

Factors Influencing Knowledge-Sharing Intention in Virtual Waste Management Community: A Systematic Review and AHP Analysis

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Abstract: Most people are unaware of the dangers of waste, so they do not reduce waste. Knowledge and awareness of a system are essential perspectives for realizing socio-economic desires. Virtual communities are a means to share knowledge about proper waste management. Based on previous literature searches, research has yet to identify the factors influencing knowledge-sharing intentions (KSI) in virtual communities focusing on waste management issues. This literature review examines previous research regarding the factors influencing KSI using the Kitchenham method in virtual communities focusing on waste management. This literature review also examines previous research in the context of the higher education community and professional organizations. This literature review resulted in the extraction of data from previous research, including the type of knowledge disseminated, methods of sharing knowledge, technology used to share knowledge, and factors that influence KSI. Thirty-nine factors influence KSI, mapped into five domains: organizational culture, information technology (IT) infrastructure, individuals, perceived risks, and perceived benefits. These factors were then weighted using the Analytical Hierarchy Process (AHP) method to obtain 15 factors based on the characteristics of the community that shared knowledge about waste management. Based on the AHP weighting, it is known that the IT domain infrastructure is the domain that has the highest weight. This research contributes to the academic field, namely the availability of a framework regarding the factors influencing the intention to share knowledge in virtual communities focusing on waste management in Indonesia. This research also provides a practical contribution, namely a framework that can be used by environmental practitioners to develop policies to support environmental sustainability initiatives.

Keywords: Knowledge sharing, Knowledge sharing intention, Virtual community, Virtual waste management, Waste management knowledge

1. Introduction

The waste problem is increasing as the number of human activities increases. The World Bank Organization released data showing that every year, 2.01 billion tons of solid municipal waste are produced, and only 67% of the total waste can be managed safely for the environment (World Bank Organization, 2018). Meanwhile, the issue of waste management that is developing in all countries is related to the sustainable development goals (SDGs) initiated by the United Nations, including clean water and sanitation (goal 6), sustainable cities and communities (goal 11), responsible consumption and production (goal 12), climate action (goal 13), and life below water (goal 14) (United Nations, 2023; 2024). Research conducted by (Mir, Cheema and Singh, 2021) states that most people are unaware of the dangers of waste, so they do not reduce waste. Awareness is an individual's consciousness of new trends through new systems or technologies. At the same time, knowledge is a thorough understanding of something, and the relationship between the two cannot be separated (Alordiah et al., 2023). Knowledge and awareness of a system are essential perspectives for realizing sustainability in socio-economic aspects (Islam et al., 2021).

Previous research has identified a relationship between knowledge management and sustainability. Knowledge management plays a crucial role in sustainability practices that support the Sustainable Development Goals (SDGs) by identifying organizational knowledge needs, developing strategies to enhance learning, and institutionalizing sustainability knowledge within organizations (Klingenberg and Rothberg, 2020). Additionally,

knowledge management has been shown to influence environmental sustainability through the mediation of green innovative culture, green technological use, and environmental awareness (Weina and Yanling, 2022). To effectively manage sustainability knowledge, there are three key approaches: identifying the sustainability knowledge required based on organizational goals, developing strategies and securing resources to acquire sustainability skills, and disseminating this knowledge throughout the organization (Klingenberg and Rothberg, 2020). Knowledge-sharing, as part of knowledge management, involves the distribution of knowledge between individuals within an organization. Knowledge-sharing requires adequate support to maximize its benefits for the organization through system.

Knowledge-sharing systems are designed to support individuals' sharing of knowledge among virtual communities of practice (CoP) through mechanisms and frameworks that enable members to communicate and collaborate (Corbett-Etchevers et al., 2024). These systems aim to help users explore new or foreign perspectives and increase tacit knowledge (Wu, 2022). This study seeks to determine the factors that influence the knowledge-sharing intentions of virtual community members regarding waste management, facilitated by social media. Knowledge-sharing is an essential factor for the sustainability of a community and must be supported by active participation from its members (Liu and Zhang, 2020). Social media serves as one of the electronic technologies that supports knowledge-sharing (Tajpour, Hosseini and Mohiuddin, 2023). Virtual communities can utilize developing social media technology to facilitate sharing experiences regarding sustainable waste management. Social media can increase virtual community engagement by promoting environmentally friendly practices, raising awareness, and fostering a sense of the need for sustainable living among users (Redyantanu, Yatmo and Atmodiwirjo, 2022). Besides social media, various technologies support virtual communities to support sustainable lifestyles through waste management. A framework for intelligent household waste management in Indonesia states that information technology such as machine learning, artificial intelligence, social media, and digital applications is one of the determining dimensions for communities to carry out sustainable waste management practices (Wirani, Eitiveni and Sucahyo, 2024). Furthermore, sustainable waste management practices carried out by virtual communities can encourage a creative economy through community-based initiative programs with recycling and upcycling projects, as well as waste collection services that provide incentive-based exchange (Redyantanu, Yatmo and Atmodiwirjo, 2022). Understanding the factors that affect knowledge-sharing intentions in virtual waste management communities is crucial for guiding knowledge management practices to promote environmental sustainability by disseminating waste management knowledge. These factors help develop a framework for knowledge-sharing intentions within the virtual waste management community. When knowledge is well-managed and widely disseminated within the community, environmental awareness will grow, supporting sustainability initiatives (Weina and Yanling, 2022). This illustrates how knowledge-sharing practices can foster effective waste management practices.

Several studies have explored the factors that support knowledge-sharing intention (KSI) in areas such as social media for higher education students (Hosen et al., 2021), online platform (Bi and Cao, 2022), or virtual communities (Luo et al., 2021). However, no research has explicitly addressed KSI within virtual communities focused on waste management. Virtual communities play a crucial role in disseminating knowledge about waste management, as they foster community-driven efforts to protect the environment at even the smallest scale. Factors influencing KSI in waste management communities were identified through a Systematic Literature Review (SLR) of previous research related to KSI in virtual communities, academic institutions, and professional organizations. These studies utilized knowledge-sharing methods based on knowledge management theory (Becerra-Fernandez, Irma; Sabherwal, 2015). This research has yet to find a similar domain, virtual communities, focusing on waste problems. Still, this research has strong arguments for using previous research that discusses higher education students, online platforms, academic institutions, and professional organizations.

