



Exploring the Influential Factors of Knowledge Sharing in Virtual Communities in Disaster Events: A Systematic Review

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Abstract

Amid any debacle occasions, learning sharing assumes an essential job. The significance of learning sharing among exploited people is recognized in the catastrophe the board writing. Very little research has been done to look at information sharing conduct and not very many investigations have analyzed this conduct from the fiasco the board point of view. Thus, to guarantee a superior comprehension of this conduct, this investigation has directed a methodical writing survey to investigate the compelling elements of information sharing conduct in virtual networks in a fiasco occasions. An orderly procedure has been done to look six noteworthy scholarly databases for this survey. Two hundred eighty-four studies were identified as 21 fulfilled the inclusion criteria and were used for synthesis. The factors in this study include trust, self-efficacy, reciprocity, reputation, rewards, enjoy helping, sharing culture, attitude toward knowledge sharing and knowledge sharing intention. This paper proposes a conceptual model to represent the influential factors identified.

Keywords: Disaster Management, Emergency Events, Knowledge Sharing Behavior, Virtual Community.

1. Introduction

Bangladesh is the fifth most natural disaster-prone country among 173 nations in the world, suffering from regular floods, cyclonic storms, riverbank erosion, landslides, droughts, and earthquakes [13-14]. Cataclysmic events strike both created and creating nations alike, with colossal pulverization and human enduring [14]. Violent wind Sidr was the most grounded twister to occur in Bangladesh that occurred in November 15, 2007. The quantity of passings from Cyclone Sidr was evaluated to be somewhere in the range of 5,000 and 10,000 [30]. The obligation regarding debacle incorporates reaction to the catastrophe, recuperation, moderation, and readiness to conquer the fiasco. Ongoing investigations found that absence of powerful data and learning sharing, and scattering on calamity relief measures as one of the real explanations for the inadmissible execution dimensions of current fiasco the executives rehearses [24].

Data sharing and coordination are a basic factor in Disaster Management, particularly among reacting associations for basic leadership and assessment, the safeguard plan advancement, and the development and utilization of crisis reaction choice frameworks [19][28]. Numerous virtual networks, for example, discussions, online journals, and long range interpersonal communication destinations would give an enormous measure of debacle data if any normal or man-made fiascos happened [27-28][32]. Interpersonal interaction destinations (SNS) are the most unmistakable kind of virtual network. SNSs have been broadly utilized in ongoing catastrophes to share data and information. It has been especially used

to caution individuals, and help in the coordination of reaction and recuperation. Online life has assumed an essential job amid and after real catastrophes like 2010 Haiti quake [32]. Social media is being used by many agencies alongside with traditional media (e.g. newspapers, television, meetings) as a communication tool for warning, response and recovery. Twitter was broadly used during Typhoon Ondoy/Ketsana in 2009 in the Philippines. It was also used in 2011 during Virginia Earthquake to warn people [29]. In 2010 after Haiti Earthquake the online Ushahidi system was used on a large scale disaster condition for the first time. It provided a way to obtain, consolidate, and share critical information from Haitians. The US Federal Emergency Management Association (FEMA) encouraged people to use SMS and SNS to keep in touch with family and friends during Hurricane Irene, in 2011 [29]. In 2015 during Nepal Earthquake, Facebook provides safety check services. Crisis Map was used to identify victims and help then during the earthquake.

In any disaster events, it is very important to share knowledge but many members participate in virtual communities as lurkers to acquire knowledge rather than contribute knowledge [2][34]. Shan et al. [27] points out that it is important to understand the personal perception and the relationship behind knowledge sharing behaviors of members in virtual communities which can help to simulate the knowledge sharing behaviors in virtual communities. Although virtual communities have been used by community members to share relevant information, Lu and Yang [22] reports that not much research has been done to examine knowledge sharing behavior. Learning Sharing (KS) has been an extremely well known issue in the writing of data frameworks [7][21]. In any case, in the learning sharing writing a large portion of the past investigations have been centered around information sharing inside the areas of training, business, the



board in and association [2][7][15][21] and not very many examinations have analyzed this conduct from the catastrophe the board point of view. In this way, the present investigation plans to investigate the powerful factors of information partaking in virtual networks in a fiasco occasions through a deliberate survey and propose an applied model so as to fill the hole so separate specialists can take viable measures to enhance individuals' learning sharing conduct.

