Factors that affect scientists’ behavior to share scientific knowledge

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Nowadays, it is accepted that development in the modern science is directly related to achieving success in science. The scientists should be able to develop, understand and use the modern scientific methods in their researches. Since, science is developing fast; the scientists should share their scientific knowledge with individuals who attempt to update frequently their information. Studying factors that affect knowledge sharing scientists’ behavior should be considered in knowledge era. Therefore, the focus of this paper centers on the behavior of sharing scientist’s acquired knowledge with other scientists in scientific collaboration and co-authorship. Theory of planned behavior (TPB) is adopted and explained the factors of Attitude, subjective norms and perceived behavioral control to predict behavior of scientists. This paper presents sets of critical factors such as individual, organizational and technological that is believed to affect on knowledge sharing behaviors. Overall, the results of this study advance prior research in the area of knowledge sharing by shedding light on the determinants of knowledge sharing behaviors, and develop the better understanding of knowledge sharing for the scientists who attempt improve their knowledge in scientific collaboration in the future.

Keywords: scientists, scientific knowledge, knowledge sharing behavior, TPB, scientific collaboration

1. Introduction

In recent years, science production has multiplied in many countries; this indicates the active cooperation in the field of science and knowledge which have gained

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significant advancements through effective communication in scientific activities. Each scientific activity requires to publish and share scientific knowledge and information in national and international levels (Hart[1]).

There’s no doubt without sharing, the mission of science production means the production of scientific knowledge- will not be done properly; on the other hand, research co-operations have significant effect on increasing the rate of scientific productions and their citations. With the rapid growth of science and technology, and considering the fact that an individual usually can’t research in all fields of science, it’s much better the scientists share their scientific views and ideas and go forward along with modern sciences to achieve new aspects of researching in different fields, and even inter-disciplinary fields (Hassanzadeh, Baghaei and Noroozi Chakoli[2]). Hence, to increase the scientific co-operations and co-authorship in the international level, in spite of acquiring and applying scientific knowledge, focusing on knowledge sharing and factors effect on it, are clearly observed among scientists. Sharing their scientific knowledge scientists show behaviors which reveal the level of their interest in either others’ request for knowledge or others’ need for their own knowledge. So, it seems to be essential to study the issue of scientific knowledge sharing and identify the factors influencing the behavior of scientific knowledge sharing.

2. Knowledge

In current era, knowledge is the driving force behind the social and economical development so that in the past decade, it has been increasingly highlighted as one of the important competitive elements in the organizations (Marouf[3]). Knowledge plays a significant role in technological and scientific development. Knowledge is a combination of background information, values and experiences which helps to evaluate and consolidate scientists’ new information and experiences. Knowledge exists not only in scientific documents but also in people’s minds and is exhibited through their actions and behaviors (Alawi, Marzooqi and Mohammad[4]). If experts’ beliefs, ideas, experiences and background information provide the basis for their research and scientific expansions, people’s intellectual assets could be introduced as “scientific knowledge”. In many researches, it was shown that the articles produced by scientists’ scientific cooperation have better quality and more citations (Hollis[5]; Frenkel, Hölzl, Vor [6]). In fact, “the dynamics of new economy requires scientists who can create new knowledge and by sharing it, help the acquisition of collective knowledge” (Babalhavaeji, Jafarzadeh Kermani[7]). Therefore, one can understand the importance of scientific knowledge among scientists.

3. Knowledge sharing

Knowledge sharing is a process through which a scientist’s knowledge is transferred to another scientist in an understandable, absorbable and applicable form (Lin [8]). According to Christensen, the goal of knowledge sharing is to create new knowledge by combining
existing knowledge in new knowledge or to exploit the existing knowledge in a better way (Antonova, Csepregi, J.R [9]). Bock and Kim [10] believe that knowledge sharing occurs when scientists, besides being interested in sharing their knowledge, seek learning from each others’ knowledge and experience. Knowledge sharing is the social interaction culture which includes the exchange of knowledge, employees’ experience and skills all over the organization (Lin, [11]). Generally, Knowledge sharing is a cooperative process which includes the distribution of information, ideas and skills among scientists.