The selection of prior research that discusses higher education students is considered appropriate in this research because students are active in sharing knowledge and using digital platforms to collaborate (Abdullah et al., 2024). This condition is in line with the character of virtual communities, which focus on sharing information and collaborating to achieve sustainability goals. The context of sharing knowledge with the help of online platforms is also similar to research conducted because online platforms are an essential medium to support the provision of helpful communication for online communities that focus on health sustainability (Bi and Cao, 2022). Apart from the similarities between communities that use online platforms, the harmony between the health community and the waste management community is that they have common goals, the desire to carry out the best practices in disseminating knowledge, and the involvement of various groups. Meanwhile, academic institutions have the characteristics of being the primary source of scientific knowledge and innovation that encourages a culture of knowledge sharing. This condition is relevant to virtual communities

that focus on waste problems because of the encouragement for the emergence of a knowledge-sharing culture that involves innovation. Meanwhile, the choice of the previous research domain, which focused on professional organizations, was considered consistent because professional organizations are a forum for practitioners to share knowledge that is in line with their field and can increase information capabilities for their members (Lin and Hwang, 2021).

This study uses one of the virtual communities in Indonesia, which focuses on waste management issues, to get arguments for the similarity of characteristics from previous research selections. One of the online waste management communities in Indonesia that is used as a characteristic comparison with previous research is the LyfeWithLess (LWL) Online Community. LWL Online Community was chosen because it is one of the online communities that focuses on waste management using a minimalist lifestyle approach. The context of students as individuals who act as knowledge producers by using social media assistance is in line with the characteristics of community members who are members of a waste management community called Lyfe With Less (LWL). The community carries out a knowledge-sharing process about efforts to manage waste by building a minimalist lifestyle through social media such as Instagram (@lyfewithless), Facebook (Lyfe With Less), Spotify Podcast (LyfeWithLess), and website (lyfewithless.com). The LWL virtual community uses various electronic technologies, such as websites aligned with research (Chedid et al., 2020) of professors and researchers at universities in Portugal. This research uses electronic technology support such as websites, email, and academic portals and is influenced by aspects of organizational culture to support KSI.

Research conducted by (Abdel Fattah et al., 2020) on students in Oman using the meeting method is also considered in line with the LWL virtual community, which routinely conducts knowledge-sharing using virtual seminars with topics around waste management efforts. In addition, research conducted by (Endres and Chowdhury, 2022) on students in business classes and (Matsuo and Aihara, 2022) on health organizations is also considered to be in line with the characteristics of the LWL virtual community because it uses best practices. The LWL virtual community provides simple best practices that are linked to the telegrams used by the community. This literature review aims to identify the factors influencing KSI in virtual community that focused on waste management in Indonesia. The identified factors will be used to design a framework to support knowledge-sharing intention regarding waste management in the virtual communities. This research uses analytical hierarchy process (AHP) method to weigh factors influencing KSI in the LWL virtual Community that was obtained from SLR.

2. Theoretical Foundation

2.1 Knowledge-sharing

Knowledge-sharing is one factor that drives the success of knowledge management practices (Jennex, 2006). Knowledge-sharing is the process of sharing or transferring explicit or tacit knowledge that is addressed individually to increase the knowledge of the individual recipient (Doronin, Lei and Shah, 2020). Knowledge-sharing is a complex process of social interaction, but the individuals involved benefit from social network connections and social interaction to gain access to new information and expertise (Han, Grace Oh and “Pil” Kang, 2022). Knowledge users carry out knowledge-sharing by utilizing their social networks to share knowledge that is considered significant (Wang et al., 2022a). In mobile social networks, knowledge-sharing has increased creativity, learning, and the creation of valuable cyberspaces (Hoseini, Saghafi and Aghayi, 2019).

Several studies have identified ways to share knowledge in communities, higher education academics, and professional associations. Some ways to share knowledge include communities of practices (CoP), electronic technology, after-action reviews, seminars, or meetings (Awad and Ghaziri, 2004). CoP develops a learning environment that supports knowledge-sharing to achieve innovation, flexibility, and competitiveness (Mládková, 2023). In research (Matsuo and Aihara, 2022), learning goals are proven to mediate the effect of CoP on knowledge-sharing. Social media is one of the electronic technologies that is currently developing. The use of social media in virtual communities has also been researched by (Hoseini, Saghafi and Aghayi, 2019), using the Telegram platform to search, learn, entertain, communicate, and get advice. Research conducted by (Endres and Chowdhury, 2022) used the after-action review method on students who were given complex tasks, then students were asked to reflect to find ways to make fewer mistakes. Research conducted by (Abdel Fattah et al., 2020) encourages students to share knowledge on the results of seminars or meetings.

2.2 Knowledge-Sharing Intention (KSI)

KSI is the desire to give the best effort when sharing knowledge with other community members (Kim, Lee and Oh, 2020). KSI is a motivational factor that individuals should have (Hoseini, Saghafi and Aghayi, 2019). According

to (Bi and Cao, 2022), KSI is related to behavioral factors that are influenced by personal and environmental factors, which consist of the supporting platform environment and the platform user environment. KSI can be reflected by the willingness of community members to share their knowledge if other community members ask questions (Zhou, 2019). Research conducted by (Hsu and Lin, 2020) states that KSI in the context of social media is defined as the level of user trust in sharing their knowledge through social media. Students who are encouraged to do KSI on social media will generate confidence among students and support the development of KS culture (Hashmi, Soroya and Mahmood, 2021).

2.3 Goal and Research Questions

This literature review aims to identify factors that influence KSI in communities, healthcare organizations, and HEIs that have similarities with communities that focus on waste management. There are four research questions (RQ) developed in this study, namely:

RQ1: What types of knowledge are shared?

RQ2: What are the ways to share knowledge?

RQ3: What technologies are used to support knowledge-sharing in the community?

RQ4: What factors influence knowledge-sharing intention in the community?

RQ5: What is the framework to guide knowledge-sharing intention in a virtual waste management community?

In RQ1 and RQ2, this literature review contains references, scope, types of knowledge shared, and ways to share knowledge. In RQ3, this literature review contains technologies used to support knowledge-sharing in the community. In RQ4, this literature review contains factors influencing knowledge-sharing intentions that impact knowledge-sharing behavior. RQ5 is answered using the framework to identify knowledge-sharing intentions in virtual waste management communities. The framework embodies the language and processes needed to guide knowledge management practices, especially knowledge sharing, to support environmental sustainability.