2. Literature review

2.1. Knowledge sharing (KS) in virtual community

Learning sharing is known as a procedure, an action, or a conduct. Person's KS conduct is guided by close to home attributes and their surroundings condition. Past investigations found a few factors that influence a person's readiness to share learning such reward frameworks, extraneous and characteristic inspiration, hierarchical atmosphere, and the board title [16][20][31][34]. Learning sharing conduct coordinates new information into existing learning [12]. As indicated by Liao, To, and Hsu [20], KS can't be constrained, yet can be empowered and encouraged. In this investigation Knowledge Sharing (KS) is characterized as the sharing of fiasco related data, thoughts, recommendations and ability among individuals in virtual network space. There are a few theories can be used to support the importance of knowledge sharing behavior in virtual communities in disaster events. A study by Park et al., [23] shows how theory of Weak Ties explains why people seek information from weak ties (e.g. Facebook, twitter) when answers from strong ties (e.g. Traditional news media, government agencies) are not available and the more the number of weak ties the more expand the information received by the individuals. Situational crisis communication theory (SCCT) suggests to provide information that helps the affected audiences physically and psychologically cope [8-9]. During a disaster situation authorities can provide real time information to the public through social media and can get plenty of volunteers that help the affected individual physically cope. In disaster phase it is important to share information and knowledge among victims because it helps to calm down the victims who are waiting for rescue [2][22]. During a disaster event organizations (e.g. government) can provide continuous information to the public that helps the affected individual psychologically cope.

2.2. Overview of Previous Studies

Yu, Lu, and Liu [33] expressed that it is imperative to discover the approaches to urge people to contribute individual information and to help virtual network individuals to share their skill. In view of their examination they found that getting a charge out of helping, sharing society and convenience/importance are firmly connected to part information sharing conduct. Thus, aftereffects of the investigation by Pi, Chou, and Liao [25] demonstrated that person to person communication sharing society is the most huge factor, specifically influencing learning sharing aim, as well as in a roundabout way affecting the sharing expectation through emotional standard and information sharing frame of mind. A progressively nitty gritty research [35] led by Liao, To, and Hsu [20] uncovered that sharing society affect continuation goal to share learning and getting a charge out of aiding is the most grounded inspiration of frame of mind toward information sharing. Appreciate helping is additionally tended to as a characteristic inspiration that impacts individuals to partake and share their insight in virtual networks [16][31]. By helping other people, people are inspired inherently to contribute learning in virtual network [36]. Chang, Hsu, and Lee [5] likewise done an examination to inspect the difference in the jobs of trust, responsibility, and self-adequacy

with time. Results uncovered that, trust is a critical factor that impacts information sharing goal. Their investigation proposes that social aim is a solid indicator of genuine conduct. In the past writing, numerous examinations have given observational proof to help the connection between social goal and real conduct [37]. They likewise discovered that information sharing aim influence learning sharing conduct emphatically. Chen, Chen and Kinshuk [7] likewise distinguished that information sharing expectation is essentially connected with information sharing conduct in virtual learning network.

The examination led by Ahmad, Zani, and Hashim [2] explores the determinant elements of people's learning sharing goals amid a calamity. Social subjective hypothesis (SCT) is utilized as the fundamental hypothesis to anticipate exploited people's learning sharing conduct. They found that social help and social acknowledgment altogether impact information sharing aim. Ahmed, Ahmad, and Zakaria [3] found a few factors that can impact specifically and by implication the information sharing procedure in catastrophe alleviation associations in the Disaster Management (DM) cycle. These components are sorted in four gatherings, in particular, natural variables, persuasive elements, innovative elements and institutional elements.

There are a couple of variables that effect on learning sharing conduct, for example, self-adequacy, correspondence, rewards and so on. Self-Efficacy has been found by Kim, Lee, and Elias [17], Hsu et al. [11], Zhou [34], Chen and Hung [6]. Self-viability is a type of self-assessment that impacts a choice with respect to what moves to make. Individuals who have high self-adequacy are bound to play out a related activity than those with low self-viability Enjoy helping others is an intrinsic motivation that influences members to participate and share their knowledge in virtual communities [16][31]. By helping others, individuals are motivated intrinsically to contribute knowledge in virtual community. Shan et al. [27] found that Trust, Emergency event characteristics, Shared language, Shared vision, Social interaction ties are the important factors that affect the quality and quantity of the shared knowledge in disaster situation. Some other factors such as Reputation, Management/ Social support, Commitment [38], Expected relationship has been found by different authors in different context.