4. Knowledge sharing behavior

Knowledge sharing may be defined as a behavior in which one offers his knowledge and experiences voluntarily to others. Since the “principles of knowledge management” has been proposed, researchers tried to review the variants related to the scientific knowledge sharing behavior. According to the researches, several factors including attitudes, intentions, subjective norms affect on knowledge sharing) Chatzoglu and Vraimaiki [12]). Considering the fact that behavior, is a response to a certain stimulus (Karimi [13]), in the context of knowledge sharing, knowledge sharing behavior could be defined as an scientists response to others’ request or others’ need for knowledge. Beliefs, views, goals and behavior of knowledge source and knowledge receiver will have significant impact on the effectiveness of knowledge sharing strategies (Lichtenstein and Hunter [14]). One can state that the success of knowledge sharing is related to behavioral elements (Sohail, Daud [15]).

5. Theory of Planned Behavior

Researchers frequently ask about the factors determine scientific knowledge sharing behavior and if there’s a general theoretical framework to predict such behavior? (Zhikun, Fungfai [16]). Studies in the field of knowledge sharing show that despite researchers’ focused on investigating the goals of knowledge sharing among people, they didn’t pay enough attention to knowledge sharing behavior (Chennamaneni [17]). Therefore, in the field of knowledge sharing, it’s important to pay attention to the behavior of scientists and factors affect it- including attitude, intention, subjective norms and perceived behavioral control. As knowledge sharing is an intentional behavior, we introduce “Theory of planned behavior” model proposed by Fishbein and Ajzen [18] in 1975 in order to focus on knowledge sharing behavior) Gagné [19]). According to Sheeran and Orbell [20], this theory refers to a person’s intention in performing positive and negative behavior towards knowledge sharing (Tohidinia, Mosakhani [21]). Besides, attitude towards behavior, subjective norms and perceived behavioral control are other elements which affect the element of intention as one of key factors of behavior (Ajzen [22]). Each one is explained below:

6. Attitude

Attitude is “an individual’s positive or negative evaluation of self-performance of a particular behavior” (Fishbein and Ajzen[18]). Knowledge is significantly influenced by
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people’s attitude towards learning, sharing and storage of knowledge. Besides, its important role in transferring knowledge, people’s attitude can also prevent the creation and sharing the knowledge among them (Shiue, Chang, Yang, Chen [23]). Because many people consider knowledge as “power” and believe sharing it will harm them (Szulanski [24]; Dunford [25]; Grandori, Kogut [26]). Personal attitude, through Interpretation processes, is probably accompanies by a collection of predetermined behaviors which can have pleasant or unpleasant effects on knowledge acquisition and knowledge transfer processes (Vithessonthi [27]). In knowledge sharing, attitudes like “no knowledge is created” or doubts about the authenticity of source, can possibly cause receiver’s disinclination to receive knowledge.

Attitude could be different in various conditions and environments. In a research, Dong, Liem and Grossman [28] found that two factors of self-worth and social trust influence the attitude towards knowledge sharing behavior. Jarvenpaa and Staples believe that social-psychological factors like self-worth affect people’s attitude towards sharing information in organizational environment (Julibert [29]). A study by Bock, Kim, Zmud and Lee [30] found that people’s positive attitude towards knowledge sharing affect their intention to share knowledge. According to Shin, Ramayah and Jahani[31], negative attitude towards knowledge sharing leads to selfishness and keeping scientific knowledge inside the institutions. Babalhavaeji and Jafarzadeh kermani [7]) found in a research that people’s attitude has a significant effect on their behavior intentions. Therefore, according to this model, we can argue that scientists’ attitudes effect on their personal intentions and it’s expected that scientists with positive attitudes towards scientific knowledge sharing have stronger intentions for sharing the scientific knowledge with others (and vice versa).