3. Research Method

The literature review was carried out by adapting the guidelines from Kitchenham (Kitchenham, 2004). Based on these guidelines, this literature review aims to identify research positions regarding the factors that influence knowledge-sharing intention regarding waste management practices from relevant articles since 2019. This literature review also provides a framework to support the development of new research positions related to knowledge-sharing intention. This literature review conducted an article search using criteria including Population, Intervention, Comparison, Outcome, and Context (PICOC). Table 1 will present the structure of the research question based on the PICOC criteria. This literature review identifies the factors influencing knowledge-sharing intention in the waste management community.

Table 1: Research question structure

Population	knowledge sharing intention, factor, driver
Intervention	community, communities, household, individual, higher education student
Comparison	knowledge-sharing intention in household community, knowledge-sharing intention in health community, knowledge-sharing intention in higher education civitas, knowledge-sharing intention in individual
Outcome	factor affect knowledge-sharing intention in waste management community
Context	waste management community

3.1 Article Searching Process

This literature review uses five journal databases for article searches: Scopus, Science Direct, IEEE Xplore, Emerald Insight, and Sage Journal. The process of searching for articles using Boolean Search with search queries is presented in Table 2.

Table 2: Boolean search for article search

Database Journal	Boolean Search
Scopus	TITLE-ABS-KEY (("knowledge-sharing intention") AND (factor OR driver) AND (community OR household OR communities))
Science Direct	("knowledge-sharing intention") AND (factor OR driver) AND (community OR household OR communities)
IEEE	("knowledge-sharing intention") AND (factor OR driver) AND (community OR household OR communities)
Emerald Insight	("knowledge-sharing intention") AND (factor OR driver) AND (community OR household OR communities)
Sage Journals	("knowledge-sharing intention") AND (factor OR driver) AND (community OR household OR communities)

This literature review applies these search queries to the title, keywords, and abstract of all articles. At the initiation stage, this literature review found 730 articles consisting of 45 articles on Scopus, 79 articles from Science Direct, five from ACM Digital Library, 572 from Emerald Insight, and 28 from Sage Journals. The flow of the systematic literature review process is presented in Figure 1.

3.2 Article Selection Process

Articles obtained from the stages of the article search process will then be evaluated for suitability based on the title and abstract. The evaluation results were 363 articles consisting of 12 from Scopus, 33 from Science Direct, one from ACM Digital Library, 303 from Emerald Insight, and 14 from Sage Journal. The next stage was to make a selection based on full text and produce 25 (21 without duplicate) articles consisting of five articles from Scopus, five articles from Science Direct, 1 article from ACM Digital Library, nine articles from Emerald Insight, and four articles from Sage Journal. In the final stage, this literature review applies several criteria to evaluate the quality of articles. In the final stage, there are 20 articles to be extracted. There are seven rules to evaluate the quality of articles:

1. The article describes the research objectives related to knowledge-sharing intention.
2. The article writes an appropriate literature review, background, and research context.
3. The article displays related work from previous research, which help supports the primary research contribution.
4. The article clearly describes the factors, drivers, and framework for knowledge-sharing intention in the community.
5. The article includes statement indicators.
6. The article has research results related to knowledge-sharing intention.
7. Articles display conclusions that are relevant to the objectives or research problems.

4. Results

This section presents the results of data extraction according to the research question. A comparison of the scope, types of knowledge shared, methods of knowledge-sharing, technologies used to support knowledge-sharing, supporting theories, and factors influencing KSI are presented in Appendix 1.

4.1 Type of Knowledge Shared

This literature review has identified the types of knowledge used by the community. These types of knowledge include specific knowledge, general knowledge, simple knowledge, complex knowledge, procedural knowledge, and tacit-explicit knowledge. This literature review uses knowledge categorization derived from theories regarding knowledge management (Becerra-Fernandez, Irma; Sabherwal, 2015). Specific knowledge in the context of online health communities (OHC) identified by research (Zhou, 2019; Liu and Zhang, 2020; Bi and Cao, 2022; Zhang and Liu, 2022) is individual treatment experiences and health information which are specific and rarely known by the general public (Asghar et al., 2023). With academics at HEI, specific knowledge shared is about the areas of expertise of academics (Akosile and Olatokun, 2020) (Hashmi, Soroya and Mahmood, 2021) (Chedid et al., 2020). In the context of professional accountants, the specific knowledge shared is related to topics regarding accounting (Lin and Hwang, 2021). In research conducted by (Hsu and Lin, 2020), in the context of members of the Facebook community, specific knowledge is shared according to the expertise of each member. Other people commonly known general knowledge, so it is easy to share with others (Becerra-

Fernandez, Irma; Sabherwal, 2015). In research (Hoseini, Saghafi and Aghayi, 2019; Luo et al., 2021; Liao, 2022), general knowledge in virtual communities relates to general knowledge that members know according to their interests, such as music, movies, or other topics.

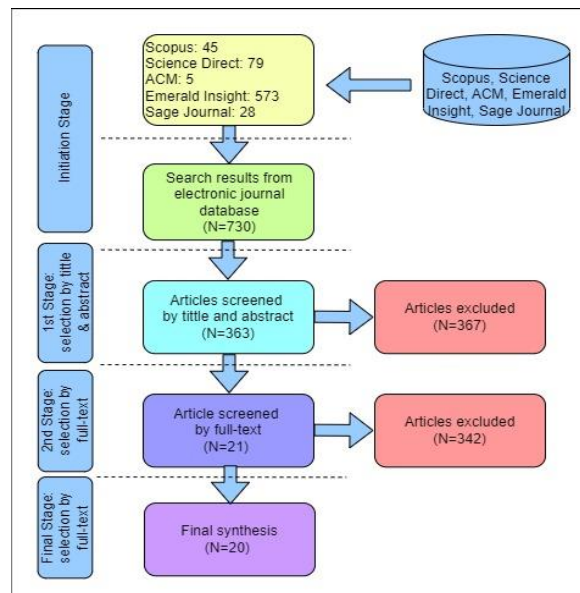


Figure 1: The flow of the systematic literature review process

Simple knowledge focuses on one particular primary area (Becerra-Fernandez, Irma; Sabherwal, 2015). In online travel communities (OTC) (Selim et al., 2022), simple knowledge is shared according to tourist experiences at specific locations. In the context of a higher education institution (HEI), the knowledge shared relates to the subject chosen by students as in research (Abdel Fattah et al., 2020; Hosen et al., 2021). In research (Kim, Lee and Oh, 2020), simple knowledge shared by learning community members is related to Macintosh usage, game development, education, architecture, software, and math. Complex knowledge involves various areas of expertise (Becerra-Fernandez, Irma; Sabherwal, 2015) and is in line with research (Endres and Chowdhury, 2022) on management students at HEI who research knowledge on tasks that are complex and require expertise in several fields.