3. Methodology

This study has conducted a systematic review of the literature (SLR) to find the factors that influence knowledge sharing behavior in virtual communities in disaster events. SLR is defined as a process of identifying, evaluating, and interpreting related research area with the purpose to provide answers for specific research questions [18]. This study followed the guideline by Abedin, Babar, & Abbasi [1] where they altered the rules for precise audits laid by Kitchenham [18] [1]. SLR has been led audit in four stages (as appeared in Figure 1) (an) Identification of Resources, (b) Selection of Studies, (c) Data extraction and blend (d) Data investigation.

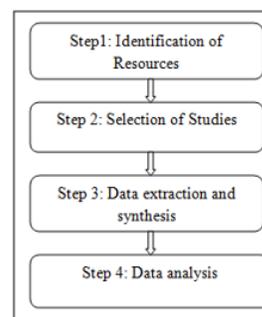


Figure 1: SLR Steps

3.1. Identification of resources

To direct SLR, logical databases have been utilized for looking instead of explicit books or specialized reports, since real research results in books and specialized reports are additionally examined or referenced in logical papers. To get the amplest arrangement of papers conceivable, Six (6) most famous and significant writing databases have been chosen. They are ISI Web of learning, ACM computerized library, IEEE Xplore (IEEE), ScienceDirect, Google Scholar and Emerald.

After an underlying hunt of these databases, an extra reference filtering and investigation has been done so as to discover any missing articles. The accompanying pursuit watchwords are utilized to discover pertinent investigations in paper's title, catchphrases, and unique:

"Virtual Community Influential Factor" OR "Virtual Community Knowledge Sharing" OR "Virtual Community Knowledge Sharing Behavior" OR "Disaster Knowledge Sharing Behavior" OR "Virtual Community Disaster Knowledge Sharing" OR "Social Media Knowledge Sharing Behavior"

Some complex query also performed such as:

("Virtual Community" OR "Social Media" OR "Facebook" OR "Twitter") AND ("Disaster" OR "Emergency" OR "Crisis" OR "Hazard") AND ("Knowledge Sharing" OR "Knowledge Sharing Behavior")

A short review of the principal indexed lists demonstrated that the terms 'crisis', 'risk' or 'emergency' (notwithstanding the term 'Fiasco') and the terms 'Online networking', 'Twitter', 'Wiki', 'Facebook', 'Weblogs', 'Microblog' can be utilized in blend with the term 'Virtual Community' to distinguish fitting assets. These databases cover the greater part of diary and gathering papers distributed in the field of Knowledge Sharing, Virtual Community or Social media and Disaster [39]. Appropriation of the discovered articles upon six databases is appeared Table 1.

Table 1: Databases and Articles' Frequency

Databases	No of articles
ISI Web of knowledge	45
ACM digital library	35
IEEE Xplore (IEEE)	46
Sciencedirect	65
Google Scholar	56
Emerald	37
Total	284

3.2. Selection of Studies

Exclusion/inclusion criteria have been developed for the selection process. Articles published from 2000- 2015 are taken into consideration for the inclusion in search criteria. Initial hits were

Table 2: Factors that Influence Knowledge Sharing Behavior in Virtual Communities in Disaster Events

