

## THEORIES AND ANTECEDENTS OF KNOWLEDGE SHARING BEHAVIOUR IN VIRTUAL COMMUNITY: A SYSTEMATIC REVIEW

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### ABSTRACT

Virtual Community (VC) is regarded as the best platform for professionals in various fields to share their expertise and knowledge. Since the escalation of web 2.0 and the internet within the last decade and the booming interest in big data and expansion of industry 4.0, VC is deemed as an ideal proxy for practitioners to share and earned instant knowledge that can be implemented within business activities and day to day application. Despite this emerging interest, there has been no comprehensive study on the overall antecedents of KS in VC. Applying a systematic review, a total of 68 relevant articles that discusses knowledge sharing (KS) via VC are evaluated. Several central themes of theories applied in this field within the literature are discussed on its importance and relevance. Important antecedents are also reviewed on its practicality and implementation in understanding the role of KS in VC. The implication of this review would benefit stakeholders in maintaining the sustainability of VC as the platform for a knowledge-based society.

**Keywords:** Theories, Antecedents, Knowledge Management, Knowledge Sharing, Virtual Community.

### INTRODUCTION

Knowledge is vital in ensuring that organizations and industries to sustain in the current challenging business world. As the world shifted towards the advancement of internet and digitalization, virtual platform has served as a vibrant tool in knowledge distribution. Virtual communities (VC) provide a platform for users to communicate and interact without having to meet face to face (Chang et al., 2015). Practically, employees have been found to seek knowledge by consulting their peers through various virtual networks and social media rather than accessing knowledge database and repository (Akhavan et al. 2015; Djelantik, 2019). Hence, the proposition and availability of VC have provided employees the chance to interact and look out for peers that can give

instant knowledge by the community through the web.

Many of the previous studies have focused on the aspect of individual, organizational, and technological factors (Al-Kurdi et al., 2018). The three elements are embedded within the underpinning theories applied in KS studies throughout the literature. With the extensive studies on VC as the emerging area of knowledge management, there have been various theories implemented in understanding the KS behavior among members in this community (Fauzi et al., 2018). Among the commonly used theories are related to social-related theories such as social capital, social cognitive, social exchange, and social identity. Other theories that are known to the knowledge management communities

are the theory of planned behaviour and theory of reasoned action. In understanding the underlying foundation of member's engagement on KS within VC, relevant and related theories should be recognized and correlated among each other's in developing a holistic model consisting of relevant antecedents of KS in VC.

With this in mind, this paper tends to review all related studies from the year 2006-2019, thirteen years on KS within the VC. The main objective of this review is to provide insight and an in-depth understanding of the theories and essential antecedents that have been applied in the literature associated with the user's KS behaviour in VC. In parallel with today's digital development, knowledge should be shared freely and safely to ensure that implicit and explicit knowledge could be captured for the benefits of members in VC. Hence, a knowledge-based society can be enhanced and maintained for the betterment of society.

#### **Knowledge sharing in virtual community**

KS is a process where knowledge, expertise, experience, skills, and information that is exchanged between families, friends, communities, and organizations (Charband and Navimipour 2016). Virtual or online knowledge communities consist of people having the same interest, profession, or goals. They share and interchange knowledge for their use in daily life by engaging in social interaction (Feng and Ye, 2016). People use VC not only for knowledge exchange but also a tool for retrieving information, social support, entertainment, and also recreation (Phang et al., 2009; Fauzi, 2019).

Despite that VC is widely research and applied, the term and notion of VC application differ from one industry and context to another (Bolisani and Scarso, 2014). Several scholars have termed it as community of practice (Zboralski et al, 2009, Jeon et al, 2011a; Hau et al 2013; Chu et al., 2014; Tseng & Kuo, 2014; Nistor et al., 2015), virtual community of practice (Usoro et al, 2007; Fang & Chu, 2010; Majewski et al., 2011, Chang et al., 2016), professional virtual community (Lin et al., 2009; Chen & Hung, 2010; Chiu et al., 2011; Tamjidyamcholo et al., 2014), online communities (Ma & Agarwal, 2007; Phang et al, 2009; Chai & Kim, 2010, Erden et al, 2012;

Lai & Chen, 2014), online knowledge communities (Ye et al., 2015; Feng & Ye, 2016), online question and answer community (Jin et al., 2013; Khansa et al 2015; Guan et al., 2018), online health community (Yan et al., 2016; Zheng et al., 2017), virtual innovation community (Zhang et al., 2017a; Pirkkalainen et al., 2018), online user community (Hau & Kang, 2016), online discussion communities (Kumi & Sabherwal, 2018), online travel community (Ku, 2012; Yuan et al., 2016), peer to peer problem solving (P3) virtual community (Zhao et al 2013) and virtual learning community (Chen et al., 2009; Lu et al., 2013). As there are many terminologies used within this area, VC will be used throughout this paper as the majority of studies had used this term as it is more general and involved a broad definition describing the aspect of a virtual platform.

The theoretical framework of this review is based on the frequently adapted theories used in VC. These include the theory of planned behavior/reasoned action, technology acceptance model, social capital theory, social cognitive theory, social identity theory, social exchange theory, expectancy disconfirmation theory, motivation theory, and use & gratification theory. All the studies included apply at least one theory or integration of two or more, that could facilitate in understanding KS behavior in VC.

#### **METHODOLOGY**

This section delineates the method in assessing this systematic review of KS within the scope of VC. The review includes all articles within the indexed journal of Scopus and Web of science. The eight databases that were included in the review include Science Direct, Emerald Insight, Taylor & Francis, Wiley Blackwell, Springer-Link, IEEE Explore, Wiley & Blackwell, Inderscience, and JSTOR. These databases are selected because they are reliable database and has an extensive record of peer-reviewed articles within the scope of VC. The process in retrieving articles related to Knowledge sharing in VC. The author used the PRISMA method (Moher et al., 2015). This method enables the ease of the systematic review by having exclusion criteria, review process steps, data analysis, and abstraction. PRISMA serves as a checklist to clearly explain the need for a specific topic (Wormald & Evans, 2018). It adds to the future

avenues prioritizing on the fundamental aspect of VC knowledge sharing context.

