

# Review on Knowledge Sharing: Barriers and Motivations

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*Abstract*-Knowledge has been perceived as one of the most important resources needed for the survival of any knowledge intensive institution. The dependence of any university on the embedded knowledge of the non-academic staff for impressive benefits requires detail understanding of possible factors that may hamper the dissemination or facilitate the knowledge flow among them. An extensive review on the barriers and motivations influencing knowledge sharing in existing literature was carried out and adapted to the non-academic section of the University. The theoretical findings show that four barrier and motivation factors influence knowledge sharing among the non-academic staff of University. An effective knowledge sharing process among the non-academic section of the University will benefit both the individual non-academic staff and the university at large.

*Keywords:* Barriers; Motivation; Knowledge donation; Knowledge collecting; University.

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## 1. INTRODUCTION

Knowledge management as a field of study has attracted tremendous interest by researchers since its inceptions in the 90s as reflected in the large body of literature that emerged in recent time [1–4]. This is as a result of increasing awareness by managers and chief executives of corporate organization that knowledge is the most essential resources and survival kit for any organization to thrive in this technological and knowledge driven dispensation [5,6]. The survival of any organization irrespective of size or type in this competitive and knowledge-based economy is anchor on knowledge [7,8]. For any organization to achieve its specific objectives, a key strategy is for such organization to recognise the effective management of knowledge [9,10]. This will aid the organization in the sustenance of economic growth as well as competitive advantage [11]. The key features of knowledge management include knowledge creation/capturing, knowledge storing and knowledge sharing [12]. Recently, there has been growing interest in knowledge sharing as emerging key research area [13,14]. Successful knowledge sharing in any organization entails identifying those factors that could inhibits and easily increase

knowledge sharing behaviour due to the difficulties in incorporating individual's knowledge into broad organization knowledge.

Knowledge sharing as the most significant component of knowledge management has been reported to play important roles in successful implementation of KM concepts in corporate business organizations [15]. For the purpose of this study knowledge sharing is defined as an activity through which knowledge (information, skills, or expertise) is exchanged among people within an organization. Just like corporate business organization, several authors have identified the important roles of knowledge sharing in successful implementation of knowledge management in higher institution most especially University [16–18]. One of the earlier works done in this regard by [19] on the approaches to knowledge management in higher education highlighted the adoption of various concepts of knowledge management in corporate organization to higher education and the readiness by the higher educations to accept such knowledge management concepts. Individual is the custodian of knowledge and the incorporation of such knowledge into organization knowledge is a function of the extent to which the employee can share the knowledge [20].

Often time knowledge is hoarded by individual because they consider it personal valuable assets which sustain their relevance in an organization [21]. In such case, such individual cannot be compelled to share such information but rather motivated and encourage to share such knowledge. Even though the individual is motivated and encouraged, one crucial constraint to knowledge sharing is the behaviour and attitude of such people to share the knowledge [22]. It is expedient to know how the employee can be motivated to willingly share knowledge in such a manner that the overall intellectual capital of organization can be controlled. The adoption of knowledge sharing concepts in higher institution has been reported to course a significant improvement in the academic services as well as enhancing teaching and learning [17,23]. In addition, the missions of higher institutions of learning such as conducting academic research, student teaching and supervision, development of curriculum, and strategic planning were also reported to be significantly improved by good shared knowledge management practice. Reference [24] further emphasised the importance of knowledge sharing as a tool for creating an innovative relationship work and education as well as matching the existing talents with workplace pressures. Moreover, the author suggested that university as a centre of learning can facilitate learning among students. However, to have a holistic improvement in the university as an entity organization, consideration should not only be given to the academic component but as well as the non-academic component.

