Impact of Using Electronic Collaborative Media on Knowledge Sharing Phases

Mohammad Al-Ma'aitah
Al-Balqa Applied University
Jordan-Amman

Abstract:-
The advances in computers and communication technologies have enabled many companies to leverage knowledge. The emerging powerful systems such as internet, intranet, Lotus Notes, and conferencing systems allow people to collaborate and share their complementary knowledge, without overly constraining them to geographic location and time. Therefore, Organizations especially those adapting to rapidly changing environments, face the challenge of being able to use these technologies, in order to gain knowledge sharing effectively within highly constrained timeframes. This study came to explore the effect of using electronic collaborative media on knowledge sharing phases. This study investigated a sample formed of (180) individuals operating in a number of hospitals within the Jordanian health sector; using the electronic collaborative system, to perform its different duties. In order to achieve this purpose the study proposed the following hypotheses: using of electronic collaborative media is positively influences on the knowledge sharing phases. The study concluded some important results such as that among the most important electronic collaborative media used in knowledge sharing in the hospitals subject to research are the E-mail and video conferencing, and existence of a significant effect between using the electronic collaborative media and the knowledge sharing process in the researched hospitals.

Keywords:- knowledge sharing, e-collaborative media, Knowledge Routemap, collaborative platform, Groupware.

1 Introduction
Knowledge revolution, information technology and communication led to a change in the strategic concepts and the tools used by the organizations that seek for learning, competitive and obtaining high market shares. Knowledge is one of the most important strategic resources through which the organization can develop and survive and Wei[18]; Al-Alawi[1]. It is the most important concept that appeared in the last century. Therefore, organizations followed two paralleled direction, the first direction represent in searching for information and knowledge in order to be capable to compete, the other direction concentrated on sharing others with the knowledge that they belong (organizations, governmental entities, or individuals). Hawryszkiewycz[14] argued that Knowledge development and sharing is becoming increasingly important in many organizations. It is recognized that ways must be found to use highly specialized tacit knowledge to help create new innovative services and products to give organizations additional competitive advantage.

The quick development and changes in information technology provided many tools can be used by the organizations or their employees in order to obtain or knowledge sharing. Tools such as Electronic mail, groupware, and the other collaboration systems are considered among the most important tools, through which the organizations were able to reach advanced levels of knowledge. Bhatt [3] argued that Information system tools, including electronic discussion groups, knowledge-cafe’s, and chat-rooms can open up many windows for discussion and exchange of ideas and personal experience.

2 Electronic Collaborative Media
Knowledge sharing through the internet between the firm, its customers, and its suppliers is important to promote the process of knowledge management. Integrated groupware can assemble people of various skills around the globe to share their knowledge while working on a project Egan and kim[10]. Graveline[12] argued that people have begun to use communication technologies to collaborate at a distance, to enhance the way operation done. These technologies used to decrease costs and increase productivity and give employees greater flexibility in their work life by enhancing communications between organizations. There are a large number of tools and methodologies to facilitate e-collaboration inside and outside organizations, such as groupware tools.
which refer to software products that support collaboration over networks among groups of people or employees who share a common task or goal. More of these tools are available on the internet or an intranet to enhance collaboration process of people in the same place or over the world. So if any organization wants to adopt these technologies they have to prepare the infrastructure needed from hardware to groupware, such as Internet, intranet, extranet, and wireless technology Turban[29]. O’Briens[26] argued that information technology playing important role in changing the way people work together. Especially internet, intranet and extranet technologies; because these technology help to achieve communication, coordination and collaboration functions. Also he categorized electronic collaboration media into three groups:

- Electronic Communication Tools: e-mail, voice mail, faxing, web publishing, internet
- Electronic Conferencing Tools: data conferencing, voice conferencing, video conferencing, discussion forums, chat systems, electronic meeting system.
- Collaborative Work Management Tools: calendaring and scheduling, task and project management, workflow systems, document sharing.

Bajwa[2] named these tools as CIT (collaborative information technology) and classified them to five clusters; in addition he lists examples for each cluster like that:

- Email like Microsoft Outlook, Hotmail.
- Teleconferencing (two-way audio) like NetMeeting, CU-SeeMe.
- Videoconferencing (two-way audio and video) like NetMeeting, CU-SeeMe.
- Data conferencing (whiteboards, application sharing, data presentations) like NetMeeting.
- Web-based Collaborative Tools (Intranets, Listservs, Newsgroups, chat, message boards).