PRISMA

### Identification

The first process is keyword identification. Searching process for related and identical terminologies. These terms and synonym were searched through dictionaries, thesaurus and encyclopaedia. The search string used in this study includes the keyword (“knowledge sharing” OR “knowledge exchange” OR “knowledge transfer” OR “knowledge distribution” OR “knowledge acquisition”) AND (“virtual community” OR “online community” OR “community of practice” OR “professional virtual community” OR “virtual team”). The initial result had found a total of 1,502 articles having keywords, as stated. After screening using PRISMA methodology, the final relevant studies accepted for review were 68. Table 1 presents the study selection process results.

**Table 1: Study selection process results.**

Online database	Initial result	Relevant studies
Science Direct	243	30
Emerald Insight	127	8
Springer-Link	234	4
Taylor & Francis	486	12
IEEE Explore	117	2
Wiley & Blackwell	237	6
Inderscience	49	1
JSTOR	9	2
Google Scholar/ other publishers (second stage screening)	-	3
Total	1,502	68

### Screening

Before the articles are accepted for review, the inclusion and exclusion criteria process was conducted to screen the articles. Based on article type, only articles with empirical data are taken. Review article, book chapter, conference proceeding is not included. Secondly, only articles in English are accepted, to avoid problems in translating and having

originally written articles in English. Thirdly, all the studies are from the period of 13 years, from 2006 to 2019. This is considered to be adequate time in viewing research evolution in the VC field of study. Lastly, studies that are chosen within the context of VC or related terminology are accepted. Studies from other disciplines and contexts are excluded. Table 2 summarizes the criteria for this review.

**Table 2: Inclusion and exclusion criteria**

Inclusion criteria	Exclusion criteria
Available as a full-text article	No full text available
Written in English	Other than English
Within the domain of virtual community and other related terminology	Qualitative study
From the year 2006 to 2019	

### Eligibility

A total of 69 articles made up to this stage. This stage requires the authors to screen related article based on the title and abstract. It is a second stage screening to ensure that the articles included are based on KS in VC studies. A total of 68 articles were included for analysis. Figure 1 summarizes the four-stage process of the PRISMA method, indicating identification, screening, eligibility, and finally, included articles.

## RESULT

### Overview of studies

All the articles were searched in 8 databases, resulting in 68 studies. The summary of the reviews is shown in table 2. Most of the studies were found in computer cyberpsychology journals, with other areas including management and social psychology. The majority were conducted in the Asia Pacific region that includes Taiwan, South Korea, Hong Kong, and China. Other prominent countries have the USA, Singapore, Malaysia, Australia, and several European countries. Respondents of the studies vary from professional, students, teachers, teenagers, and the common public using VC as education and entertainment purpose. Most of the studies applied related social theories by integrating 2 or 3 theories with the minority using only one theory or underpinning framework. Table 3 summarizes the 68 articles found from this review.

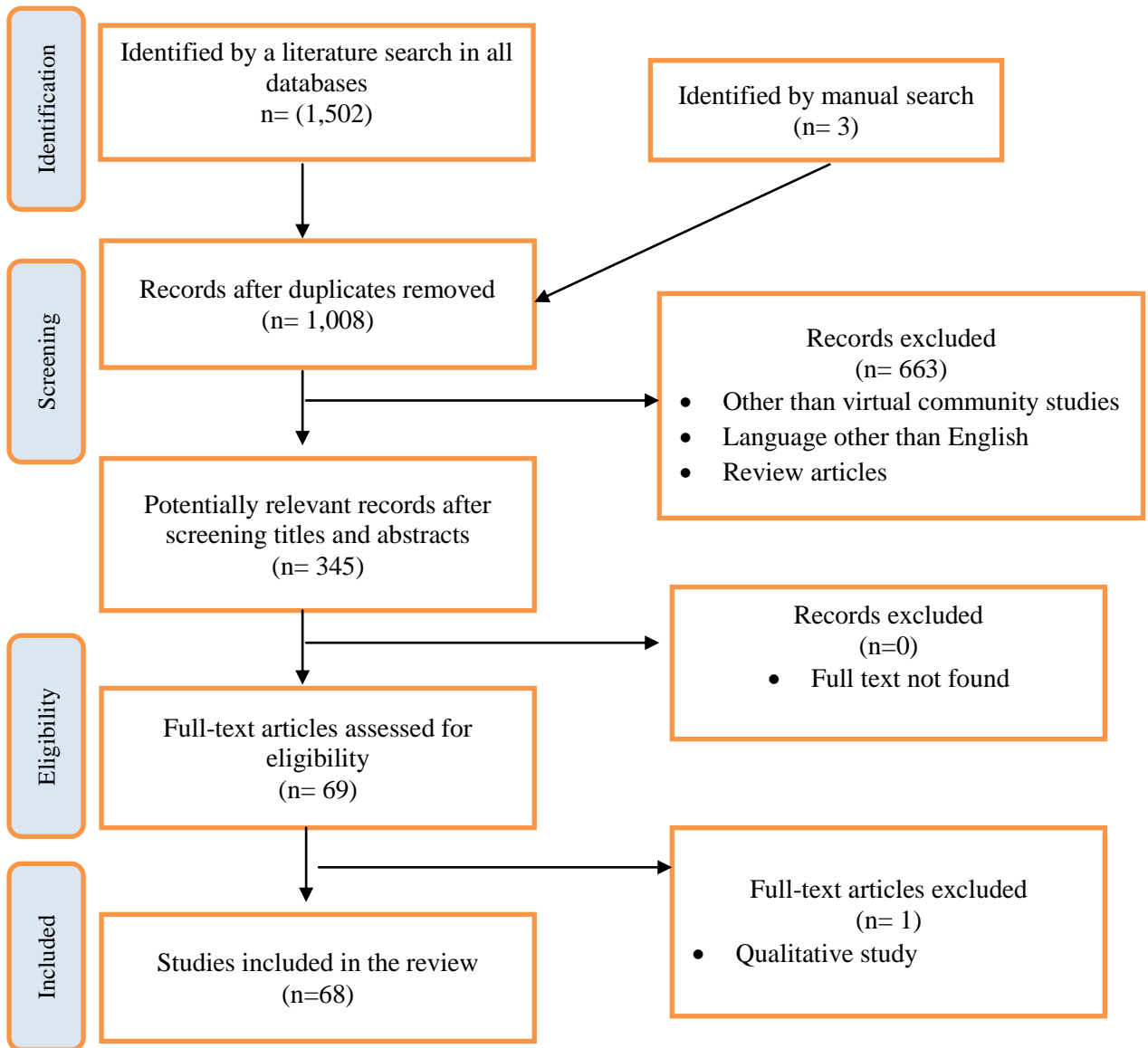


Figure 1: PRISMA diagram Four-phased flow diagram of studies' selection procedure