Procedural knowledge relates to steps to produce specific outcomes (Becerra-Fernandez, Irma; Sabherwal, 2015). Procedural knowledge in nurses relates to hospital patient care procedures (Matsuo and Aihara, 2022). Tacit knowledge can be considered as intuition and know-how individual knowledge that is difficult to articulate and transfer, in contrast, explicit knowledge relates to data and information that is easy to communicate and codify (Shahzad, Chilba and Arslan, 2024). Research conducted by (Wang et al., 2022b) examines the influence of tacit and explicit knowledge on virtual communities according to their respective topics and interests. The mapping of knowledge types is presented in Figure 2.

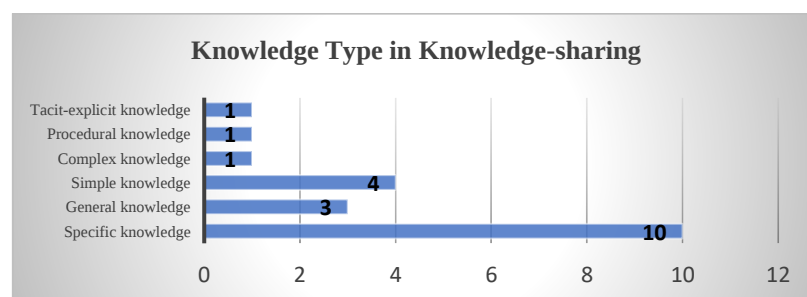


Figure 2: Knowledge type in knowledge-sharing

4.2 Ways to Share Knowledge

This literature review has identified several types of way to share knowledge, such as communities of practices (CoP), electronic technology, seminars or meetings, and after-action reviews. Several studies have identified ways to share knowledge through CoP and electronic technology (Zhou, 2019; Liu and Zhang, 2020; Bi and Cao, 2022; Zhang and Liu, 2022) on OHC, (Kim, Lee and Oh, 2020) on learning communities (Hoseini, Saghafi and

Aghayi, 2019) in social networking services (SNSs) communities, (Lin & Hwang, 2021) in professional accountant communities that also involve the water cooler method, (Hsu and Lin, 2020) in Facebook communities in Taiwan, (Selim et al., 2022) on OTC, (Wang et al., 2022b) on virtual communities. Research using the CoP to share knowledge was carried out on nurses at the hospital (Matsuo and Aihara, 2022).

Research that using after action to share knowledge was conducted (Endres and Chowdhury, 2022) on management students at HEI. Previous research also using electronic technology with social media among HEI students is research conducted by (Akosile and Olatokun, 2020; Hosen et al., 2021; Asghar et al., 2023), (Chedid et al., 2020) on academic portals, websites, and e-mails, (Hashmi, Soroya and Mahmood, 2021) on SNSs. Research conducted by (Abdel Fattah et al., 2020) used the seminar and meeting method for HEI students in Oman. The mapping of the knowledge-sharing method is presented in Figure 3.

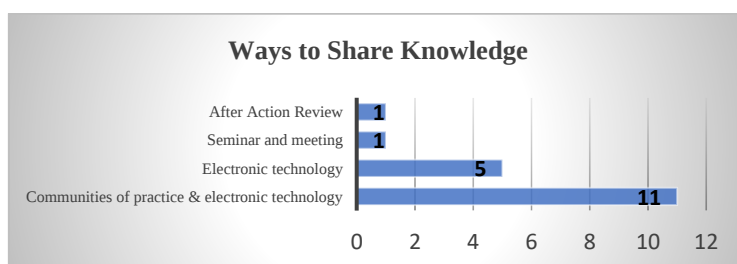


Figure 3: Ways to share knowledge

4.3 Technology Used to Support Knowledge-sharing

This literature review has identified 17 studies that use electronic technology to support knowledge-sharing, namely online health platforms (Zhou, 2019; Liu and Zhang, 2020; Zhang and Liu, 2022), SNSs (Hsu and Lin, 2020; Kim, Lee and Oh, 2020; Hashmi, Soroya and Mahmood, 2021; Hosen et al., 2021; Asghar et al., 2023), mobile social network (Hoseini, Saghafi and Aghayi, 2019), web-based platform (Akosile and Olatokun, 2020; Bi and Cao, 2022), online search engines (Lin and Hwang, 2021), collaborative web (Luo et al., 2021), online travel platform (Selim et al., 2022), virtual communities platform (Liao, 2022; Wang et al., 2022b). The mapping of the technology used to support knowledge-sharing is presented in Figure 4.

