technology usage are often collaborative with other people or groups (Bagozzi, 2007; Cheong & Mohammed-Baksh, 2019) and this argument creates an opportunity for inquiry on the mediating role of consumer behavioral traits.

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Table A1. Summary of theories used to explain social networks and consumer technology usage

Theory	Number of studies that used the theory
Social Network Theories	
Social network theory	10
Social capital theory	8
Diffusion information theory	7
Social learning theory	4
Social network analysis	3
Technology acceptance model	3
Social influence theory	3
Social information processing model	2
Elaboration likelihood model	2
Theory of tie strength	1
Social role theory	1
Theory of planned behavior	1
Unified theory of acceptance	1
Theory of institutional polycentricism	1
Affect-as information theory	1
Service quality model	1
Theory of bounded rationality	1
Standard diffusion theory	1
Social role theory	1
Gratification theory	1
Grounded theory	1
Resource based view	1
Social resources theory	1
Social connectedness theory	1
Resource based view	1

Table A2. Diversity of theories used to explain social networks

Study	Sample	Theory used	Mediating mechanism examined	construct(s) used	Consumer technology usage construct studied	Key findings
Zhang and Venkatesh (2013)	104 employees in a telecommunication company	Social network theory	N/A	<ul style="list-style-type: none"> Strong ties Weak ties 	Usage of offline and online workplace communication network by employees	Employee ties in online and offline communication networks interact to influence employee job performance
Okello Candiya Bongomin et al. (2018)	400 head of poor households in rural Uganda	Social network theory	N/A	<ul style="list-style-type: none"> Node centrality Network density Network transitivity 	Mobile money usage	<ul style="list-style-type: none"> Existence of social networks of strong and weak ties among mobile money users promotes financial inclusion in rural Uganda There is a positive moderating effect of social networks in the relationship between mobile money usage and financial inclusion in rural usage

(Continued)

Table A2. (Continued)

Study	Sample	Theory used	Mediating mechanism examined	construct(s) used	Consumer technology usage construct studied	Key findings
Magni, Angst, Agarwal et al., 2012	265 employees working in 44 teams in a large financial institution	Social network theory	N/A	<ul style="list-style-type: none"> Strong ties Weak ties 	Depth of use Scope of use Intensity of use	<ul style="list-style-type: none"> Strong ties have a U-shaped effect on individual use of technology Strong ties have a higher influence on technology usage than weak ties within a team The usage is high if strong ties in a team are also lined with bridging ties across teams
Peng & Mu, 2011	Online open source software, Behavior link panel data	Social network theory	N/A	<ul style="list-style-type: none"> Lock-in effect Imitation effect Similarity effect Recency effect 	Adoption of a technology type	<ul style="list-style-type: none"> Online social networking sites are major conduits of technology adoption A person's decision to adopt a type of technology is strongly influenced by reactions of others in the group

(Continued)

Table A2. (Continued)

Study	Sample	Theory used	Mediating mechanism examined	construct(s) used	Consumer technology usage construct studied	Key findings
Reychav, n.d.icu, Wu et al., 2016)	Controlled field experiments involving 327 people	Social network analysis	<ul style="list-style-type: none"> Eigenvector centrality Network reciprocity 	N/A	Adoption of mobile technologies	By leveraging social networks in a mobile platform, participants positively heightened their collaborative knowledge acquisition process through enhanced group interactions and enjoyment
Cai, De Janvry et al. (2015)	Randomized experiment with 5,300 households in 185 villages in rural China	Diffusion theory	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Social learning Diffusion of information 	Adoption of weather insurance	<ul style="list-style-type: none"> The decision of an individual to take up weather insurance among farmers is influenced by social learning within social networks
Young and Ready (2015)	Use of affiliation data from a large police department in South Western USA over a 4-month period	Diffusion of innovation theory	Social network structures; <ul style="list-style-type: none"> Betweenness Degree 	N/A	Usage of On-Office-video Cameras (OVC) by police officers	Interactions among police officers provide a conduit for facilitating cognitive frames that increase OVC legitimacy, which becomes part of their cultural shared norms

(Continued)

Table A2. (Continued)

Study	Sample	Theory used	Mediating mechanism examined	construct(s) used	Consumer technology usage construct studied	Key findings
J. Y. Lee, Park, Na, Kim et al. (2016)	Face-to-face surveys of young people 12–15 years old in major cities comprising 401 respondents in Australia and 644 in Korea	Social capital theory	N/A	bonding capital bridging capital	Usage of social networking sites for group activities by young people <ul style="list-style-type: none"> • Self-disclosure • Social monitoring • Information sharing • Interpersonal communication • Group activities 	The use of social networking sites for group activities among young people creates social capital
Murendo, Wolni, De Brauw, Mugabi et al., 2018)	477 households 273 mobile money users 204 non users of mobile money	<ul style="list-style-type: none"> • Social learning theory • Social resources theory • Tie strength theory 	N/A	<ul style="list-style-type: none"> • network size • strength of network ties (strong ties, weak ties) • group membership • network education 	Uptake of mobile money	Mobile money adoption is positively influenced by the size of the social network within which information is exchanged. The effect is particularly pronounced in non-poor households