**Table 3: Summary of knowledge sharing in virtual community studies**

No	Authors	Sample	Country/ countries	Term used	Theory/ theories/ framework	Antecedents
1.	Chiu et al. (2006)	310 members from one professional virtual community	Taiwan	Virtual communities	social capital + social-cognitive	Social interaction ties, trust, norm of reciprocity, identification, shared language, shared vision, personal outcome expectations, community- related outcome expectations
2.	Ma & Agarwal (2007)	666 from two online communities	USA	Online communities	attribution theory + self-presentation theory	Virtual co-presence, persistent labeling, self- presentation, deep profiling, tenure, offline activity, satisfaction, information need fulfillment, group identification, offline activity.
3.	Usoro et al. (2007)	75 community members	US (45%), UK (34%) and Australia (11%). Switzerland,	virtual communities of practice	Trust factors	Three categories of trust: Integrity-basedtrust Competence-basedtrust Benevolence-basedtrust

No	Authors	Sample	Country/ countries	Term used	Theory/ theories/ framework	Antecedents
			Spain, Denmark, and India (10%).			
4.	Hsu et al. (2007)	274 respondents	Taiwan, Hong Kong, and China	Virtual community	Social cognitive theory	Trust (economy, information-based, identification) self-efficacy, expectation (personal, community)
5.	Staples & Webster (2008)	824 respondents	Canada	Virtual team	Social exchange theory	Task interdependence, trust, virtualness, team effectiveness
6.	Lin et al. (2009)	Three hundred fifty respondents from 3 club (Programmer- Club, Blue- Shop, and Pure C)	Taiwan	Professional virtual communities (PVCs)	Social cognitive theory	Trust, self-efficacy, perceived relative advantage, and perceived compatibility.
7.	Phang et al. (2009)	115 students from computing course	China	Online communities	Value theory + Social exchange theory	Ease of use, system reliability, knowledge tracking fulfillment, social interactivity, perception of the moderator, perceived usability, perceived sociability
8.	Zboralski 2009	222 CoP members multinational company	Germany	Community of practice (CoPs)	interaction frequency (notheory)	Members' motivation, community leader, management support, interaction frequency, interaction quality
9.	Chen et al. (2009)	396 MBA students enrolled in virtual courses.	Taiwan	Virtual learning communities	Theory of planned behavior + SCT (social network ties)	Knowledge creation and web-specific self-efficacy, social network ties, TPB variable
10.	Fang and Chiu (2010)	142 IT-oriented VCoP	Taiwan	Virtual community of practice (VCoP)	Social exchange theory + organizational citizenship behaviors (OCB)—	Justice, trust, altruism, personality (conscientiousness)
11.	Zhang et al. (2010)	144 professionals	China	Virtual communities	Psychological safety	Psychological safety, Trust Self-consciousness
12.	Yu et al. (2010)	442 from 3 online communities	Taiwan	Virtual community	three community sharing cultural factors: fairness, identification and openness	fairness, identification, and openness, enjoy helping, usefulness/relevancy
13.	Cho et al. (2010)	223 respondents	Singapore	Wikipedia community/virtual community	Theory of planned behavior + motivations theory + cognitive belief + social-relational factors	Belongingness, general reciprocity, altruism, attitude, reputation, subjective norm, self- efficacy, controllability
14.	Chai and Kim (2010)	485 respondents (bloggers)	United States of America	Online community	trust in multiple dimensions	Trust: categorized into bloggers, economy, trust in the Internet, trust in a blog service provider
15.	Chen and Hung 2010	323 members of two PVCs communities	Taiwan	Professional virtual communities (PVCs)	Social cognitive theory	Norm of reciprocity, interpersonal trust, self- efficacy, perceived related advantage, perceived compatibility.
16.	Shen et al. (2010)	430 registered Members from 4 VCs	United Arab Emirates	Virtual communities	social presence theory + social identity theory	Awareness, affective, social presence, cognitive, social presence

No	Authors	Sample	Country/ countries	Term used	Theory/ theories/ framework	Antecedents
17.	Chiu et al. (2011)	270 members of a professional virtual community	Taiwan	Professional virtual community	Expectancy disconfirmation theory + social network factors + justice theory	Playfulness, satisfaction, disconfirmation, justice
18.	Hsu et al. (2011)	324 technical VC members	Taiwan	Virtual communities	Trust building factors	Trust (in members, in the system), knowledge growth, perceived responsiveness, social interaction ties, shared vision, system quality, and knowledge quality
19.	Kim et al. (2011)	185 Members of Cyworld (a virtual community of relationships, interests, and transactions)	South Korea and a few other countries using Cyworld	Virtual community-blogging communities	Social identity theory	Involvement, kindness, social skills, creativity
20.	Jeon et al. (2011a)	formal CoP members (125) and informal CoP members (157) N= 282	South Korea	Community of practice (CoPs)	Theory of Planned Behaviour + Motivation Theory + Triandis model	Extrinsic motivation (image, reciprocity), intrinsic motivation (enjoyment in helping, need for affiliation), type of CoP, attitude, PBC, subjective norm
21.	Majewski et al. 2011	152 respondents	USA, UK, Netherlands, Germany, Canada, and Australia	Virtual community of practice	Social factors (trust, norm of reciprocity)	Norms of reciprocity, trust, perception of community, knowledge provision and reception
22.	Shu & Chuang. (2011)	217 respondents online virtual communities	Taiwan	Virtual communities	Theory of reasoned action	Expected return, absorption capacity, organization-based self-esteem, trust, attitude
23.	Jeon et al. (2011b).	179 members from 70 CoPs of a large multinational electronics firm	South Korea	Communities of practice	Triandis model + expectancy theory of motivation (perceived consequences)	Facilitating conditions, social factors, affect anticipated recognition, anticipated reciprocal relationship, anticipated usefulness, perceived consequence.
24.	Yoon and Rolland (2012)	209 VC users	South Korea	Virtual communities	Self-determination theory	Familiarity, anonymity, perceived competence, perceived autonomy, perceived relatedness
25.	Xu et al. (2012)	199 Chinese undergraduates and 200 USA undergraduates	China and the United States of America	Virtual communities	Social cognitive theory	Attachment motivation, trust, social support orientation
26.	Erden et al. (2012)	531 Online photo community	South Korea	Online community	Theory of planned behavior	Community munificence, attitude, subjective norm, perceived behavioral control.
27.	Ku 2012	235 online travel communities	Taiwan	Online travel community	Social identity theory + Technology acceptance model	Trust, commitment, website design quality, website service quality
28.	Hau et al. (2013)	2010 respondents from multiple industries	South Korea	Community of practice	Rational action theory + Social capital	Organizational reward, reciprocity, enjoyment, social capital (social tie, social trust, social goals