Non-Academic staff members of University as professionals and support staffs make significant contributions to the overall success of the day-to-day running of the University. It has been stated that the contributions of non-academic staffs in terms of their input, financial expertise used in managing the funding resources and other various competencies are crucial to the university policy and decision-making which influences the overall performance of academic staffs and students [25]. The academic staffs cannot performance their divers academic functions without the expertise of their non-academic counterparts [26]. For instance, the students are provided guidance on their admission processes, registration processes, orientation and creation of enabling environment for students learning activities are often supported by them. Even the non-academic accounting function members of a university, with the aid of their financial knowledge and analytical skills, handle the financial aspects of the institution. This unit help the university to pay all its staffs salaries on time, accurately, run its operations effectively and advises on strategies that can be used to generate more funds. These crucial roles performed by the non-academic staffs of the university can be enhanced through effective implementation of knowledge sharing among non-academic staff of university for improved performance. Although there are enormous literatures reviews and empirical research covering various aspects of knowledge sharing especially the academic staffs, knowledge sharing among non-academic staff of higher institution is not well researched. Besides, at the time of this study, there have not been a comprehensive review and framework on the barriers and motivations influencing knowledge sharing among non-academic staff of Universities. The knowledge gap is addressed in this study by focusing on reviewing of literatures on knowledge sharing barriers and motivations among non-academic staff of University and their link to university innovative performance in a theoretical framework.

To arrive at the theoretical framework for the purpose of this review, relevant literature review on knowledge sharing barriers will be considered first, followed by motivating issues affecting knowledge sharing in literature, then adapting them to develop the propose model and finally conclusions proffering possible recommendations.

## **2. KNOWLEDGE SHARING BARRIERS**

Knowledge sharing involves the process of individuals communicating their personal intellectual capital to others and the process of consulting colleagues in a work place to encourage them to share their intellectual capital for individual organizational benefits [36]. For the purpose of this paper, these knowledge sharing processes comprises knowledge donating and knowledge collecting processes occurring at different level within (intra) a department and between (inter) departments in an institutions. This is because research most results revealed that barrier and motivating factors usually have great effect on both knowledge donation and knowledge collection [27,28]. Moreover, knowledge sharing is not complete if there is no donor donating the knowledge and a collector ready to receive the knowledge shared. Identifying the factors that could easily inhibit

employee's attitude towards effective knowledge sharing is essential to successfully incorporating knowledge sharing activities in a university.

Reasons such as, lack of time, low awareness, difference in level of experience, lack of leadership, lack of appropriate reward system, lack of absorptive capacity of the recipient, organizational factors, stressors and personal gains have been identified by several authors as major barriers to successful knowledge sharing (cf. Table 1). Reference [29] in his extensive review identified over twelve potential barriers to sharing knowledge. Some of the barriers identified by the authors includes lack of time to share, apprehension of fear of job security, low awareness, dominance in sharing, use of strong hierarchy, insufficient capture of past mistakes differences in experience levels, lack of contact time, poor verbal/written communication, age differences, gender differences, lack of social network, differences in education levels, taking ownership of intellectual properties, lack of trust in people and differences in national culture or ethnic background.

Reference [30] also identified the barriers impeding knowledge sharing as individual barriers which include internal resistance, trust, motivation, gap in awareness and knowledge as well organization barriers which include language, conflicts of avoidance, bureaucracy and distance. Reference [31] in his studies proposed a model to overcome barriers such as lack of leadership, lack of appropriate reward system and lack of sharing system. Barriers such as lack of top management commitment lack of proper understanding of knowledge sharing, lack of management commitment, politics and organizational were also identified by [31] and [32]. These barriers can be grouped into individual, technological, and organizational as reported by [28,33–37]. The authors grouped barriers such as, lack of time, past mistakes, differences in levels of experience, lack of interaction, differences of education levels and difference in national culture as individual. Organizational barriers include lack of leadership, lack of formal and informal space to share, physical work environment, existing corporate culture and deficiency of company while the barriers associated with technological factors include unrealistic expectations of employees, lack of compatibility, mismatch, reluctance to use IT systems, lack of training and lack of communications. The impact of barrier on employee attitudes to knowledge sharing could differ from one organization to another.