(Continued)

Table A2. (Continued)

Study	Sample	Theory used	Mediating mechanism examined	construct(s) used	Consumer technology usage construct studied	Key findings
Vishnu, Gupta, Subash et al., 2019	320 technology adopter farmers in India	<ul style="list-style-type: none"> social learning theory social constructivism theory 	Structure of networks: <ul style="list-style-type: none"> degree betweenness closeness density centrality 	N/A	Acquisition of information on vital livestock technology	<ul style="list-style-type: none"> Farmers rely mainly on formal communication sources (vet doctors) followed by information from peers homogeneous group of farmers facilitate meaningful interactions as well as information sharing on technology
Lee and Katz (2015)		social capital theory	N/A	<ul style="list-style-type: none"> network size weak ties strong ties bridging capital bonding capital trust norms 	Tourism technology adoption especially Web 2.0	<ul style="list-style-type: none"> With the exceptions of trust and tie strength, all other components of social capital exerted significant effects on the level of adoption of technology by tourism direct marketing officers

(Continued)

Table A2. (Continued)

Study	Sample	Theory used	Mediating mechanism examined	construct(s) used	Consumer technology usage construct studied	Key findings
Wedajo, Belissa, Jilito et al., 2019	Focus group discussions with member of an indigenous society (Afoosha) of farmers in Ethiopia	<ul style="list-style-type: none"> social capital theory 	N/A	<ul style="list-style-type: none"> Bonding capital Bridging capital Linking capital 	Adoption of technology by an indigenous society of farmers in Ethiopia	<ul style="list-style-type: none"> Strong networks among members of the Afoosha indigenous society have more power to influence behavior, decision-making values and practices of the community members such as adoption of technologies
Nayak, Bhatnagar, Budhwar et al., 2018	78 semi-structured interviews with HR professionals of IT-enabled services Talent acquisition organizations	<ul style="list-style-type: none"> Social capital theory Grounded theory 	N/A	<ul style="list-style-type: none"> Organizational branding Talent management Retention 	Usage of social networking sites by human resource practitioners for employer branding and talent sourcing and retention	<ul style="list-style-type: none"> Usage of social networking sites reinforces stronger relationship between employees and employers

(Continued)

Table A2. (Continued)

Study	Sample	Theory used	Mediating mechanism examined	construct(s) used	Consumer technology usage construct studied	Key findings
Katz et al. ()	450 adult members of Korean immigrant church in New Jersey	<ul style="list-style-type: none"> Theory of bounded solidarity Theory of tie strength Social capital theory 	N/A	<ul style="list-style-type: none"> Network size Diversity Centrality Weak ties Strong ties Frequency of interactions Relational closeness Reciprocity Time known to each other 	Usage of mobile communications by Korean immigrants	<ul style="list-style-type: none"> There is a significant association between texting with co-ethnic strong ties and network centrality Network diversity is associated with weak ties networks

Table A3. Variables used to operationalize the social networks using various theories		
Most common theories in the reviewed studies	Variables used to operationalize social network construct	Variety of items used to measure social networks
Social network theory	<ul style="list-style-type: none"> • Information exchange • Strong ties • Weak ties • Network density • Network transitivity • Network density • Imitation effect • Similarity effect • Lock-in effect • Recency effect • Node centrality • Robustness • Homophily 	<ul style="list-style-type: none"> • Network size • Strength of social network ties • Information flow • Exchange of information • Frequency of interactions • Network structure • Level of social network • Norms • Trust • Social network type • Social network structure • Social network intensity • Closeness • Centrality • Social network density • Bonding capital • Bridging capital • Linking capital • Eigenvector centrality • Network reciprocity

(Continued)

Table A3. (Continued)

Most common theories in the reviewed studies			Variety of items used to measure social networks	
	Variables used to operationalize social network construct			
Social capital theory	<ul style="list-style-type: none"> • Bonding capital • Linking capital • Bridging capital • Talent management • Talent retention • Organization branding • Time spent networking 			
Social learning theory	<ul style="list-style-type: none"> • Network size • Weak ties • Strong ties • Bridging capital • Bonding capital • Trust • Norms • Group membership • Network education 			
Diffusion of information theory (DIT)	<ul style="list-style-type: none"> • Degree effect (number of connections) • Network density of connections • Betweenness • Social learning • Diffusion of information • Network structure 			

(Continued)

Table A3. (Continued)		
Most common theories in the reviewed studies	Variables used to operationalize social network construct	Variety of items used to measure social networks
Social network analysis	<ul style="list-style-type: none">• Eigenvector centrality• Network reciprocity	
Theory of bounded solidarity	<ul style="list-style-type: none">• Relational closeness• Reciprocity• Time known to each other• Centrality• Diversity• Network size	
Social influence theory	<ul style="list-style-type: none">• Engagement• Source credibility• Social influence• Information influence• Normative influence• Information adoption• Collective decisions	



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