No	Authors	Sample	Country/ countries	Term used	Theory/ theories/ framework	Antecedents
					theory	
29.	Chen et al., 2013	219 professional IT VC	Taiwan	peer-to-peer problem solving (P3) Virtual Community	uses and gratification theory (U&G theory)	Entertainment. Social need, information need, attitude
30.	Liao et al. (2013)	473 undergraduate and graduates students	Taiwan	virtual communities	Social exchange theory	Self-efficacy, reward, reciprocity, reputation, enjoying helping, expected relationship, sharing culture (fairness, identification, openness), attitude
31.	Lin and Huang (2013)	167 respondents	Taiwan	Virtual communities	Theory of reasoned action	self-efficacy, altruism, reward, and the sense of virtual community
32.	Yan et al. (2013)	232 users of Web 2.0 virtual communities	China	Virtual communities	Self-perception theory	Perceived enjoyment, attention focus, employee creativity
33.	Hung & Cheng (2013)	218 members from My3q website	Taiwan	Virtual communities	Technology acceptance model + Innovation Diffusion Theory	Personal technology (optimism, innovativeness, discomfort, insecurity), technology perceived usefulness, perceived ease of use, compatibility
34.	Zhao et al. 2013	185 patients from 3 diseased focused POC	United States of America	Patient online communities (POC)	Social identity theory	Trust, social identity, empathy
35.	Shan et al. (2013)	205 teachers and students from colleges and universities	China	Virtual community	social cognitive theory + social capital theory + characteristics of emergency events	Emergency events, shared vision, shared language, social interaction ties, outcome expectations, identification, trust.
36.	Papadopoulos et al. (2013)	175 respondents from Thailand weblogs	Thailand	Virtual communities (weblogs)	social influence theory + technology acceptance + social cognitive theory + individual factors	Subjective norm, social identity, group norm, perceived usefulness, perceived ease of use, perceived enjoyment, self-efficacy, personal outcome expectation, altruism, attitude
37.	Lu et al. 2013	321 academics of a training program	China	Virtual learning community (VLCs)	Social cognitive theory	Instructors, peers, management, self-efficacy, outcome expectance
38.	Jin et al. 2013	241 respondents from Yahoo! Answer China community	China	Online question answering communities	Expectation confirmation theory	Reputation enhancement, reciprocity, enjoyment in helping others, knowledge self-efficacy, confirmation, satisfaction, continuance intention
39.	Chu et al. 2014	120 respondents from a company	Australia	Communities of practice (CoPs)	Personality traits	Personality traits
40.	Tamjidyamcholo et al. (2014)	142 respondents online from LinkedIn	Malaysia	professional virtual communities (PVC)	Triandis model + expectancy theory of motivation (perceived	perceived consequences, affect, social factor, facilitating conditions

No	Authors	Sample	Country/ countries	Term used	Theory/ theories/ framework consequences)	Antecedents
41.	Zeng et al. 2014	211 members of the online hotel industry	China	Virtual communities	Social cognitive theory + social capital theory + Social identity theory	Social interaction ties, trust, norm of reciprocity, identification, shared vision, expected results, self-efficacy, loyalty
42.	Tseng & Kuo (2014)	321 teachers from largest CoPs in Taiwan	Taiwan	Community of practice (CoPs)	Social Capital Theory + Social Cognitive Theory	Tie strength, self-efficacy, altruistic commitment, performance expectation
43.	Lai & Chen (2014)	324 (n=146 for poster and n=178 for lurker)	Taiwan	Online communities	Value theory	Reputation, reciprocity, enjoyment in helping, self-efficacy, perceived moderator's enthusiasm, offline activities, enjoyability.
44.	Tsai & Bagozzi (2014)	Collectivist Members Subsample (N = 517) Individualistic Members Subsample (N = 455)	Taiwan, Hong Kong, and China	Virtual communities	Extended Theory of planned behavior + social identity theory + theory of collective intentionality	Subjective norm, group norm, social identity, anticipated emotions, desires, attitude PBC, intentions
45.	Nistor et al. (2015)	136 German and Romanian scholars	Germany and Romania	communities of practice (CoP)	Sense of community theory	time in CoP, centrality in CoP, and socio-emotional interpersonal knowledge (SEIK)
46.	Gang & Ravichandran (2015)	118 experts from Global Network of Korean Scientists and Engineers (KOSEN)	South Korea	Virtual communities (VCs)	Theory of reasoned action + Social exchange theory	Trust, anticipated reciprocal relationships, attitude, perceived information quality
47.	Chang et al. (2015)	150 members of a technical virtual community	Taiwan	Virtual communities	Social cognitive theory + Trust-commitment theory + Theory of planned behavior	Trust, commitment, knowledge self-efficacy, experience
48.	Ye et al. (2015)	169 from 6 online knowledge communities	Did not state	Online knowledge communities	Organizational support theory + Social exchange theory	Pro sharing Norm, information need fulfillment, perceived recognition from the leader, perceived presence of a leader, perceived community support, perceived leader support.
49.	Yao et al. (2015)	222 members from various VC	Taiwan	Virtual communities	Social capital theory	Social capital, team learning, e-loyalty
50.	Cheng & Guo (2015)	348 members of Baidu Space (online platform)	China	Virtual communities	Social identity theory + Social capital theory	Social interaction, membership esteem, social identity, self-identity
51.	Khansa et al. 2015	2,920 Yahoo! Answer users	United States of America	Online question-and-answer communities	Goal-setting theory	Incentives, level of membership, tenure, current behaviors, prior behavior
52.	Yen 2016	201 teachers'/educators users	Taiwan	virtual community (VC), social network sites (SNS),	social capital theory + social identity	Trust, social interaction tie, shared vision, interactivity (online and offline), emotional