2.2 Related Issues of Electronic Collaborative Media

Using electronic collaborative media become wide spread among organizations, so organization faced many problems related with this developments, because many communication technology available for distributed team to use, as example on these problem is how the organization could choose the best suited option for their activities and tasks among these available media. One of the most theories related to these issues is media richness theory proposed by Daft and Lengel[9]. Theses theory defines several characteristics of media such as:

- Feedback Capability: refers to synchronous and asynchronous media, e-mail is an example on asynchronous media, and instant chat is an example on synchronous media.
- Availability of multiple cues: some of media has various numbers of communication channels like conferencing software, and single channel like e-mail.
- Language variety: the capability to use different types of language.
- Personal focus: refers to Socio-emotional content a message contains.

2.3 Electronic Collaborative Media and knowledge sharing

Electronic collaborative media has enabled information and knowledge flows to become more fluid within and outside the organization. Kock[21] findings that social influence such as organizational culture and others organizational context have an important effect on using collaboration technology for knowledge sharing. He argued theses factors were the reasons why results in the past have been generally negative to investigate the relation between knowledge sharing and collaborative technology. Kim and lee[19] finding that computer supported cooperative work present opportunities for knowledge sharing through solving limitations and bounded interactions problem. Jarvenpaa and Staples[17] argued that use of collaborative electronic media for knowledge sharing affected by many factor such as organizational culture, propensity to share, task interdependence, computer comfort and Perceived characteristics of computer-based information.

3 Knowledge Sharing

In recent years share what they know becomes dominant fields of research within knowledge management. The literatures focus on why people share knowledge, or why they fail to share knowledge. Nonaka and Takeuchi[25] argued that Shared knowledge is one of the unique, valuable, and critical resources that are central to having a competitive advantage. Sharratt and Usoro[27] argued that it is difficult to maximize the value of the organization resource without adequate understanding of how to leverage and share knowledge throughout the organization. Also he suggested that knowledge-sharing lead to the creation of new knowledge while the sharing of information does not necessarily lead to the creation of new knowledge.

Gurteen[13] emphasized that today it needs to be explicitly understood that sharing knowledge is power not knowledge is power. Because knowledge is a perishable and knowledge is increasingly short lived. If you do not make use of your knowledge then it rapidly loses its value. We agree with this opinion because knowledge overload without used and evolve will be lost. Connelly and Kelloway[8] defined knowledge sharing is a set of behavior that involve the exchange of information or assistance to others. Lin[23] defined Knowledge sharing as
4 Research Model

Depending on semi-structured interviews and literature we posed the following model:

“individuals sharing organizationally relevant experiences and information with one another”.

3.1 Factors Contributing to Knowledge Sharing

Kim and Lee[20] analyzed the influences of organizational culture, structure, and IT on employee knowledge sharing capabilities in five public and five private sector organizations in South Korea. The results suggest that organizational culture, structure, and information technology all exert significant influences on the KS capabilities of the employees of five South Korean government ministries. According to Clarke[6], technology platforms may assist in knowledge sharing process, but no technology will stimulate the flow of knowledge without attention to the cultural and organizational contexts in which people are encouraged to develop and share their knowledge. Kim and Lee[20] stated that social networks, performance-based reward systems, and IT application utilization are all significant variables affecting knowledge sharing capabilities. Egan and Kim[10] argued that IT infrastructure provides a suitable framework for knowledge sharing. To explain his suggestion he argued that “the use of tools that foster a culture of sharing. Electronic mail facilities communication; data stores and libraries offer repositories of shared information; and internet and intranet Web sites are used to publish and disseminate organizational information and message. All of these digital tools serve to community building and knowledge sharing “.

Staples and Jarvenpaa[17] suggests three sets of factors are influence individuals’ sharing behaviors in organizations: motivating sharing via cultural norms, motivating Sharing via Individually-held attitudes and beliefs that influence if an individual will share information, motivating Sharing by using information technology. Based on the previous review, we classified factors that contribute to knowledge sharing into three categories, namely cultural Factors, IT Factors, and organizational Support Factors.