Previous study shows that barriers such as organizational structure, leadership, time allocation and trust were reported to significantly affect knowledge sharing in Dubai police force. In a separate studies conducted by [38] and [39] using a pharmaceutical R & D and bank in Greece, it was discovered showed barriers such as lack of absorptive capacity of the recipient, casual ambiguity concerning the knowledge itself and an arduous relationship between the sender and the receiver affect knowledge sharing among the employee of the pharmaceutical R & D. On the other hand, knowledge sharing among bank employees in Greece was found to be hindered by time and space availability, cognitive, authority and status hierarchies. Reference [40] in studies identified lack of reward, lack of time to share, lack of formal and informal activities to cultivate knowledge sharing in the university, existing university culture, lack of interaction between who need the knowledge and those who can provide the knowledge, retention of highly skilled and experienced staff, lack of proper physical work environment, reluctance of staff to seek knowledge from their seniors and lack of IT systems and processes as majors barriers to knowledge sharing among academic staffs in Klang Business School, Malaysia. All the discussed factors in this section are summarized below for a quick glance and understanding of the extent of research done so far in this respect.

Based on the reviewed literatures, most studies focused on academic staffs and students while non- academic staff knowledge sharing barrier factors are under-investigated. Apart from investigating the possible barriers that may hamper knowledge sharing activities among the non –academic staff in this paper, factors that may encourage them to continuously share and exchange their knowledge for mutual gain are also considered next to obtain deeper insight.

### **3. KNOWLEDGE SHARING MOTIVATIONS**

Successful knowledge sharing in any organization requires the right motivation of the personnel which can either be intrinsic or extrinsic [49,50]. Intrinsic motivation includes attributes of an employee to engage in a task for his/her benefits. Such attributes includes enjoyment in helping others, fun, curiosity, exploration and knowledge self-efficacy. While extrinsic motivation entail the tendency of an employee to carry out a function because he/she perceived the performance of such function as essential to achieving a valued outcome [51].

An employee who is extrinsically motivated engages in a task which is often rewarded and instrumental to reach an important goal. Both extrinsic (expected organization rewards and reciprocal benefits) and intrinsic (knowledge self-efficacy and enjoyment in helping others) play significant roles in the attitude of individual towards knowledge sharing [52]. Nevertheless, this measure (extrinsic reward) has been terms as a temporary measure to overcome the barriers impeding knowledge sharing [53]. On the contrary, application of intrinsic rewards which is a non-monetary measure is in-built and has a lasting effect [51]. This is because the discontinuation of such rewards makes such individual to return to his or her earlier behaviour [54].

Table 1: Summary of knowledge sharing barriers from literature

Studies Objectives	Barriers to knowledge sharing	References
Investigated the barriers in a public organization	Lack of time, fear of job security, low awareness, dominance in sharing explicit over tacit knowledge, use of strong hierarchy power, insufficient capture of past mistakes, differences in experience levels, lack of contact time, poor verbal/written communication skills, age difference, gender difference, lack of social network, differences in education levels, taking ownership of intellectual properties, lack of trust in people, lack of trust in the accuracy of knowledge, differences in national culture or ethnic background.	[29]
Instigated strategies for overcoming barriers to knowledge sharing in financial company	Individual barriers (internal resistance, trust, motivation, a gap in awareness and knowledge) and organization barriers (language, conflict avoidance, bureaucracy, distance)	[30]
Proposed a model to overcome knowledge sharing barriers	Lack of leadership, lack of appropriate reward system and lack of sharing opportunity	[31]
Investigated knowledge sharing barriers through an approach of interpretive structural modeling	Lack of top management commitment, knowledge sharing is not well understand	[32]
Investigated barriers to knowledge sharing using web 2.0 technologies	Technological, organizational and environmental barriers	[34]
Investigated cultural barriers affecting knowledge production and sharing in an organization	Organizational, environmental, emotional, intelligence and managers' commitment	[35]
Investigated knowledge sharing barriers in Pharmaceutical research and development	Lack of absorptive capacity of the recipient, casual ambiguity concerning the knowledge itself and an arduous relationship between the sender and the receiver.	[38]
Investigated barriers to tacit knowledge sharing	Structure and power relationship	[41]
Investigated knowledge sharing barriers in organizational context	The willingness of individual to share and integrate their knowledge	[42]
Investigated the barriers to participate in virtual knowledge-sharing communities of practice	Employee willingness to share, selfish attempt to hoard knowledge, fear of sharing inaccurate knowledge	[33]
Investigated the influence of perceived cost of sharing knowledge	Politics and organizational barrier, management commitment and lack of trust	[43]
Investigated knowledge sharing barriers in a software company	Individual, organizational and technological barriers	[37]
Empirical investigation of knowledge sharing barriers in higher institution	Organizational and individual barriers	[44]
Investigated knowledge sharing behaviour of bank employee in Greece	Natural barriers (time and space availability), cognitive barrier, structural barrier (authority and status hierarchies.	[39]
Investigated the constraining-factor model to knowledge sharing	Ability to share, lack of time, willingness to share, capability to share knowledge	[45]
Knowledge sharing in new organizational entities The impact of hierarchy,	Hierarchy, organizational context, micro-politics and suspicion	[46]