No	Authors	Sample	Country/ countries	Term used	Theory/ theories/ framework	Antecedents
					theory + use and gratification theory	support, social identity (cognitive, affective and evaluative)
53.	Chang et al. (2016)	253 respondents from Zclub and Jorsindo online communities	Taiwan	Virtual communities of practices (VCoPs)	Social capital theory + Theory of collective action	Social interaction ties, shared vision, shared language, trust, commitment, sense of virtual community (SOVC)
54.	Yan et al. 2016	323 users of two well-known OHCs	China	Online health community	Social exchange theory	Sense of self-worth, perceived social support and reputation enhancement, face concern, cost (cognitive and executional)
55.	Yuan et al. (2016)	364 airline passenger online community	China	Online travel communities	consumer psychology literature + Technology Acceptance Model	Innovativeness, subjective knowledge, perceived ease of use, perceived usefulness
56.	Hau & Kang (2016).	140 online community user	South Korea	Online user community	lead user theory + social capital theory + social cognitive theory	Social capital (tie, trust, goals), lead users, perceived behavioral control (self- efficacy, controllability)
57.	Feng and Ye (2016)	169 from online English forum	China	Online knowledge community	equity theory + Social Identity explanation of De- individuation Effects (SIDE)	Community norm, indebtedness, perceived anonymity, intention to reciprocate
58.	Zhang et al. (2017a)	443 sample from three famous online health communities	China	Online health communities	Motivation theory	Reputation, reciprocity, self- efficacy, altruism, empathy
59.	Liao (2017).	176 college students	Taiwan	Virtual communities	Social influence theory	cognitive benefits, social integrative benefits, personal integrative benefits, and hedonic benefits
60.	Alsharo et al. (2017)	193 respondents from LindkedIN.com	Jordan	Virtual team	Social capital + Social exchange	Trust, collaboration, team effectiveness
61.	Zhang et al. (2017b)	516 college students (VIC users')	China	Virtual innovation community (VIC)	social cognitive theory + social exchange theory	Self-efficacy, hope, optimism, tenacity, material reward, reciprocal relationship
62.	Park and Gabbard (2018)	141 scientist	United States of America	Virtual community	Social exchange theory	Reciprocal benefit, anticipated relationship, reputation, altruism, fear of losing one's value
63.	Pirkkalainen et al 2018	205 respondents	Finland	Open innovation communities	psychological ownership theory	Personal outcome expectation, organizational innovativeness, previous online KS experience, commitment, openness to experience, psychological ownership
64.	Guan et al. 2018	1599 Q&A online users	China	online Q&A communities	Social capital theory + social exchange	Identity-based trust, social feedback, identity communication, social exposure, norms of

No	Authors	Sample	Country/ countries	Term used	Theory/ theories/ framework	Antecedents
					theory + social identity theory + social cognitive theory	reciprocity
65.	Xiong et al. 2018	666 of online communities (Baid Bar)	China	Virtual communities	Social capital + Social identity + Social exchange	Status of opinion leader, self-identity, reciprocity, social interaction tie
66.	Kang et al. (2018)	359 respondents	United States of America	Virtual communities	Social capital theory	Anonymity, virtual network connectivity, virtual network closeness
67.	Kumi and Sabherwal (2018)	144 users from two online communities	United States of America	online discussion communities (ODCs)	Social identity	Intrinsic motivation, extrinsic motivations, social identity (cognitive, affective, evaluative), satisfaction with community
68.	Hao et al. (2019)	219 virtual team members	China	Virtual team	personality traits theories + Job Characteristics Model + Job Demands- Resources Model + social cognitive theory	Conscientiousness, job demands of skill variety, knowledge sharing self- efficacy

### Theories in Virtual community studies

There were various theories used to understand member KS in VC. As the VC platform involve social interaction among members, the majority of researchers applied theories related to social factors that can ultimately understand the antecedents of member's behavior. In this section, a list of mostly used theories are discussed:

#### Theory of planned behavior and reasoned action

This theory is probably the most used in understanding KS behavior. It was first developed by Ajzen and Fishbein (1975) as theory of reasoned action. An individual intention towards a behavior is determined by the attitude and subjective norm. In 1991, Ajzen had extended the theory of reasoned action into the theory of planned behavior by introducing perceived behavioral control as the third independent variable. Perceived behavioral control explains the ability of a person to perform the behavior in question. The use of TPB in VC studies enables scholars to understand the behavior of members to share depend on the personal attitude, perception of other people towards the behavior (subjective norm), and the perceived

ability of the person to perform it. Studies that applied the theory of reasoned action were done by Shu and Chuang (2011) and Lin and Huang (2013), while Gang and Ravichandran (2015) integrated the theory with social exchange theory. Various studies had used TPB in VC KS studies. This includes Erden et al. (2012) and Chen et al. (2012). Some studies integrated this theory with other relevant theories by incorporating social-related factors and extending the TPB model (Jeon et al. 2011b; Cho et al. 2010; Tsai& Bagozzi 2014; Chang et al. 2015).