3.2 Knowledge Sharing Process and its Components

Magnini[24] described Knowledge as “the process by which individuals mutually exchange their knowledge and collaboratively generate new knowledge”. According Garfield[11] he describe three components to knowledge sharing are people, process and technology. People: may be representing persons with a question, problem, or need, Community members who respond with answers and solutions and knowledge brokers who monitor discussions to ensure that answers are provided. Process: may be representing collaboration process to support asking and answering questions, Policies and procedures for sharing knowledge and measurements and rewards for sharing knowledge. Technology: may be representing structured repositories, Collaborative team spaces, and threaded discussion forums.

3.3 Knowledge Sharing Benefits

After we reviewed many literatures we note that participating in knowledge sharing supports many benefits for organizations. Follow we will mention some of them:
1- Enhancing the sharing of knowledge with our clients and partners.
2-Enhancing new product development. Hong [16]
3-Supporting ongoing organizational activities. Christensen[5]
4-Increased company value. Voelpel and Han[30]
5-Facilitate the learning and alleviate the isolation. Coakes[7]

3.4 Knowledge sharing Phases

Blink[4] proposed the following knowledge sharing phases:

Unawareness phase: An organization does not realize the possible contribution of knowledge to its competitiveness and Knowledge sharing is not addressed in the organizational strategy.

Knowledge repository phase: “The knowledge repository phase is applicable to organizations that have become aware of the potential value of information and knowledge. In its strategy the organization pays attention to information management and it is willing to invest in information systems”.

Knowledge routemap phase: “An organization in the knowledge routemap phase realizes the benefits of knowledge and undertakes increasing effort in knowledge sharing. This phase focuses not only on sharing of explicit knowledge but also on sharing of indirect knowledge by means of knowledge “

Collaborative platform phase: “Organizations in the collaborative platform phase use knowledge to compete and to address their business drivers. The way of working is focused on participative decision-making, collaboration, and learning together (for instance in communities of practice)”. Organizational learning phase: "Learning by trial and error is sided by explicit, systematic (double loop) learning. Competitive advantages are attained through collective learning in the organization, through combination and coordination of skills, competencies and technologies."
Fig (1.1): The suggested model of the study

To test the suggested model we posed the following hypothesize:

H0: Using of electronic collaborative media has not positive effect on knowledge sharing.
H1: Using of electronic collaborative media has positive effect on knowledge sharing.

5 Methods
5.1 Sample Selection and Survey Administration

We have chosen hospitals belonging to the Health care sector in Amman city to conduct this study. Therefore, we have made a preliminary survey of Amman city's hospitals to determine which ones using more often the electronic collaborative tools and how they apply knowledge management concept. Through the survey a number of hospitals have been distinguished with the previous characteristics. This study aims to cover a wide variety of respondents from different hospitals located in the Amman city. These hospitals are at the heart of the health care industry in the Jordan. The study sample included department directories and heads of administrative and vocational section of study community's hospitals, as well as those having information about their hospitals duties, availability of electronic collaborative tools and application aspect to manage knowledge sharing. Therefore there was a total of (210) persons, constituting the study sample forming (43%) of the whole community which were 470 persons. There were (190) questionnaires which have been retrieved of which have been discarded because of being invalid for statistical analysis, so the real number of study sample is (180) persons constituting (37%) percent of whole community and it is acceptable in such type of this studies.

5.2 Survey Measures and Items

The self-administered questionnaire was designed to elicit demographic data and information on employee perceptions of using electronic collaborative media and knowledge sharing phases. The items used in this survey were adapted from previous studies. Responses were recorded along a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. Cronbach alpha reliability estimates for all variables ranged from .70 ("Collaborative platform phase") to .81 ("knowledge repository phase"). According to a factor analysis, the items designed to measure electronic collaborative media variables and knowledge sharing phases loaded on seven separate factors. The factor loadings support the use of these items as indicators of the constructs they were designed to measure.

Using electronic collaborative media dimension were dived into three construct as shown in the fig (1.1) adapted from O’Brien[26]; Hofte[15]. Electronic communication tools construct was assessed with a five-item scale which was a) "The hospital use application software which allows interested employees to contribute their ideas relating to certain subject"; b) "The employees within the hospital rely on fax machine to send or receive documents"; c) "The employee rely on voice male as a method of communication to exchange information within the hospital"; d) "The employee rely on electronic email to exchange information inside or outside the hospital"; e) "The hospital uses application software which enables publishing of information on web site." The Cronbach alpha reliability of the five items was measured as 0.79, KMO = 0.82, factor loading = 0.74, mean = 3.5, standard deviation = 0.90.