7. Subjective norm

Subjective norms refer to the external stimuli that directly or indirectly affect a person’s intention to share the knowledge (Bock, et al., [30]). According to this model subjec-
tive norms are a combination of expectations of people towards others’ behavior (Dong, etc [28]). According to Fishbein and Ajzen[18], subjective norms are the factors that cause most people believe the individuals have expected a special behavior from them. Chang believes that Subjective norm (Lu, Hsiao [32]). Cheung believes that subjective norm is such as social influences positively affected an individuals’ behavior (Li, Mizerski, Lee, Liu [33]). Generally it can be argued that subjective norm, in the environment of knowledge sharing, is the person’s expectation towards others for offering their experiences and scientific knowledge. Based on Theory of planned behavior, the more subjective norms towards knowledge sharing expect the stronger intention of person towards sharing knowledge (and vice versa) (Teh, Yong, Chong, Yew [34]). Chatzoglu and Vraimaiki [12] found that subjective norm and employees’ attitude towards knowledge sharing have definitely positive effect on their intention for knowledge sharing. Lu and Hsiao [32] showed that subjective norms effects people’s intention indirectly. According to this model, if scientists’ subjective norms are influenced by their attitude and perceived behavioral control, they will strengthen personal intentions and scientists’ behavior of scientific knowledge-sharing.

8. Perceived behavioral control

According to Ajzen [22], perceived behavioral control is “individual’s perception of easy or difficult performing a particular behavior. This factor is accompanied by control elements which can affect on easy or difficult performance of a behavior (Liao, Chen, Yen [35], Li, et al., [33]. Based on theory of planned behavior, perceived behavioral control is a person control on his behavior and it usually has direct effect on the behavior (Fielding, McDonald, and Louis [36]. Control factors could be divided to two components of internal and external; while internal control deals with self-efficacy and personal scientific knowledge, and external control is related to the environment (Liao, et al., [35]). Emphasizing on the issue of knowledge-sharing behavior, one can argue that perceived behavioral control refers to a control that scientists reveal when a certain behavior occurs during scientific knowledge sharing. In fact, this control depends on scientist’s perception of their capability in performing specific behavior towards others and the scientists have a control on their behaviors according to current conditions and their recognition of people. If scientists have better control on their own behavior in scientific knowledge sharing, their knowledge sharing behavior will be more active.

9. Intention

The success of knowledge management is dependent to a considerable extent on people’s intention to share scientific knowledge (Chatzoglu and Vraimaiki [12]). Knowledge sharing requires people’s intention for sharing their personal knowledge (Gupta, Govindarajan [37]). A few researches have been performed about the factors affecting the scientists’ intention for knowledge sharing (Cyr, Choo [38]). According to Davonenport and Prusak, time, energy and knowledge of people are limited and they will not
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have the intention to share scientific knowledge if there is no benefit to them (Hung, Durcikova, Lai, [39]). Sometimes people may have the intention to share knowledge but lack of facilities and proper organizational, cultural and economical infrastructures prevent them from knowledge sharing. Researches by Bock and Kim [10]; Bock et al., [30]; Aulawi, Sudirman, Suryadi, Govindaraju [40] showed that if the conditions for knowledge sharing are provided, the intention for knowledge sharing is created and people’s attitude towards knowledge sharing strengthened. According to Kankanhalli, Tan and Wei [41], people’s intentions are rooted in their attitude towards knowledge sharing; so we expect scientists to have positive attitude towards knowledge sharing if they have the intention to do so (Gao, Sheng [42]). According to this theory, people’s intention to share their knowledge leads to increase scientific knowledge sharing behavior in scientists.