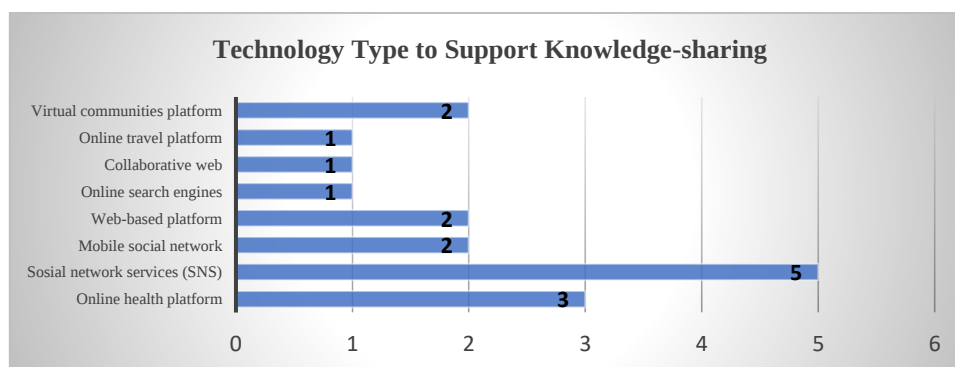


Figure 4: Technology type to support knowledge-sharing

4.4 Factors Influencing Knowledge-Sharing Intention

This literature review identified 39 factors influencing knowledge-sharing intention (KSI) from previous research. These factors will be mapped into several domains, namely organizational culture, information technology (IT) infrastructure, perceived risk, perceived benefit, and individuals. Domain organization culture and IT infrastructure are components of knowledge management infrastructure (Becerra-Fernandez, Irma; Sabherwal, 2015). The mapping between domains and factors is presented in Table 3. Domain mapping is carried out based on the definition of each factor. The organizational culture domain relates to factors that show the similarity of vision, mission, understanding, feelings, beliefs, and values that develop within an organization (Assoratgoon and Kantabutra, 2023). A good organizational culture can be built based on trust between members and organizational culture can strengthen trust between members (Mousa Alriyami et al., 2024). The IT Infrastructure domain relates to the characteristics of the digital platforms used to share knowledge. Domain Perceived Risk relates to uncertain and unwanted factors (Matsuo and Aihara, 2022). The Perceived Benefit domain relates to the benefits felt by users when using a system (Huang, 2023). The individual domain is

associated with the personal and psychological characteristics of a person who is the motivation (Kim, Lee and Oh, 2020; Hosen et al., 2021) . An explanation of each factor used as an argument for grouping factors is available in Table 3.

Table 3: Mapping between domains and factors

No.	Factor	Research	Frequency
Domain: Organization Culture			
1	Sense of belonging: The emotional attachment to being part of a community that focuses on waste management	(Liu and Zhang, 2020)	1
2	Shared Cognition: Similarity of thinking between members in a community to share knowledge about waste management	(Hoseini, Saghafi and Aghayi, 2019)	1
3	Trust: The hope held by individuals towards something that can be relied on to share knowledge regarding waste management.	(Hoseini, Saghafi and Aghayi, 2019; Akosile and Olatokun, 2020; Chedid et al., 2020)	5
	Trust in other member: Trust to share knowledge about waste management with community members	(Zhou, 2019)	
	Trust in community: Trust to share knowledge about waste management in the community	(Bi and Cao, 2022)	
4	Commitment		4
	Community commitment: Strong commitment to share knowledge within the community focused on waste management	(Bi and Cao, 2022)	
	Virtual community commitment Strong commitment to a virtual community focused on waste management	(Liao, 2022)	
	Normative commitment, affective commitment, continuance commitment: The commitment of community members related to moral, emotional and dependency drives to share knowledge about waste management in the community	(Luo et al., 2021)	
5	Relationship commitment: Commitment to maintaining long-term relationships in the community	(Zhang and Liu, 2022)	1
	Expected relationship: A person's expectations of relationships in a community that focuses on waste management	(Hsu and Lin, 2020)	
6	Subjective norm: Subjective norms that apply to a community that focuses on waste management	(Abdel Fattah et al., 2020; Chedid et al., 2020; Hashmi, Soroya and Mahmood, 2021; Selim et al., 2022)	4
7	Organisational culture: An organizational culture rooted in a community that focuses on waste management	(Akosile and Olatokun, 2020)	1
8	Reward system: The community has a reward system for members who share knowledge about waste management	(Akosile and Olatokun, 2020)	2
	Virtual community rewards:	(Wang et al., 2022b)	

No.	Factor	Research	Frequency
	The virtual community gives awards to members who implement a culture of sharing knowledge regarding waste management		
9	Management support: Support provided by community management to sustain a culture of sharing knowledge regarding waste management	(Akosile and Olatokun, 2020)	1
10	University policy: Policies regarding knowledge sharing in the university context	(Akosile and Olatokun, 2020)	1
11	Social influence: Social influence that encourages someone to share knowledge about waste management	(Asghar et al., 2023)	1
Domain: IT Infrastructure			
12	Performance expectancy: The level of effectiveness of technology to support knowledge sharing regarding waste management in the community	(Asghar et al., 2023)	1
13	Effort expectancy: The level of ease of use of a technology that supports sharing knowledge about waste management in the community	(Asghar et al., 2023)	1
14	Document exchange: Technological functionality that supports document exchange as a basis for knowledge-sharing activities in the community	(Hosen et al., 2021)	1
15	Virtual communication: Technology that supports the communication process as part of sharing knowledge in the community	(Hosen et al., 2021)	1
16	Knowledge formation: Technology that can support the formation, creation and sharing of knowledge in communities	(Hosen et al., 2021)	1
17	Availability of infrastructure: Availability of technological infrastructure, which is the basis for carrying out knowledge-sharing activities in the community	(Akosile and Olatokun, 2020)	1
18	Usage of social media: Availability of social media to share knowledge between community members	(Akosile and Olatokun, 2020)	1
Domain: Perceived Risk			
19	Privacy risk: The level of concern of individuals in a community that their data will be misused	(Zhou, 2019)	1
20	Loss of knowledge power: The level of fear of individuals in a community who feel that sharing knowledge can reduce their superiority	(Lin and Hwang, 2021)	1
Domain: Perceived Benefit			
21	Perceived worth: Community members feel that sharing knowledge about waste management is a valuable action	(Liu and Zhang, 2020)	
22	Expected reciprocal benefit:	(Hsu and Lin, 2020)	