#### Technology Acceptance Model (TAM)

TAM is a model that explains individual behavior that is dependent on an individual's attitude in executing that specific behavior. It evaluates each of that outcome as a function of one's belief on the expectation in performing such behavior (Ku, 2012). the model constitutes the concept of usefulness and perceived ease of use (Davis, 1989). Perceived usefulness is a person's perception that using technology can bring benefits and enhance their application performance. Perceived ease of use is the ability to use such technology without having any difficulty (Papadopoulos et al., 2013). The review found thatfour

relevant studies applied the technology acceptance model (Hung & Cheng, 2013; Ku, 2012; Papadopoulos et al., 2013; Yuan et al., 2016).

### **Social Capital Theory**

The social capital theory explains the network of relationships that are created among individuals or a group of people with the set of resources within it. This system would have enhanced and positively impact interpersonal KS among the members (Chiu et al. 2006). Nahapiet and Ghoshal (1998) described social capital theory in three perspectives, based on KS in communities. The structural capital (nodes that are interconnected, creating a pattern), relational capital (leveraging and creating assets through connection), and cognitive capital (systems of meaning among members that produce resources by having shared representation and interpretations). Among the factors identified in social capital are trust, recognition, common language, and shared vision. Among studies that practiced only social capital theory was Yao et al. (2015). In practice, social capital theory usually combined with other theories in assessing members of virtual communities KS behaviour. Many studies integrated social capital with either social cognitive theory, social identity, social exchange and other related theories (Chiu et al. 2006; Shan et al. 2013; Zeng et al. 2014; Tseng & Kuo, 2014; Hau & Kang 2016; Cheng & Guo, 2015, Yen, 2016; Chang et al., 2016; Al-Sharo et al., 2017; Guan et al. 2018). A theory related to social capital is the theory of collective action. The theory explained how problems should be avoided, arising from the existence of conflicting incentives. It suggests individuals engage with action in context due to social capital (Coleman, 1990). The study that applied this theory was Chang et al., (2016).

### **Social Cognitive Theory**

The social cognitive theory comprises three factors, personal, environment, and behavior that play essential roles in influencing individual interactivity (Hsu et al. 2007). The social cognitive theory explained that individual personal factors interact with the behavior and environmental aspect, which ends up with triadic reciprocity (Lu et al. 2013). Among the determinants in personal factors are self-efficacy and outcome expectations, as both can predict a person's

behavior (Bandura, 1997). While trust and altruism are considered as an environmental factor as it can influence personal characteristics and the behavior itself (Papadopoulos et al., 2013). Others had considered the norm of reciprocity as factors in the environment while perceived relative advantage and perceived compatibility as personal factors (Lin et al., 2009; Chen and Hung 2010), There is one study that tested on several individual factors such as hope, optimism, and tenacity (Zhang et al. 2017a). The social cognitive theory had been applied solely in many studies (Hsu et al., 2007; Lin et al., 2009; Chen & Hung, 2010; Xu et al., 2012; Lu et al., 2013). There are also many studies had combined and integrated with other theories (Chiu et al. 2006; Cho et al., 2010; Shan et al., 2013; Papadopoulos et al. 2013; Zeng et al., 2014; Tseng & Kuo, 2014; Chang et al., 2015; Hau & Kang, 2016; Zhang et al., 2017b; Guan et al., 2018 Hao et al., 2019).

### **Social Identity Theory**

Based on social identity theory, the characteristic of a person determines their sharing behavior rather than the distinctive feature, according to their social identification (Turner, 1982). This theory is rooted in personal belongings to a group. It is an individual-based perception that defined the team within a group membership. Social identity differentiates a person and other members of a group from other group members (Kim et al. 2011). Social identity consists of three main domains of the interactive process of psychology: cognitive, evaluative, and affective (Kumi & Sabherwal, 2018). Personal identification within social groups enables members to develop self-esteem and positively influence attitudes and behaviors. The affective domain plays a role in the group's emotional attachment. Evaluative, on the other hand, is vital to personal self-esteem as an outcome of association with groups. Cognitive in self-identity is the creation of awareness belonging to a group and having an objective in pursuing goals. These three main attributes of social identity explain how individual develop identities and hence leads to attitude and behaviors (Tajfel, 1978). Studies that applied social identity theory include Kim et al. (2011), Ku (2012), and Zhao et al. (2012). Studies that integrated identity theory with other theory include social presence (Shen et al., 2010) social

cognitive and social exchange and social capital (Zeng et al. 2014; Cheng & Guo; Guan et al. 2018) and extended theory of planned behavior (Tsai & Bagozzi, 2014).

### **Social Exchange Theory**

The social exchange was developed in explaining a non-contractual relationship between individuals (Staples & Webster, 2008). Social exchange in VC studies posits that the engagement between individuals in online communities enables them to receive some form of benefit (Phang et al. 2009). VC serves as a platform for users to contribute and receive different information and resources from various sources. These resources are a form of social exchange, either tangible or intangible. During the exchange, it may constitute cost or benefits. The use of social exchange theory may facilitate scholars to assess which dimension or factors that are highly perceived by individual either in knowledge contribution or act of seeking. Social exchange theory explains that the factors that lead the individual towards social interaction are based on the expectation that he or she would receive social rewards, such as respect, status, and approval (Liao et al. 2013). The level of interaction is based on cost and benefits consideration. If the benefits are more than the cost, the chance for them to engage in such interaction is high. Among the crucial factors in social exchange theory is trust. For the social exchange to be realized, reciprocation among the exchange members should be rooted in trust (Blau, 1964). This is to ensure a complete exchange to note the perceived obligation and strengthen trustworthiness among members in VC.

Literature shows that plenty of studies had applied this theory (Staples & Webster, 2008; Liao et al. 2013; Yan et al., 2016; Park & Gabbard, 2018). Some other studies had combined with different theories, such as the theory of reasoned action (Gang & Ravichandran, 2015), the theory of social capital, identity and cognitive (Guan et al., 2018; Xiong et al. 2018) and value theory (Phang et al., 2009). An extension of the social exchange theory is value theory. It explained that an individual is attached to different values based on objects or concepts that can fulfill their requirement (Harper, 1974). Studies that applied value theory were Phang et al. (2009) and Lai & Chen (2014). Another

theory that is similar to the social exchange theory is rational action theory. According to rational action theory, if a person perceived that there is benefit from a particular behavior, it will be more likely for them to engage with the said behavior (Hau et al. 2013). In line with this theory, expected benefits such as organizational reward, reciprocity, and enjoyment would encapsulate one to share in an online platform.