organizational context, micro-politics and suspicion		
Perceptions and Knowledge-Sharing Behaviour of Pre-University Students	Lack of time, lack of sharing culture and inadequate depth in relationship	[47]
Perceived barriers to effective knowledge sharing in agile software teams	Communication, organizational and team capability	[48]
Investigation of barrier to knowledge sharing activities among academic staff: A case study of Business Schools in Klang Valley Malaysia	Organization, individual and trust	[40]

Reference [55] in their report on the role of intrinsic and extrinsic motivation on individual's knowledge sharing intentions suggested that motivational factors such as reciprocal benefits, knowledge self-efficacy, and enjoyment in helping others have strong correlation with employee knowledge sharing attitudes and intentions. Their findings further show that expected organization rewards did not show any significant influence on the attitudes of the employee as well as their intentions to share knowledge. Reference [56] investigated factors that motivated the sharing of knowledge in an intra-organizational social media platform. Intrinsic factors such as intention to help the organization reach its goal, enjoyment of sharing, financial rewards, strengthening intrapersonal ties, feeling of having something to offer and curiosity were investigated. Moreover, extrinsic factors such as expectation of knowledge in return, making job easier, part of the job, wanting to achieve one's goal, expanding scope of association, gaining recognition from colleagues and superiors, job security, financial reward, showing off of one's experience and anticipated promotion opportunities were also investigated.

Out of the intrinsic factors investigated, the findings from the study showed that the desire to help the organization reach its goals has the strongest influence on the motivation to knowledge sharing within an intra-organizational social media platform while the expectation to receive knowledge in return was the most significant extrinsic motivating factor to knowledge sharing. Another important factor affecting knowledge sharing motivation according to [57] is the culture and climate of an organization which is defined as the shared, basic assumptions that an organization learnt while coping with environment and solving problems of external adaptation and internal integration that taught to new members as the correct way to solve those problems. Organization culture plays significant role in motivation individual towards knowledge sharing. Reference [58] identified six key components of organization culture as it related to knowledge sharing. These factors include organization structure, information system, processes, leadership, reward system and people. The authors suggested that people behaviours in an organization can be influenced through motivation, proper communication (interaction) and trust [59].

Reference [14] conducted an empirical study on the relationship between organization culture and knowledge sharing using a survey method. The authors evaluated the relationship of variables such as trust, communication between staff, leadership and reward system. The findings showed that trust, communication between staff and leadership had the most significant relationship with knowledge sharing. The authors' findings are however limited in that it can only be applied to service industries. This is due to difference in geographical location and the structures exhibited by every organization. Similar to the work of [14], [60] also investigated the implementation of knowledge sharing through organization culture change. The authors formulated a dynamic model which serves as a tool for implementation of experience of organization culture change. The formulated model was helpful in determining expected organization objectives which helps in propelling knowledge management culture with the overall goal of achieving the organization set goals. Several authors have enumerated the importance of reward systems as a motivating factor for knowledge sharing (Table 2). The different types of rewards are usually extrinsic motivations which is an employee benefits derived from sharing knowledge [55]. These rewards can be offered in form of enhancing the reputation of the employee as well as his/her promotion as summarized below in Table 2.