Electronic conferencing tools construct was assessed with a six-item scale which was a) "Video conferencing is used to exchange information and special experiences related to the employee job within the hospital"; b) "The hospital provide special application software which help employees to perform shared tasks"; c) "The employee rely on the chatting software on the internet for real time exchange of information and special experience related to their job within the hospital"; d) "The hospital provide special application software which help employees to perform shared tasks"; e) "Electronic Bulletin Board is used to exchange information with in the hospital"; f) "The employee rely on the forum available through the internet to exchange information and special experience related to their job within the hospital." The Cronbach alpha reliability of the five items was measured as 0.81, KMO = 0.824, factor loading = 0.72, mean = 3.4, standard deviation = 0.99.
E-Collaborative management tools construct was assessed with a six-item scale which was a) "The hospital provides an extranet which enables exchange of information with other business partners"; b) "Workflow system is used within the hospital to transfer information related to task execution mechanism"; c) "Specialized computer systems are used to manage different functional activates"; d) "The hospital poses application software which include many methods to share knowledge"; e) "The hospital poses an intranet that links all of the employees within the hospital"; f) "The employees in the hospital rely on electronic memos to coordinate appointment and task scheduling related to individual." The Cronbach alpha reliability of the five items was measured as 0.75, KMO = 0.82, factor loading = 0.69, mean = 3.3, standard deviation = 0.98.

Knowledge sharing phases dimension were divided into four construct as shown in the fig(1.1) adapted from Blink[4]; Laycock[22]; Hawryszkiewycz[14]; Stonehouse and Pemberton[28].

Knowledge repository construct was assessed with a six-item scale which was a) "There exist specific and organized procedures to attract knowledge and store in knowledge base"; b) "There exists mechanism to categorized and classify knowledge before the storing process beings"; c) "The management of the hospital realized the worthy value of information and knowledge"; d) "The management of the hospital care for knowledge management activities and references"; e) "The storing knowledge is upgraded continuously"; f) "The management uses technology to store information and knowledge from external and internal resources." The Cronbach alpha reliability of the six items was measured as 0.81, KMO = 0.83, factor loading = 0.72, mean = 3.40, standard deviation = 0.93.

Knowledge routemap construct was assessed with a six-item scale which was a) "The management of hospital realizes the advantages of create maps which indicate the centers of special knowledge within the hospital"; b) "The hospital and its management increase effort to share knowledge"; c) "There is concentration on tacit and explicit shared knowledge at the same time"; d) "There exist directories to determine internal knowledge recourses"; e) "There exist directories to determine external knowledge recourses"; f) "There exist directories that determine the best practices and activities that must performed." The Cronbach alpha reliability of the six items was measured as 0.81, KMO = 0.83, factor loading = 0.73, mean = 3.25, standard deviation = 1.06.

Collaborative platform construct was assessed with a five-item scale which was a) "Information technology is used as bases for collaborative work within the hospital"; b) "The knowledge is used as a tool to direct different activities within the hospital"; c) "The hospital concentrate on group decision making process"; d) "There exists within the hospital data communication network to support collaboration and team work activities" e) "The hospital provide motivation to encourage collaboration team work." The Cronbach alpha reliability of the five items was measured as 0.70, KMO = 0.74, factor loading = 0.69, mean = 3.28, standard deviation = 0.74.

Organizational learning construct was assessed with a five-item scale which was a) "There exist motivations for employees who tend to learn and gain new experience"; b) "There exist systematic activities for continues learning"; c) "The management strive to develop and apply the best practices in the field of health care sector"; d) "The management of hospital tries to build communities of practice that strive to learn"; e) "The management concentrated with training employees within the hospital." The Cronbach alpha reliability of the five items was measured as 0.73, KMO = 0.72, factor loading = 0.70, mean = 3.40, standard deviation = 0.96.

### 6 Research findings and conclusions

Hypothesis testing results:

H0: Using of electronic collaborative media has not positive effect on knowledge sharing.

H1: Using of electronic collaborative media has positive effect on knowledge sharing.