Factor	Sources
Trust	Shan et al. [27]; Ahmed, Ahmad, & Zakaria [3]; Chang, Hsu, & Lee [5]; Hsu et al. [11]; Zhou [34]; Chen & Hung [6]
Reputation	Liao, To, & Hsu [20], Wasko & Faraj [31], Pi, Chou, & Liao [25]
Rewards	Liao, To, & Hsu [20], Lin & Huang [21], Ahmed, Ahmad, & Zakaria [3]
Reciprocity	Liao, To, & Hsu [20], Ahmad, Zani, & Hashim [2], Wasko & Faraj [31]
Enjoy Helping	Liao, To, & Hsu [20], Yu, Lu, & Liu [33], Wasko & Faraj [31]
Self-Efficacy	Liao, To, & Hsu [20], Chen, Chen, & Kinshuk [7], Hsu et al. [11], Chang, Hsu, & Lee [5], Ahmad, Zani, & Hashim [2], Lin & Huang [21], Zhou [34], Chen & Hung [6]
Sharing Culture	Liao, To, & Hsu [20], Yu, Lu, & Liu (2010), Pi, Chou, & Liao [25]
Attitude toward Knowledge Sharing	Liao, To, & Hsu [20], Chen, Chen, & Kinshuk [7], Lin & Huang [21], Pi, Chou, & Liao [25], Ahmed, Ahmad, & Zakaria [3]
Knowledge Sharing Intension	Chen, Chen, & Kinshuk [7], Ahmed, Ahmad, & Zakaria [3], Chang, Hsu, & Lee [5], Liao, To, & Hsu [20], Pi, Chou, & Liao [25], Lin & Huang [21], Ahmad, Zani, & Hashim [2]
Knowledge Sharing Behavior	Chen, Chen, & Kinshuk [7], Hsu et al. [11], Zhou [34], Ahmed, Ahmad, & Zakaria [3], Chang, Hsu, & Lee [5], Yu, Lu, & Liu (2010), Chen & Hung [6]

filtered and excluded in several steps as explained below:
Exclusion criteria:

- Did not consider Knowledge Sharing in virtual community/Social media (e.g. Facebook, weblogs, wiki, twitter)
- Studies that are not related to the research questions
- Studies are not in English
- Repeated articles (By title or content)
- Not available online
- Short papers under four pages

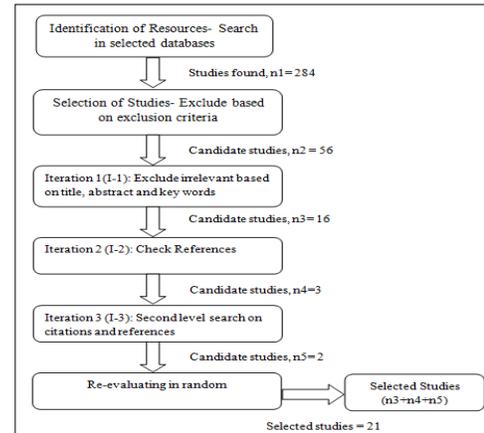


Figure 2: Finding candidate studies procedure

3.3. Data Extraction and Synthesis

Initially, 284 primary studies were identified. After completing the iteration processes 21 studies were selected. In this progression, the key subtleties of every one of 21 chose papers were recovered. It incorporates the setting of the investigation (e.g., internet based life, virtual network, and Knowledge Sharing conduct), catastrophe type and data, destinations and consequences of the examination.

3.4. Data Analysis

After reviewing the selected literatures following influential factors has been found however all of them are not usable in Disaster knowledge sharing. So, a factor filtering technique has been used to identify the factors that occurred most. Table 2 demonstrated the result from SLR studies conducted representing the influential factors of knowledge sharing and its behavior in virtual communities in disaster events.

4. Results

4.1. Research Model and Research Hypothesis

Table 2 shows the result from SLR studies conducted representing the influential factors of knowledge sharing and its behavior in virtual communities that have higher occurrences. In other words, they are examined and tested the most by past researchers. The proposed conceptual model is an extended and modified version which is derived from a model by Liao, To, and Hsu [20]. After comparing several models [2-3][5][7][20-21][25][33] and results from Table 2, the proposed conceptual model were designed. Because most of the factors in the original model are also identified in Table 2, hence the interrelated factors and better occurrence can serve as factors for the proposed model. It states that learning sharing goal is the indicator of information sharing conduct [5][7]. As the hypothesis of arranged conduct likewise proposes that, social goal is a solid indicator of real conduct. Drawing from the literary works of information sharing and virtual network and the outcomes from Table 2, trust has been attested as a persuasive factor. Zhou [34] found that trust can go about as an impetus in the network to decrease client saw hazard and increment his confidence in other individuals' capacity, uprightness and consideration. Utilitarian inspiration with regards to information sharing emerges from the normal aftereffects of taking an interest in learning sharing. This investigation incorporates prizes, correspondence and notoriety as the factors of utilitarian inspiration. Indulgent inspiration with regards to learning sharing alludes to the satisfaction and pleasure members feel when information sharing [20]. The proposed theoretical model is delineated as Figure 3.