Meanwhile, equity theory corresponds to the perception and request of fairness/equity of individuals concerning a relationship (Cohen & Greenberg, 1982). According to Feng and Ye (2016), equity theory is the assessment of an individual in social exchange. It includes the ratio of the input and output from a relationship. It also has other person ration of the production from their input. Equity theory suggests that a healthy relationship between individual existed when each of them perceived that their output is equal to what they have provided in the input, suggesting fair as key to KS. Organizational support theory is also an extension of the social exchange theory. The theory proposes that there two categories of perception (organizational support and supervisor support) that constitute one behavior within an organization (Eisenberger et al., 2002). It also refers to the general belief behold by an individual concerning how the organization values their contribution and welfare is being taken care of (Eisenberger et al., 1986).

### **Expectancy Disconfirmation Theory (EDT)**

Another theory in VC KS behavior is expectancy disconfirmation theory (EDT) that was proposed by Oliver (1980). It explained that person repurchase intentions are depending on their satisfaction. This theory explains an individual continuance to share knowledge based on their satisfaction as the main factor (Jin et al., 2013). It is also known as expectancy confirmation theory. Satisfaction, on the other hand, is depending on one pre-purchase expectation and post-purchase disconfirmation of expectations. In 1993, EDT was revived by including affection, performance, and equity as the antecedents of customer satisfaction and repurchase intention. This theory work by the customers resulting in expectations positively confirmed (perceived performance more than expectation), confirmed (perceived

performance same as expectation), and negatively confirmed (perceived performance less than expectation). Customer's or user's expectation is the basis of evaluating satisfaction. In an event where confirmation occurs, the satisfaction will fall either lower or more than the expectation. A common theme found in this theory, regardless of its application, is the disconfirmation size and direction. Consumers would be satisfied in the case of positive disconfirmation and dissatisfied when negative disconfirmation occurs (Venkatesh & Goyal, 2010). In the VC context, members would have a certain expectation in using the platform to search for knowledge. Their future participation will depend on their satisfaction on whether their participation would enable them to receive relevant knowledge based on their needs. Studies in VC that had applied this theory were Chiu et al. (2011) and Jin et al. (2013). Chiu et al. (2011) had integrated with justice theory and social network factors.

### **Motivation Theory**

Three theories are based on motivation: motivation theory, self-determination theory, and expectancy theory of motivation. Motivation theory was developed to understand human behavior derived from the expectation of beneficial outcomes (Zhang et al., 2017a). The two main motivation is intrinsic and extrinsic. Self-determination theory (SDT) is a theory explaining human motivation that is concerned with tendencies of one's inherent growth and the needs of their psychology. These two main domains have a direct effect on their self-motivation (Yoon and Rolland, 2012). On the other hand, the expectancy theory of motivation is based on the perceived consequences factor that relies on the action and value of each consequence (Vroom, 1964). The perceived consequence is known as the chances of a specific consequence that would like to happen as a result of a behavior.

### **Use and Gratification Theory (U&G theory)**

U&G theory originated from the field of communication, where scholars apply it to determine why members engage in the community as a tool in fulfilling their needs (Chen et al. 2013; Mairaru et al. 2019). Katz et al. (1974) posited that the U&G theory was introduced to understand the user's application of media. How the users take the

initiative, rather than being a free rider in receiving the message and manipulating medium in searching for an information meeting their needs. As the fast increment of internet usage since the last two decades and a rapid level of interactivity compared to conventional media has paved the way for U&G theory to assess internet use motivations. The theory has been adapted in user acceptance of instant messaging, the internet, emails, electronic bulletin boards, and VC (Yen, 2016). With the development of the internet, the user's acceptance of the theory has been empowered due to easy conversion from one medium to another (Xu et al., 2012).

U&G is based on three dimensions: process, socialization, and content (Peters et al. 2007). These three dimensions can be further illustrated as entertainment (process), social needs (socialization), and information (content). The user's motivation to participate in acquiring knowledge in VC is different. Knowledge required in professional forums is perceived to be more critical than social-based VC, thus focusing on the content dimension. While members in social-based, their weigh is more on the social needs and entertainment aspect. In studying VC KS behavior, these three dimensions would vary depends on the platform basis and the community involved. Studies applying U&G theory were Chiu et al., (2013) and Yen (2016).

### **Other theories**

Other relevant theories used in this study are the Triandis model (Jeon et al., 2011a; Tamjidyamcholo et al., 2014). This theory explains an individual towards behavior in question. The behavior is influenced by facilitating factors that can positively impact, such as perceived consequences, social factors, and affect. Another critical theory is the sense of community theory. It was first formulated by McMillan and Chavis (1986), which was further enhanced by McMillan (1996). The purpose of community theory is described as the belonging feelings and feeling that the group members are matter to one another, having a shared faith among members. Each member needs to commit to meet the member's need. While an advanced definition of this theory is described as a "feeling of belonging spirit, having trust feeling on the structure of authority. Awareness and mutual benefit that come from being together with the

spirit that exhibits from shared experience, preserved as art" (McMillan, 1996, p. 315). The study that applied a sense of community theory was Nistor et al., (2015). Other theories applied were self-perception theory (Yan et al., 2013), goal setting theory (Khansa et al., 2015), lead user theory (Hau and Kang, 2016), social influence theory (Liao, 2017), attribution and self-presentation theory (Ma & Agarwal, 2007)

## DISCUSSION

Understanding the theories used in VC members, KS is vital. A majority of studies focused on the aspect of social within all the theories presented; understandably, social factors are deemed to be of the utmost importance. Even the theory of planned behavior and reasoned action is based on human relationships with one another on the aspect of the subjective norm (Erden et al., 2012). Almost all the major studies have used social-related theories directly in their studies (social exchange, social identity, social cognitive, and social capital). Even though other studies did not apply a direct social theory, mostly other theories have embedded a social foundation underlying construct or having social-relational constructs such as trust, reputation, norm of reciprocity, and enjoyment in helping others. These factors are so important in VC studies as interaction with other people may lead to trustworthiness that builds up from such a relationship.