According to the Theory of planned behavior, one can expect that the elements of attitude, subjective norms, perceived behavioral control increase the intention of scientists for scientific knowledge sharing, which in turn will lead them to engage more actively in scientific knowledge sharing and increase their scientific cooperation and involvement in the international level.

In addition, there are some factors that if they are provided, they will facilitate the path for better scientific knowledge sharing by scientists. The better conditions for knowledge sharing, the more active behavior of scientists will show in it. In fact, the effectiveness of knowledge sharing is dependent on the capacity for receiving the knowledge and scientists’ ability for knowledge sharing (Soller [43]). Knowledge sharing takes place under certain conditions and factors. According to studies and researches in the field of knowledge sharing behavior, the factors influencing it are reviewed in three personal, organizational and technological categories.

10. Individual factors

Self-satisfaction, trust, motivation and communication skills are some personal factors to effect on knowledge sharing. Enjoyment to help others comes from altruism feeling (Lin [11]). Experimental researches by Kankanhalli, et al., [41] indicate that there’s a positive relations between altruism feeling and knowledge sharing (Hung, etc., [39]). Trust is one of important elements in knowledge sharing behavior (Chow, Chan [44]). van den Hooff and Leeuw van Weenen [45] believe the more trust among the employees lead to the higher levels of knowledge sharing. If experts don’t trust the knowledge they receive, they will not use it properly.

Motivation is another factor which has been highlighted significantly in researches regarding knowledge sharing (Hendriks, Sousa [46]; Siemsen, Roth, Balasubramanian [47]; Swift, Balkin, Matusik [48]). So, one of the most priorities proposed by knowledge management is creating the motivation for sharing knowledge amongst people. In fact, personal motivation could be an incentive element for scientists to offer their scientific knowledge to each other. On the other hand, better communication skills in scientists provide the situation for easier creation, acquisition and sharing scientific knowledge among them and they
can achieve co-authorship and scientific productions by active cooperation and partnership. They may have information and knowledge about a certain field but won’t be able to transfer their scientific knowledge to others efficiently due to lack of enough communication skills. The factors such as: lack of enough time to identify scientists who need certain knowledge, being unaware if one’s scientific knowledge is useful for others, differences in level of people’s experiences in knowledge sharing may become personal barriers in scientific knowledge sharing; if such factors are dealt with and resolved properly, we can expect the increase of scientists’ cooperation and their scientific knowledge-sharing.

11. Technological factors

Information technology is used in broad level in order to heighten the level of cooperation between people and groups (Samarah [49]). Information technology has the potential of acquisition, storage, processing, retrieving and transferring the knowledge (Reychav, Weisberg [50]) and enables scientists, geographically close or far from each other, to share their knowledge simultaneously or separately. There are different tools for knowledge sharing which let the scientists to increase their mutual cooperation and scientific productions. These tools give speed to experts’ communications in scientific knowledge sharing. Ideal expectations of scientists from information technology and scientists’ intention to use information technology systems and also training them to use information systems have been named as incentive factors in many researches (Moeller, Svahn, 2004 [51]; Riege [52]; Ling, Sandhu, Jain [53]). Although communication channels help the creation, storage and sharing scientists’ scientific knowledge, they are not considered the only factors required for knowledge sharing and in addition to them, social-organizational factors should also be considered in their scientific knowledge sharing (Marouf [3]).

12. Organizational factors

Organizational factors affecting scientists’ knowledge sharing behavior cover a wide range of elements influence their motivation for scientific knowledge sharing. Organizational culture and structure are important factors reviewed mainly in knowledge sharing and management articles (Bartol, Srivastava [54]; Lin [11]; Shiue, etc., [23]). One of the key factors for knowledge sharing in each organization is to have a culture which strengthens the trust and honesty among the scientists. Buckman believes that “to establish knowledge sharing among scientists it’s essential to create an environment of trust for them” (Dulaimi [55]). Organizational culture determines the personal and collective behavior (McDermott, O’Dell [56]) and culture of knowledge sharing should be founded to change the views and behaviors of people (Hassanzadeh [57]).