No.	Factor	Research	Frequency
	Community members hope that by sharing knowledge about waste management, they will gain reciprocal benefits		
23	Reputation: Opinions obtained from other community members due to knowledge-sharing activities	(Hoseini, Saghafi and Aghayi, 2019; Hosen et al., 2021)	2
24	Reciprocity: Expectation to get something similar in the future because you have carried out knowledge-sharing activities	(Hoseini, Saghafi and Aghayi, 2019; Lin and Hwang, 2021)	2
25	Performance: Increasing the results of a knowledge-sharing process within the community	(Endres and Chowdhury, 2022)	1
Domain: Individual			
26	Personal identity: A strong identity attached to community members and encouraging sharing of knowledge regarding waste management	(Kim, Lee and Oh, 2020)	1
27	Self-efficacy: The level of confidence of community members to share knowledge about waste management	(Wang et al., 2022b)	4
	Web-specific self-efficacy: The ability of community members to use the web to encourage sharing knowledge regarding waste management.	(Kim, Lee and Oh, 2020)	
	Knowledge Creation Self-efficacy: Community members' confidence in being able to create knowledge that is then shared	(Kim, Lee and Oh, 2020)	
	Knowledge self-efficacy: Community members' confidence in being able to generate, manage and share knowledge regarding waste management	(Akosile and Olatokun, 2020)	
28	Altruism: The desire of community members to help in sharing knowledge without expecting rewards or rewards	(Hoseini, Saghafi and Aghayi, 2019; Hsu and Lin, 2020; Hosen et al., 2021)	3
29	Enjoyment: The enjoyment felt by community members when sharing knowledge about waste management	(Selim et al., 2022; Wang et al., 2022b)	2
30	Learning goal: Goals that community members want to achieve and relate to learning from shared knowledge sources	(Matsuo and Aihara, 2022)	1
31	Personal information management capabilities: The ability of community members to be able to manage information related to waste management	(Lin and Hwang, 2021)	1
32	Satisfaction: It feels good when community members can share knowledge about waste management	(Selim et al., 2022)	1
33	Perceived behavioural control: Perceived control over sharing knowledge with community members	(Hashmi, Soroya and Mahmood, 2021; Selim et al., 2022)	2
34	Attitude:	(Selim et al., 2022)	5

No.	Factor	Research	Frequency
	Positive or negative attitudes of community members towards sharing knowledge about waste management		
	Student's attitude: Positive or negative attitudes of students towards sharing knowledge	(Abdel Fattah et al., 2020)	
	Attitude toward knowledge-sharing: A community member's view on sharing knowledge about waste management	(Chedid et al., 2020; Hashmi, Soroya and Mahmood, 2021; Bi and Cao, 2022)	
35	Personal expectations: Community members' expectations regarding the benefits they will get if they share knowledge about waste management	(Akosile and Olatokun, 2020)	1
36	Willingness to share: Willingness of community members to share knowledge about waste management	(Akosile and Olatokun, 2020)	1
37	Personal interaction: Individual relations from community members and other members in sharing knowledge	(Akosile and Olatokun, 2020)	1
38	Ambiguity tolerance: Tolerance for conditions of opaqueness when sharing knowledge in the community	(Endres and Chowdhury, 2022)	1
39	Reflective thinking: The ability of community members to assess existing knowledge and ensure compliance with community needs	(Endres and Chowdhury, 2022)	1

4.5 Factor Weighting with Analytical Hierarchy Process (AHP) Method

This literature review uses the analytical hierarchy process (AHP) to determine factors influencing KSI in the LWL Virtual Community. AHP is used to obtain an assessment of the criteria owned by the management of the LWL virtual community, which is then used in the assessment of prioritized factors. AHP can simplify decision-making by dividing complex problems into structured stages (Benmoussa et al., 2019). The AHP method will produce a priority scale, namely the factors with the main priority that influence KSI in the LWL virtual community.

There are three main elements of AHP, namely problems, criteria, and alternatives. The problem, according to this literature review, is the factors that influence KSI in the LWL virtual community. The criteria in the literature review include compliance with the vision and mission of the LWL virtual community (C1), conformity with the objectives of the LWL virtual community (C2), and characteristics of members of the LWL virtual community (C3). Alternatives in this literature review include 39 factors identified from previous research. Based on interviews with LWL management, information was obtained that C1 and C2 had the same interests, while C1 and C2 were considered more critical than C3.

Determination of the values of each alternative is obtained from interviews to determine alternative values based on the level of importance of the Likert scale. The value of the scale explains that a scale of 5 means very important, and a scale of 1 means very unimportant. AHP weighting produces factors with certain weights which are presented in Table 3. Based on Table 4, it can be seen that the domain that has the highest average weight value is the IT Infrastructure domain. Based on the results of the interviews, 15 factors with the highest weight were selected to be developed into a framework of the factors that influence KSI in the LWL virtual community. Table III shows the top 15 factors according to AHP weighting. Table 5 presents a comparison of the 15 factors obtained based on the highest frequency of occurrence in previous studies and based on AHP weighting. Figure 5 presents a framework developed based on the results of AHP weighting according to Table 5.

Table 4: AHP weighting results

Domain	Factor	AHP Weight	Average AHP Weight
Organizational Culture	Sense of belonging	0,030268239	0,023612
	Trust in community	0,030268239	
	Virtual community commitment	0,030268239	
	Management support	0,029952581	
	Shared Cognition	0,024214591	
	Trust in other member	0,024214591	
	Expected relationship	0,023357559	
	Subjective norm	0,018160943	
	Organisational culture	0,018160943	
	Virtual community rewards	0,018160943	
	Community policy	0,018160943	
	Social influence	0,018160943	
IT Infrastructure	Performance expectancy	0,029329524	0,026139
	Virtual communication	0,029329524	
	Usage of social media	0,029329524	
	Effort expectancy	0,023745234	
	Document exchange	0,023745234	
	Knowledge formation	0,023745234	
	Availability of infrastructure	0,023745234	
Individual	Altruism	0,029329524	0,021534
	Personal interaction	0,029329524	
	Personal information management capabilities	0,024534835	
	Willingness to share	0,023929524	
	Knowledge self-efficacy	0,023745234	
	Enjoyment in helping other	0,023745234	
	Learning goal	0,023745234	
	Perceived behavioural control	0,023745234	
	Attitude	0,018950545	
	Personal expectations	0,018950545	
	Personal identity	0,018160943	
	Satisfaction	0,018160943	
	Ambiguity tolerance	0,012576653	
	Reflective thinking	0,012576653	
Perceived Benefit	Reciprocity	0,018160943	0,015927
	Performance	0,018160943	
	Perceived worth	0,018160943	
	Reputation	0,012576653	
	Expected reciprocal benefit	0,012576653	
Perceived Risk	Privacy Risk	0,006992362	0,006992
	Loss of knowledge power	0,006992362	

Table 5: List of the top 15 factors and AHP weighting

Previous Research			AHP Weighting	
No.	Factor	Frequency	Factor	Weight
1	Commitment	6	Sense of belonging	0,030698
2	Trust	5	Trust in community	0,030638
3	Attitude	5	Virtual community commitment	0,030638
4	Subjective norm	4	Management support	0,030317
5	Self-efficacy	4	Performance expectancy	0,029686
6	Altruism	3	Virtual communication	0,029686
7	Reward system	2	Usage of social media	0,029686
8	Reputation	2	Altruism	0,027194
9	Reciprocity	2	Personal information management capabilities	0,024824
10	Perceived behavioural control	2	Shared Cognition	0,02451
11	Sense of belonging	1	Trust in other member	0,02451
12	Shared Cognition	1	Attitude toward knowledge-sharing	0,024156
13	Management support	1	Personal expectations	0,024156
14	Performance expectancy	1	Effort expectancy	0,024034
15	Effort expectancy	1	Document exchange	0,024034