In this paper, all the above motivating factors affecting knowledge sharing are assumed to be potential motivating factors influencing the non-academic staff to indulge in knowledge sharing processes. These motivating factors are grouped into individual and organizational benefit motives in trying to develop the research theoretical model.

Table 2: Summary of motivation to knowledge sharing from literature

Studies Objectives	Motivations to knowledge sharing	References
Investigated knowledge sharing behaviour amongst academics in private University in Malaysia	Organizational (incentive system, management system and organizational culture), individual motivation	[61]
Investigated the factors that inhibit the behaviour of knowledge sharing among members of a public university	Self-efficacy and organizational reward	[62]
Investigated the motivation for participation in virtual knowledge sharing communities practice.	The use and perceived benefits of knowledge sharing source, viewing of knowledge as public good, belonging not to them individually.	[33]
Investigated a cognitive model of intra-organizational knowledge sharing motivations in the view of cross-culture	Reward incentive and punishment avoidance	[63]
Investigated how motivation drive knowledge sharing using constraining-factor model	Perception that knowledge sharing is a way of building reputation, belief in the organization ownership of knowledge, proper incentive structures and internal competition	[45]
An analysis of faculty perceptions: Attitudes toward knowledge sharing and collaboration in an academic institution	Perception, reward system, trust, openness in communication and collaboration	[59]
Investigated motivations for knowledge sharing	Social capital (social interaction, trust, identification and reciprocity for knowledge sharing) and individual motivations	[53]
Investigated knowledge-sharing motivations affecting research and development employees	Reciprocity, altruism and reputations, intensions for knowledge sharing	[64]
Investigated the determinant of individual engagement in knowledge sharing	Self-efficacy, openness to experience, perceived support from colleagues and supervisors, organizational commitment, job autonomy, perception about rewards associated with sharing knowledge	[65]
Determinants of knowledge sharing in a public sector organization	Social interaction, personal benefits, organizational supports, normative considerations and degree of courage	[66]
Investigated motivations of employees' knowledge sharing behaviours using a self-determination perspective	Internal (controlled) and external (autonomous) motivation	[67]
Investigated the drive of knowledge sharing in a software development team	Intrinsic and extrinsic motivations	[51]
Investigated the roles of psychological climate on knowledge sharing	Knowledge sharing psychological climate	[68]
Fostering knowledge sharing behaviour among public sector managers	Intrinsic, extrinsic and organizational socialization motivations	[49]
Investigated information	Intrinsic, extrinsic and organizational supports	[50]

security knowledge sharing model in organization		
Investigated the influence of intrinsic and extrinsic motivations on knowledge sharing	Intrinsic and extrinsic motivations	[55]
Investigated knowledge sharing motivational factors of using intra-organizational social medial platform	The desire to help the organization reach its goal, financial reward and advancement of career	[56]
Investigated knowledge sharing in information system	Culture and climate of the organization	[69]

#### 4. THE CONCEPTUAL MODEL

The empirical model adapted and modified for this study is [36]. This is because the work examined factors influencing knowledge sharing extensively and will aid the development of this study conceptual framework. In [36], these factors promoting or inhibiting organizational knowledge disseminating activities were divided into individual factors (using two factors as proximal determinants), organizational factors (using two factors as proximal determinants), and technology factors. According to the paper, staffs that derive enjoyment from helping others may be more favourable oriented toward knowledge sharing and more inclined to share knowledge in terms of both donation and collecting. The findings revealed that the two individual factors as shown in Figure 1 below and one of the organizational factors that is top management support to be specific, significantly influences knowledge sharing processes. A positive significant relationship was stated for ICT use and knowledge collecting but no significant relationship with knowledge donation.