Trust is the most studied factor in KS literature (Bandura, 1997). The importance of trust in understanding VC members KS is deemed crucial as sharing on the internet comes with the possibility of risk and liability. Trust, together with commitment, is considered to be supported by the feeling of belongingness (Chang et al. 2016, Capello and Fagian, 2005). The concept of trust is well documented within three theories, namely social capital, social identity, and social exchange. Documented from this review, the majority of studies applied the construct of trust either directly from the three theories or by having the trust construct as an indirect factor. Multiple studies applied theories that are based on trust by nature such as applying trust in multiple dimension (Chai & Kim, 2010), trust-building factors (Hsu et al., 2011), Social factors which include trust (Majewski et al., 2011) and trust-commitment theory (Chang et al., 2015).

The three most cited categories within the trust domain are ability, integrity, and benevolence (Zeng et al., 2014). Meanwhile, Usoro et al. (2007) termed the ability to trust as competence-based trust. Integrity is regarded as the expectation of an individual that everyone within VC is following a prescribed general set of rules, principles, and values (Chiu et al., 2006). Benevolence is a preference to commit to a kind and charitable act. Meanwhile, competence or ability is known as the activity based on one qualification, skills, and training (Usoro et al., 2007). These three domains are distinct among each other, but the result shows that they are empirically inseparable. For a proper KS to be realized, all three dimensions of trust should be inculcated. Apart from the trust domain, there have been researchers that studied trust within a different aspect. Such as work by Hsu et al. (2011) that studied trust in members and trust in the system. This is the only study that focuses on the trust in the system. It is deemed vital in such a way when every member of VC can be trustworthiness, but the system might jeopardize a member's personal information. If the system is compromised, data can be leaked to the wrong hand, to the extent used for criminal activities. The two different categories of trust have made an understanding of trust in different aspects of KS via VC. On the other hand, Hau et al. (2013) have adopted a trusted domain in measuring the different types of behavior of sharing based on tacit and explicit knowledge. It was identified that trust and risk profiles of users are different based on the type of knowledge they share (tacit and explicit) (Becerra et al., 2008).

Social exchange theory has a very significant impact on the study of VC members KS. This theory is based on the perceived benefits and the return of sharing behaviors of members in VC. The human being would want something in return when they contribute and participate. As this basis, the theory has led to other related or derivation from a social exchange such as respect, approval, and status (Liao et al., 2013). This social reward would be the main reason whether members are willing to share their knowledge freely. The theory perceived that human would weigh the cost and benefits before engaging in any social interaction. Phang et al. (2009) and Lai & Chen (2014) applied value theory that suggests members value realizing from VC that

confides on participation in knowledge seeking and contribution. According to Harper (1974), a different type of profession and group value knowledge differently which lead to their specific behavior. Professionals may value VC as a source of knowledge within their specific field while it is different from a socially-oriented VC. A VC that focuses on social may regard it as a platform for entertainment. Meanwhile, in equity theory (a similar theory to social exchange) suggest that fairness or equity should adhere when individual engage in any relationship. The theory suggests that when one provides certain input in a relationship, he or she should attain the same amount of output. Other theories having a similar concept to social exchange are rational action theory and organizational support theory. It can be understood from the literature that having much exchange within the community is vital in ensuring that knowledge can be circulated within the VC network. Factors related to self-attainment must be attached within the scope of KS. This attainment is considered not only in virtual setting but in a physical KS environment.

#### **FUTURE WORK**

Future avenues should see in the context of personalities that are significant towards VC member's KS. From the 68 studies, no studies had applied the big five personalities that are commonly used by scholars in organizational studies. Despite that were few studies undertaken on a broader aspect personality (Chu et al., 2014) and preferably on some specific personality of the big five such as conscientiousness (Fang & Chiu, 2010; Hao et al., 2019) and openness to experience (Yu et al., 2010). From these extensive and latest studies on KS behavior on VC, it can be seen that personality traits were somewhat neglected and received little attention. By understanding which traits are having the most impact on KS behavior, scholars and practitioners can make use of the VC platform to be the best possible mean in ensuring that knowledge can be disseminated. For example, it may be postulated that those who are high in extroversion and conscientiousness would have no problem communicating and sharing knowledge due to their inclination towards open interaction and enjoy helping others. On the other hand, a person high in neuroticism might be more cautious, and having a

calculative measure to share and received information either from peers or strangers. All the social-related factors can be related to individual personality traits that can provide meaningful insight into organizational behavior studies such as in VC.

With extensive studies on VC, there have been many terms used in describing individual online knowledge participation. Another term used by Hseseinoiun et al. (2018) is big data community, focusing on how scholars are actively participating in information and knowledge retrieval from big data. The domain focused on knowledge quality, system quality, use, user satisfaction, and community success. With the enhanced development of industrial revolution 4.0, the need to engage within big data analytics would see as a significant leap towards advanced technological adoption. As younger members participate in VC, the perceived ability to apply advanced tools in VC is deemed appropriate. Those who are not able to commit to using recent technology would be left behind and thus unable to make benefits from it. Future work should look into using the theory of acceptance model with the application of industrial revolution software and tools. Furthermore, the use of big data and data analytics should pave the way for VC moderators and stakeholders in acquiring useful information that can further improve the function of VC in the near future.

#### **CONCLUSION**

VC has provided the best possible environment for the communities to engage in KS activities. As the world develops even further, people would prefer to attain information and knowledge within a short period. The availability of VC realizes this rapid information retrieval. More and more professional individuals from various professions and socially oriented communities have used VC to acquire or share their knowledge. This paper has managed to review 68 studies within the 13-year period (2006-2019) that has conducted KS studies within the scope of VC. Most of the studies were focusing on the related social theories that involved much domain of social variables such as trust, reputation, norm of reciprocity, enjoyment in helping, and many others. All these antecedents are within the scope of main theories available within VC literature encompassing the theory of planned behavior,

technology acceptance model, social capital theory, social identity theory, social exchange theory, expectancy disconfirmation theory, and use & gratification theory. Other related theories and antecedents had also been briefly discussed throughout this review process.

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