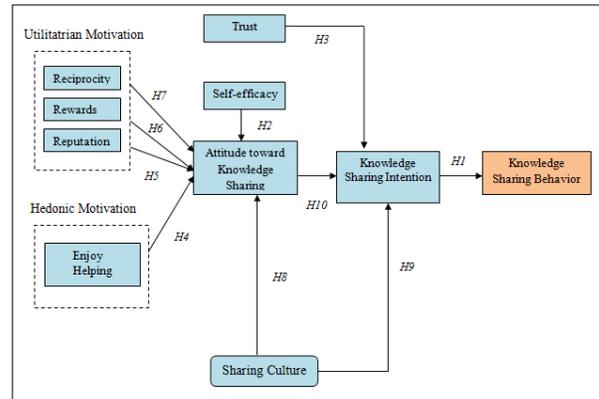


Figure 3: Proposed Model for Knowledge Sharing Behavior in Disaster Events

Based on Figure 3, it can be hypothesize that:

- H1: Knowledge sharing intention positively influences knowledge sharing behavior.
- H2: Self-efficacy has a positive impact on attitude toward knowledge sharing.
- H3: Trust is positively associated with knowledge-sharing intention.
- H4: Enjoying helping is positively associated with attitude toward knowledge sharing.
- H5: Reputation has a positive impact on attitude toward knowledge sharing.
- H6: Rewards have a positive impact on attitude toward knowledge sharing.
- H7: Reciprocity has a positive impact on attitude toward knowledge sharing.
- H8: A sharing culture has a positive impact on attitude toward knowledge sharing.
- H9: A sharing culture has a positive impact on intention to share knowledge.

Table 3: Operational Definitions of Identified Factors

Factor	Definition	Source (s)
Trust	Refer to the extent to which individuals believe that they can rely on the given information	Chang, Hsu, & Lee [5]
Self-efficacy	Refer to the extent to which individuals believe that he or she is capable of providing knowledge	Liao, To, & Hsu [20]
Reciprocity	Refer to the extent to which individuals believes if he or she provides resources, also expects others to do the same for him/her.	Liao, To, & Hsu [20]
Reputation	Refer to the degree of individual's perception of earning respect or enhancing status through participation in virtual community (e.g. Facebook Group).	Pi, Chou, & Liao [25]
Rewards	Refer to the degree of individual's perception of getting benefits through participation in virtual community.	Liao, To, & Hsu [20]
Enjoy Helping	Refer to the extent to which individuals believes that helping behaviors can enhance value, group cohesiveness and performance.	Yu, Lu, & Liu [33]
Sharing Culture	The degree of individual's perception that all members are equally treated in virtual community (e.g. Facebook Groups) and it is encouraged to bring knowledge into groups.	Pi, Chou, & Liao [25]
Attitude toward Knowledge Sharing	Refer to the degree of individual's positive feelings about sharing knowledge in virtual community (e.g Facebook Groups).	Pi, Chou, & Liao [25]
Knowledge Sharing Intention	Refer to the degree to which individual believes that individual will participate in knowledge sharing in virtual community (e.g. Facebook Groups).	Pi, Chou, & Liao [25]
Knowledge Sharing Behavior	Refer to the extent to individual's willingness in a virtual community to share with others the knowledge they have acquired or created.	Yu, Lu, & Liu [33]

5. Discussion and conclusion

Web technologies are an emerging trend. Due to the advancement of Information and communications technologies (ICT) many new virtual communities like social networking sites are being developed.

Social networking sites are a wonderful tool to transform traditional information sources into real time sources by making it more accessible and effective for disaster preparedness. In this study, a few factors that impact information sharing conduct in virtual networks in a fiasco occasions were distinguished dependent on the precise writing survey. Most of the information depended on quantitative

research inspecting learning sharing conduct factors. The powerful factors recognized are trust, self-adequacy, correspondence, notoriety, rewards, appreciate helping, sharing society, disposition toward learning sharing and information sharing goal. The distinguished elements may assist the separate experts with improving the part's present learning sharing conduct in virtual networks in misfortune occasions. The outcomes from SLR were utilized to plan a calculated model. The reasonable model proposed speaks to the relationship of compelling variables towards learning sharing conduct in virtual networks. The confinement of this examination is that it didn't test the proposed calculated model.

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