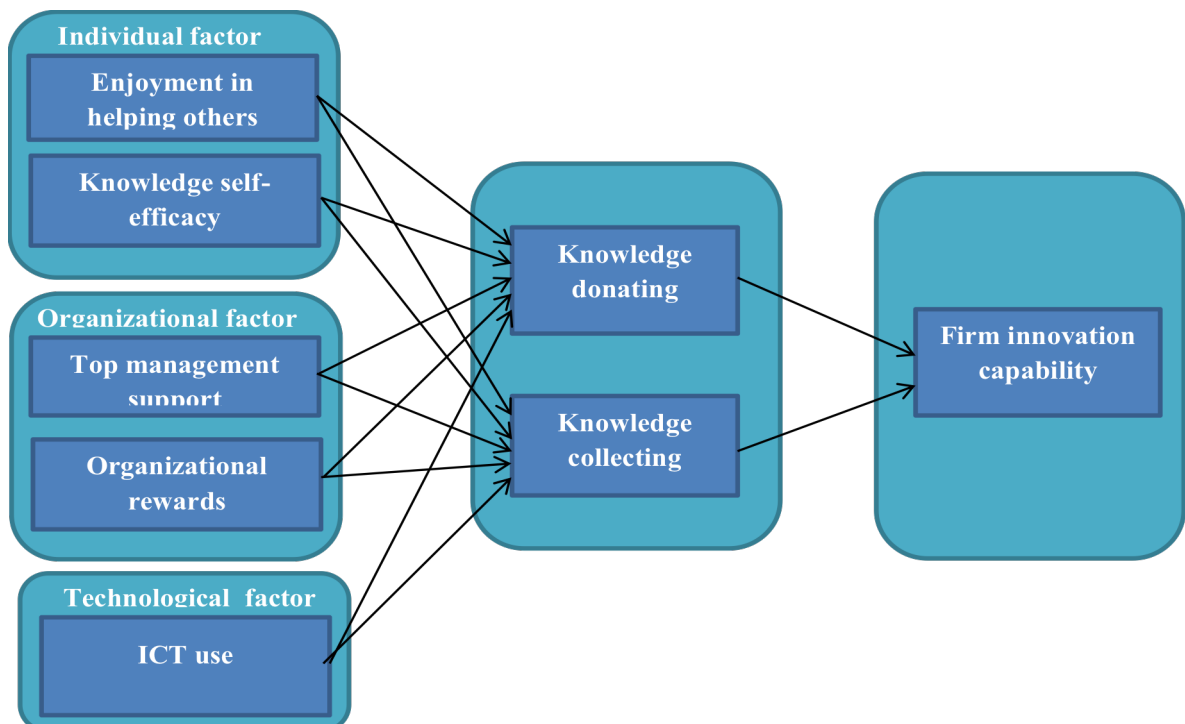


Figure 1: Schematic representation of three categories of barriers and motivation affecting knowledge sharing [28]

The developed conceptual framework on motivations and barriers influencing knowledge sharing among non-academic staff of a university is based on information gathered from prior relevant theoretical and empirical literature as shown in Figure 2 below after integrating figure 1 key components.

Knowledge sharing involving both knowledge donation and knowledge collecting is assumed to occur at the individual, departmental and university levels. Knowledge is exchanged within and between the different units of the institution. Knowledge sharing at the individual level means talking to colleagues to help them solve task problem, do something done better and more quickly while at both the departmental and university level is the capturing, creation, applying and transferring experience-based know how among the non-academic staff that resides within the department to become collective university own and making that knowledge available for re-use.

The potential factors which are likely to foster (motivates) or hinder (barrier) knowledge sharing among non-academic staff are grouped into four for the purpose of this review with various proximal determinants. This is necessary because majority of these factors investigated in various literatures overlapped. They are individual factors, university factors, technological factors and environmental factors. Individual factors are issues pertaining to the uniqueness of personality traits; the university factors popularly known as organizational factors, are factors relating to specific university in which the non-academic staffs are employed; both the hardware and software in use by the institution is referred to as the technological factors while the environmental factors are those external ones not within the control of the university [32-33, 35, 43].

Apart from these four factors identified below in Figure 2, the expected benefits to be derived by individual non-academic staff and the university benefit also motivate the knowledge sharing processes couple with other crucial activities vital for continuous knowledge sharing.