<table>
<thead>
<tr>
<th>Table (1): Multiple Regression Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>KS</td>
</tr>
</tbody>
</table>

Predictors (constant): ECT, ECNT, EMT

Multiple Regression Test

According to table (1) the multiple correlation coefficient $R = .934$ indicated that there is a strong correlation between the knowledge sharing and those predicted by the regression model, $R^2 = .87$ which means that Using of electronic collaborative media (Electronic conferencing tools, Electronic conferencing tools, Collaborative management tools) explained 87% of variance in knowledge sharing. The adjusted $R^2$ is an attempt at improved estimation of $R^2$ in the population. Use of this adjusted measure leads to a revised estimate .871 of the variability in knowledge sharing can be explained by the three explanatory variables. F value equal 402.991 with significant equal .000, therefore we reject the null hypothesis and accept the alternative which indicate that there is an effect of Using of electronic collaborative Media on knowledge sharing.
Table (1) also show that the Durbin Waston test equal 1.806 which means that there is no autocorrelation between independent variables.

Table (2) depicts which of independent variable has a significant effect on KS.

Table (2): Coefficient table

<table>
<thead>
<tr>
<th></th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td>Tolerance</td>
</tr>
<tr>
<td>Constant</td>
<td>.633</td>
<td>.079</td>
<td>8.044</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>ECT</td>
<td>.344</td>
<td>.024</td>
<td>.461</td>
<td>14.287</td>
<td>.000</td>
</tr>
<tr>
<td>ECNT</td>
<td>.332</td>
<td>.023</td>
<td>.480</td>
<td>14.555</td>
<td>.000</td>
</tr>
<tr>
<td>EMT</td>
<td>.141</td>
<td>.024</td>
<td>.192</td>
<td>5.987</td>
<td>.000</td>
</tr>
</tbody>
</table>

Table (2) show that there is positive relation between using electronic communication tools and knowledge sharing where Beta equal .461(T equal 14.287, Sig equal .000). There is positive relation between using electronic conferencing tools and knowledge sharing where Beta equal .480(T equal 14.555, Sig equal .000). There is positive relation between using electronic collaborative management tools and knowledge sharing where Beta equal .192(T equal 8.987, Sig equal .000).

Collinearity statistics shows that the VIF values are less than 10 and tolerance values above 0.1 so there is no collinearity between independent variable which indicates the power of study model.

### 6.1 Conclusion and further researcher recommendation

This study proposed that using of electronic collaborative media has positive effect on knowledge sharing. The results of the proposed examination indicated the presence of significance effect of using electronic collaborative media in knowledge sharing in the hospital under study, whereas the three dimensions of this variable (ECT, ECNT, and EMT) have a significance effect on the knowledge sharing. These results coincide with the meetings that were held by the researcher, and with the other previous studies such as Hayes, 2000; Jarvenpaa and Staples[17]. Hayes (2000) finding that using electronic collaborative media present opportunities for knowledge sharing through solving limitations and bounded interactions problem. According to Jarvenpaa and Staples[17] Collaborative systems provide the promise of much increased information sharing within and across organizations. This consistency between the results and literature review confirms that using of electronic collaborative media plays an important role in achieving knowledge sharing; therefore organizations must take into consideration this new technology in order to achieve a higher level of knowledge sharing. In addition, it has to prepare suitable environment for these tools.

### 6.2 Recommendation for electronic collaborative media

1- To work on reduce the gab resulted of the variance by using electronic collaborative tools that may be reduced the advantages for the hospitals to use these tools at a comprehensive and integrated aspect
2- To increase the use of voice mail as an electronic tool that affects to achieve the effective performance for the hospitals and individuals
3- There is a necessity to follow-up the quick developments in electronic collaborative tools to provide and to use the recent tools to facilitate knowledge sharing
4- There is a necessity to depend on electronic bullet board to get to the instructions and guidance at wok field for the workers in real time

### 6.3 Recommendations for knowledge sharing

1- There is a necessity to clear up the importance of knowledge sharing with its different dimensions for the workers at hospital sector and the importance of the role that reflected on knowledge sharing on organizational and individual performance.
2- There is a need to set indicators and guidance that explain external knowledge sources.
3- There is a need to increase the reliance on teamwork method to perform the tasks and missions the make the individuals work at teamwork framework which serves the hospitals and individuals.

### References:

18- Ke, W., and Wei, K.K., Critical factors affecting the firm to share knowledge with trading partners: a comparative exploratory case study, Proceedings of the 7th international conference on Electronic commerce, Vol.113, 2005, pp.177-183:ACM.