Although organizational culture is considered to be one of the most important organizational factors in scientists’ scientific knowledge sharing, focusing on organizational structure also facilitate the path for increasing the sharing of scientific knowledge. Today, most of managers know that improper organizational structures slow the processes and prevent
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the flow of information and knowledge between departments. Besides, such structures often take a lot of time to refine the knowledge in each phase. Knowledge sharing increases structures which create fewer boundaries between different organization sections (Sun [58]). In this case, such an organization will benefit from features like trust, psychological safety vs. risk, no improper prejudice towards different ideas and participation in decision makings (Nemanich, Vera [59]), and that organizations’ scientists will share their scientific knowledge more actively.

Nowadays, Effect of personal, organizational and technological factors on how scientists behave in scientific knowledge sharing is an important issue. In this article, the factors affect knowledge sharing behavior, are well shown in Table 2. Actually, the effect of these three factors, along with the elements introduced in Theory of planned Behavior, offer a better understanding of the factors affect scientists behavior; by providing these factors and eliminating the barriers in national and international levels, scientists’ cooperation in research and scientific productions through scientific knowledge sharing can be achieved. Base on different factors that affect scientists’ behavior to share scientific knowledge, the following model is designed:

13. Concluding Remarks

Considering the mentioned discussions, the factors affect scientists’ behavior in scientific knowledge sharing can be reviewed based on Theory of planned behavior. positive attitude and intention, proper understanding of a certain behavior performance, and awareness from others’ expectations in knowledge sharing can lead to active behavior of
scientists in knowledge sharing; however, possessing such factors alone cannot determine the performance of active behavior by scientists, but there is a collection of factors and infrastructures which should be provided in addition to mentioned elements. Therefore, the infrastructures should be made to promote and raise the basis for knowledge sharing among the scientists in order to raise their motivation for scientific cooperation and co-authorship in national and international levels.

Culture is the most important factor in determining the personal and collective behaviors in organizations and it should be paid attention by policy makers and managers as a key role in success of knowledge sharing programs. Also, rewards systems and organizational structures- as organizational factors affect the scientists’ knowledge-sharing behavior in the organizations. Therefore, proper rules and regulations- for implementation and practice of culture and suitable organizational structures- should be applied so as to enable scientists to cooperate and share their scientific knowledge and expertise with more trust. As, lack of proper organizational infrastructures, prevents the scientific knowledge sharing by scientists.

Since scientists aim is increasing the cooperation and better scientific productions in different scientific areas, providing them with proper tools and technologies help the improvement of communication skills. Training the scientists to apply proper communication tools and software help them to take better advantage of collective knowledge. To increase scientists’ scientific knowledge sharing and move towards growth of scientific productions, by applying mentioned factors, we’ll notice better active behavior of scientists in scientific knowledge sharing in national and international levels:

- Promoting scientists’ awareness towards the value and importance of knowledge sharing through proper organizational policies;
- Identifying the motivating factors for scientists in acquisition and sharing scientific knowledge;
- Identifying the barriers (preventive factors) for scientists in acquisition and sharing scientific knowledge;
- Give the value to knowledge sharing in the society;
- Establishing the centers for planning and improving the flow and transfer of knowledge and information among top scientists of different scientific fields;
- Establishing a scientific knowledge-sharing system in national and international level;
- Strengthening the cooperation between scientists by [use of] proper tools and technologies;
- Identifying scientists of different scientific fields and facilitating mutual cooperation among them;
- Training scientists to use their knowledge, store and retrieve their own and others’ experiences;
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• Optimizing scientists’ knowledge by providing facilities and conditions required to make the scientific knowledge applicable;
• Establishing reward systems in organizations for scientists;
• Providing proper environment in organizations to boost trust among scientists;

References


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