## 5. THEORETICAL SUGGESTIONS

Based on the extensive literature reviewed in this study, apart from the aforementioned factors in Figure 2, series of proactive actions have also been proposed to foster knowledge sharing among non-academic staffs of a University. However, these activities can further be empirically validated. One of such activities is critical knowledge assessment of the nature and form of the knowledge to be shared [70]. This involve a detail understanding of the form and embeddedness of the knowledge to be shared which will go a long way in fostering knowledge sharing activities [70].

According to [71], knowledge elements such as people, tools, routines, and networks are essential to realization of Universities mission [71]. The authors also noted that, it is fundamental to develop knowledge repository map for the knowledge to be shared as well as ensuring the identification of such important knowledge elements. The implementation of this will enable the University administration to have access to the knowledge repositories in order to develop adequate plans for knowledge-transfer. Reports from literature have shown that knowledge sharing may be influenced by the extent to which knowledge is related to the specific organizational assets, people and routine [71]. Based on this available information, the University administration can design a knowledge-sharing template to ensure appropriate level of interaction among the non-academic staffs.

Based on the suggestion of [41], the University administration must make conscious effort to ensure that every member of the non-academic staff is properly informed of each other's expertise. This can be achieved using intranet as route for promoting sharing of knowledge in University. Studies have shown that knowledge sharing increases when there is adequate dissemination of information about the different expertise in an organization. But [70] argued that, it is not just enough for the University administration to carry out a comprehensive embeddedness assessments of who knows what (people-people network), who works best with what tools or technology (people-tool network) and who does which tasks most effectively (people-task network). It is of equal importance to assess whether the knowledge is explicit or tacit which is also the stand in this review. According to Wyatt [73] explicit knowledge consists of facts, rules, relationship and policies that can be coded on paper while tacit knowledge does not require being coded on.

Furthermore, the University administration should be able to manage relationship among non-academic staff by establishing rules and goals as well as identifying and accommodating the differences. Besides, studies have shown that knowledge sharing is enhanced in an environment of set of established rules, goals and norms as well in a setting where there is joint development of rules among the staffs [70]. This is likely to foster better relationship management and invariably promotes knowledge-sharing activities among non-academic staffs of University [70, 74]. Moreover research findings have shown that direct inclusion of recipients enhances knowledge-sharing success and their exclusion hampers knowledge sharing activities.