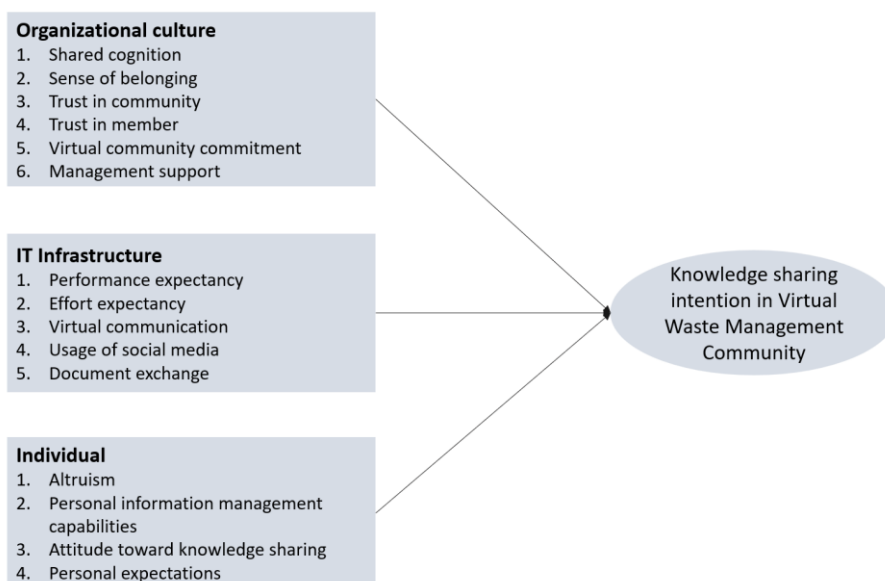


Figure 5: KSI framework in LWL virtual community

5. Discussion

This literature review identified 25 previous studies, which were then extracted to obtain information on knowledge types, ways to share knowledge, and technologies to support knowledge-sharing. The type of knowledge that is often shared based on previous research is specific knowledge. The ways to share knowledge that is often used based on previous research is CoP and electronic technology. Technology to support knowledge-sharing, which is often used based on previous research, is social network services. This literature review also extracts and synthesizes the factors that influence knowledge-sharing intention from previous research. There are 39 factors found in this literature review and mapped into six domains: organizational culture, IT infrastructure, perceived risk, perceived benefit, and individual. The number of occurrence

frequencies from previous studies calculated the factors found. This literature review carries out AHP weighting to assess the factors LWL virtual community management prioritized. Based on the results of the AHP, 15 factors support KSI in the LWL virtual community.

The research results can enrich the literature regarding factors influencing KSI in virtual communities focusing on waste management. The framework proposed in this study can serve as a theoretical basis for future research on using KSI in virtual contexts. The framework developed in this research helps guide knowledge management practices through knowledge-sharing to increase environmental sustainability among virtual community members. Environmental practitioners can use this framework to develop policies to encourage and facilitate effective knowledge sharing in virtual communities that can support environmental sustainability initiatives through waste management. In addition, future research can use this framework to assist knowledge management practices in virtual communities in other contexts such as the health, education, and tourism sectors.

6. Conclusion

This literature review has reviewed four aspects to answer the research question: the type of knowledge shared, the way to share knowledge, the technology used to support knowledge-sharing in the community, and the factors that influence knowledge-sharing intention in the community. Knowledge types distributed based on previous research are specific knowledge, simple knowledge, general knowledge, complex knowledge, procedural knowledge, and tacit-explicit knowledge. Based on previous research, the way to share knowledge are CoP and electronic technology, electronic technology, after-action reviews, seminars, and meetings. Based on previous research, the technologies to support knowledge-sharing are social network services, online health platforms, mobile social networks, web-based platforms, online search engines, collaborative web, online travel platforms, and virtual communities' platforms. The systematic literature review adopted in this literature review uses the Kitchenham method. This literature review also summarizes the factors influencing KSI in virtual communities, higher education civitas, and professional organizations.

This literature review also proposes mapping the factors that influence KSI in the community based on five domains: organizational culture, IT infrastructure, perceived risk, perceived benefit, and individual. Domain organization culture and IT infrastructure are the main aspects of knowledge management infrastructure. Based on the mapping results, there are 15 factors with the highest frequency of occurrence in previous research, namely commitment, trust, attitude toward knowledge-sharing, subjective norm, self-efficacy, altruism, reward system, reputation, reciprocity, perceived behavioral control, sense of belonging, shared cognition, management support, performance expectancy, and effort expectancy. In addition, using the AHP method, 15 factors have the highest weight to influence KSI in the LWL virtual community, namely: a sense of belonging, trust in the community, virtual community commitment, management support, performance expectancy, virtual communication, usage of social media, altruism, personal information management capabilities, shared cognition, trust in other members, attitude toward knowledge-sharing, personal expectations, effort expectancy, and document exchange. Based on the AHP weighting, it was found that the IT infrastructure domain is the domain that has the highest weight. The fifteen factors resulting from AHP weighting will become a framework of the factors influencing KSI in the LWL virtual community.

This literature review has several weaknesses that can be developed in future research. This review makes limited generalizations, namely using a research context different from virtual communities focusing on waste management. The results of this literature review are then validated so that LWL virtual community managers can decide on factors considered necessary for the community. This research focuses more on mapping KSI factors without considering how the research results can be applied to virtual communities and provide appropriate solutions for community managers. This literature review needs to identify the latest technological developments, such as artificial intelligence-based technology, intelligent knowledge management systems, or knowledge recommendation systems implemented in virtual communities. Similar research starting with a systematic literature review can identify aspects of technological development related to adopting digital platforms based on artificial intelligence or intelligent systems that can increase knowledge-sharing activities in virtual communities. This literature review can be developed further by validating several LWL virtual community management to reduce the subjectivity of the results. Several types of knowledge identified in previous studies include specific, general, simple, complex, procedural, and tacit-explicit knowledge. Recommendations for future research to convey the types of knowledge and details of the knowledge shared. Future research can identify other knowledge appropriate for the community, such as experienced-based, domain-specific, individual, and external knowledge. The majority of previous research applied electronic technology with CoP.

In the context of massive social media, future research can apply a combination of other knowledge-sharing methods such as electronic technology using social media, social collaboration 4.0 platforms, online open forums, and CoP. Future research can identify the characteristics of the CoP and the suitability of the knowledge-sharing process with the vision and mission of the community.

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Appendix 1: The Results of Data Extraction

No.	Research	Scope	Knowledge Type (RQ1)	Knowledge e-sharing Method (RQ2)	Technology Support Knowledge-sharing (RQ3)	Theory	Factors Influencing KSI (RQ4)
1	(Liu and Zhang, 2020)	Online health communities	Specific knowledge	CoP and electronic technology	Online health platform	Social Exchange Theory: Benefits & Costs	Sense of belonging Perceived worth
2	(Kim, Lee and Oh, 2020)	Social networking services (SNS) learning communities	Simple knowledge	CoP and electronic technology	Facebook communities	Theory of Planned Behavior (TPB), personal online identity, self-efficacy terhadap intention to share knowledge	Personal identity Web-specific self-efficacy (WSSE) Knowledge Creation Self-efficacy (KCSSES)
3	(Hoseini, Saghaei and Aghayi, 2019)	Mobile Social networks (MSN): Telegram, WhatsApp, Line and Viber	General knowledge	CoP and electronic technology	MSN	Social context, psychological context, cultural context, technological context	Trust Reciprocity Shared Cognition Reputation Altruism
4	(Bi and Cao, 2022)	Online health communities	Specific knowledge	CoP and electronic technology	web-based platform	Commitment-trust theory, theory of reasoned action (TRA), technology acceptance model (TAM), dan Social cognitive theory (SCT)	Attitude toward knowledge-sharing
5	(Matsuo and Aihara, 2022)	Health care organizations	Procedural knowledge	CoP	-	SCT	Learning goals
6	(Lin and Hwang, 2021)	Accounting professional	Specific knowledge	CoP and electronic technology	Online search engines	1. Social exchange theory 2. knowledge management	Personal information management capabilities Social-Psychological benefit and cost factors: a. Image b. Reciprocity c. Loss of knowledge power
7	(Luo et al., 2021)	Online communities di platform digital (Baidu)	General knowledge: Douban: movie, book, music;	CoP and electronic technology	collaborative web	1. Social exchange theory 2. commitment model	Affective commitment Continuance commitment

No.	Research	Scope	Knowledge Type (RQ1)	Knowledge e-sharing Method (RQ2)	Technology Support Knowledge-sharing (RQ3)	Theory	Factors Influencing KSI (RQ4)
		Experience, Baidu Zhidao, Douban, and Zhihu)	Zhihu: various topics				Normative commitment
8	(Hosen et al., 2021)	Social media among college students in West Malaysia	Simple knowledge	Electronic technology	SNS	1. SCT 2. connectivism theory	Document exchange Virtual communication Knowledge formation Reputation Altruism
9	(Hsu and Lin, 2020)	Facebook community members in Taiwan	Specific knowledge	CoP and electronic technology	SNS	Social exchange theory	1. Altruism 2. Expected reciprocal benefit 3. Expected relationship
10	(Selim et al., 2022)	Online travel communities	Simple knowledge	CoP and electronic technology	Platform: Tripadvisor.com, lonelyplanet.com, and virtualtourist.Com	1. Expectation Confirmation Model (ECM) 2. TPB	1. Subjective norm 2. Satisfaction 3. Perceived behavioural control 4. Attitude
11	(Akosile and Olatokun, 2020)	Academics at Bowen University (Nigeria)	Specific knowledge	Electronic technology	SNS	1. TRA 2. TPB	Organisational factors: 1. Organisational culture 2. Reward system 3. Management support 4. University policy Individual factors: 1. Knowledge self-efficacy 2. Trust 3. Personal interactions 4. Personal expectations 5. Willingness to share Technological Factors: 1. Availability of infrastructure 2. Usage of social media
12	(Chedid et al., 2020)	Professor and researcher at HEI	Specific knowledge	Electronic technology	academic portal, website, e-mail	TRA	1. Attitude towards knowledge-sharing 2. Subjective norm 3. Trust
13	(Hashmi, Soroya and Mahmood, 2021)	SNS between the library and information management researcher (postgraduate student)	Specific knowledge	Electronic technology	SNS	TPB	1. Attitude 2. Subjective norm 3. Perceived behavioural control

No.	Research	Scope	Knowledge Type (RQ1)	Knowledge-sharing Method (RQ2)	Technology Support Knowledge-sharing (RQ3)	Theory	Factors Influencing KSI (RQ4)
14	(Zhou, 2019)	Online health communities	Specific knowledge	CoP and electronic technology	Online health platform	Teori Stimulus-Organism-Response (SOR)	1. Trust in community 2. Trust in other member 3. Privacy risk
15	(Wang et al., 2022b)	Virtual communities	Tacit & Explicit	CoP and electronic technology	Virtual communities platform	-	1. Virtual community rewards 2. Enjoyment 3. Self-efficacy 4. Explicit knowledge-sharing
16	(Abdel Fattah et al., 2020)	HEI students in Oman	Simple knowledge	Seminars and meeting	-	TPB	1. Student's attitude 2. Subjective norms
17	(Endres and Chowdhury, 2022)	Students in a management class are given complicated assignments	Complex knowledge	After action review	-	Motivation-Opportunity-Ability (MOA)	1. Ambiguity tolerance (AT) 2. Reflective thinking (RT) 3. Performance
18	(Asghar et al., 2023)	HEI students in Pakistan	Specific knowledge	Electronic technology	SNS	UTAUT and leadership theory	1. Performance expectancy 2. Effort expectancy 3. Social influence 4. Social media-based KSI
19	(Liao, 2022)	Virtual communities	General knowledge	CoP and electronic technology	Virtual communities platform	TPB	Virtual community commitment
20	(Zhang and Liu, 2022)	OHC	Specific knowledge	CoP and electronic technology	Online health platform	social exchange theory and commitment-trust	Relationship commitment