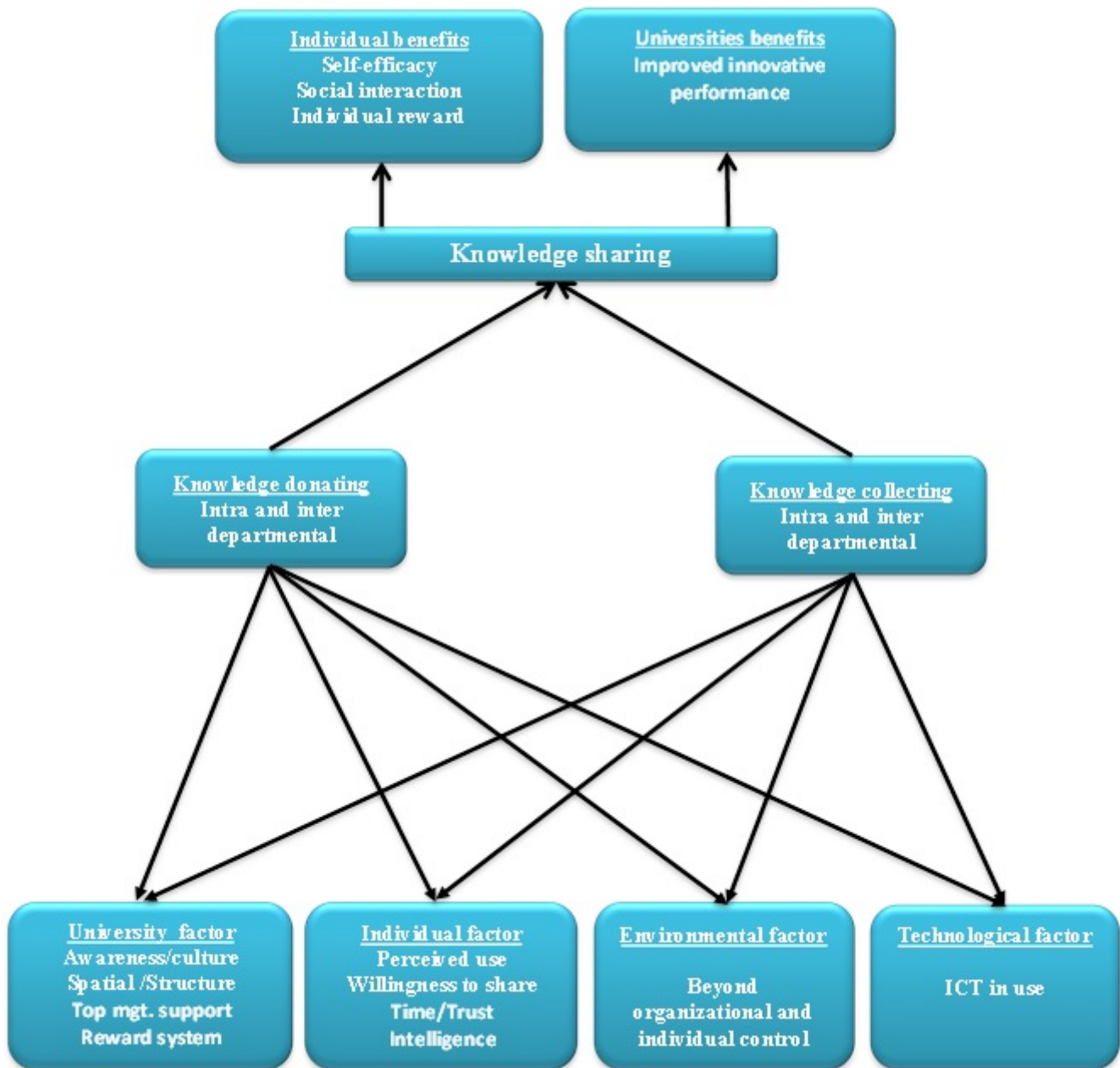


Figure 2: A framework showing the motivations and barriers to knowledge sharing among non-academic staff of university.

Also, how an organization is structured plays an important role in any effective knowledge-sharing endeavour [75]. Hence for a successful knowledge sharing among the non-academic staffs, the University management should be put up a structure that will enhance the desire for knowledge flow among non-academic staffs. The findings of [13] on the impact of organizational structure dimensions on knowledge sharing in inter-unit cooperative episodes showed that there was strong correlation between organization structure and knowledge sharing. Although organization structure has a way of influencing knowledge sharing, making it too formalize can as well defeated the objective of knowledge sharing among the employee. In line with this, [13] and [75] investigated how organization structure affects knowledge sharing. Both studies revealed that when organizational structure is less formalized social interaction is more favourable which have a positive influence on the attitude of the employee to share knowledge. In addition, organizational structure that helps to identify the potential relational differences that might exist between the non-academic staffs is crucial to an effective knowledge sharing processes. This is because challenges to effective knowledge sharing might be as a result of the existence of any difference among the non-academic staffs as indicated by [13] and [75].

## 6. CONCLUSIONS

An effective knowledge-sharing goes beyond just focusing only on the specific knowledge but rather on factors that can promote or discourage its sharing for maximum benefits. This review has highlighted the factors that can hamper or motivates knowledge-sharing effort among non-academic staffs of a University as contained in the conceptual model arrived at. Besides the conceptual model, various theoretical suggestions were also proposed for further empirical evaluation. These proactive actions as theoretically suggested include relationship management, and knowledge assessment will help to prevent hoarding of knowledge and further promote knowledge sharing activities at various departments in the University. Organizing group-based activities to discuss motivation and barrier factors contained in the conceptual model developed in this review can also facilitate effective knowledge sharing activities among non-academic staffs. This is because group-based engagements in knowledge sharing activities have been adduced to be more effective in yielding desirable knowledge outcomes than individual-based activities.

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