

THE ROLE OF INFORMATION TECHNOLOGY TOOLS TO SUPPORT KNOWLEDGE TRANSFERRING PROCESSES THROUGHOUT SECI MODEL: AN EMPIRICAL STUDY

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Abstract - In this era of globalization, information technology (IT) is an integral element which can enhance knowledge processing by breaking temporal and spatial barriers between knowledge users and expanding access to knowledge-related information. However, the use of IT has its own shortcoming as it ignores when and how the quality of knowledge processes is enhanced. Despite of this setback, a more encompassing perspective can be discovered if IT is studied with relation to the supporting materials to facilitate knowledge process. Specifically, this exploratory study aims to investigate the role of IT tools to support knowledge management processes using SECI model in educational institutions in Iraq. In this study, data was collected from 228 students, academic staff, and administration staff at Basra University in Iraq. Primarily, this research highlights the significance of SECI model deployed in enhancing HELs, particularly in Basra University by adding value to the learning process and basic activities. As a matter of fact, the empirical results indicate that the current IT infrastructure is dependent on simple tools. Additionally, this study also revealed that the respondents perceive social media, mobile technology, portal, and email as fundamental tools to SECI model. At the end of this study, further recommendations were provided and discussed for the reference of decision makers.

Key Words: SECI, knowledge management systems, Higher Educational Institutions, Information Technology Tools.

1. INTRODUCTION

Generally, knowledge has been widely acknowledged as an asset of paramount importance which significantly contributes to the successes of any organization. In fact, it is considered as a primary resource to sustain a competitive position in a dynamic and up-to-date organizational environment [1]. Hence, the knowledge acquired which is strategically administered between different sectors can enhance position of organizations in the marketplace. For instance, a consistent effort in discovering new knowledge to progressively upgrade existing knowledge has become the top priority when striving to improve an organization's competitive advantage [2].

Thus, it is essential for different structures in an organization to share, transfer, collect, store, and reuse

knowledge throughout Knowledge Management paradigm (KMP). In this context, this KM leverage encourages innovation and stimulates creativity by implementing KM strategies and practices in an organization working environment. With respect to this study, universities as Higher Educational Institutions (HELs) have been identified as producers and custodians of knowledge (Kidwell, 2004). In this context, KM implementations are very crucial in the process of disseminating and managing knowledge among the important stakeholders [3].

Furthermore, the recent interest in KM has influenced researchers to approach and incorporate Information Technology (IT) in the most practical manner which could be used to improve efficiency and effectiveness of KM implementations. Essentially, IT tools have been acknowledged as fundamental assets in facilitating knowledge management processes in organizations such as sharing, transferring and retrieving [2],[4],[5]. In this context, the use of salient technology tools should be emphasized in order to manage knowledge assets and integrate them into KM implementations. Thus, this initiative will be able to facilitate the management and the implementation of KM processes automatically [6].

Interestingly, the Nonaka and Takeuchi's SECI model on knowledge management was considered as one of the most critical KM models that accelerated KM implementations[7]. In general, the application of SECI model allows knowledge to be transferred and shared intensively and rapidly. In this respect, the role of IT tools is significant to ensure processes of SECI are operating efficiently and effectively. For instance, previous studies discovered that general information technology tools such as email, video-conferencing, and social media are also influential in knowledge transferring processes of (SECI) model which ultimately enhances knowledge creation [8],[9], [10],[11].

Most importantly, this paper aims to investigate the role of IT tools in deploying KM implementations by adapting the SECI model.

In particular, this study was conducted in Basra University as a case study on the environment of Iraqi universities. In fact, the empirical results indicate that the suitable IT tools that are currently formally and informally utilised in the

activation of knowledge transferring processes (SECI) model among Basra university users (academic staff, administrative staff, and students).

Concisely, this paper consists of seven sections. First and foremost, the introduction presents and highlights the issues and gaps in the literature along with the objectives. Next, the second section integrates and analyzes the literature related to the topic. Third, the information technology (IT) tools within KM SECI model in HEIs are elaborated. Fourth, this section discusses the research methodology. In the fifth section, the findings of the study are then presented. Sixth, this section refers to the discussion of findings. Finally, the seventh section concludes the study and provides recommendations and direction for future works.

2. LITERATURE REVIEW

2.1 KNOWLEDGE MANAGEMENT IN HEIs

Basically, KM is basically employed to enhance the sharing of knowledge that governs the working procedures in any organization. As a matter of fact, KM is unlike other activities as it is a systematic approach to retain, capture, share, and transfer knowledge [12]. In general, knowledge management can be classified into two types, namely explicit and tacit. First, explicit knowledge includes experiences and skills formulated such as written documents which can be easily captured, retrieved, shared, and used. On the other hand, tacit knowledge pertains to knowledge that resides in people's minds, which includes experiences, thoughts, competencies, deeds, and commitment [13]. Most importantly, knowledge denotes the ability to transfer the knowledge types from one form to another (tacit to explicit, explicit to tacit), besides managing the knowledge of any organization using systematic and organized methods. Thus, the emergence of the KM theory and knowledge management systems (KMS) is triggered by the need to manage the knowledge assets in various organizational sectors [14].

As mentioned previously, universities have been identified as knowledge-intensive organizations which can enhance the process of dissemination of knowledge. In this context, the process of acquiring and transferring of main knowledge occur during teaching, researching, and supervision activities [15]. For instance, the learning process can be observed when lecturers and students participate in classroom interactions such as lectures, discussions, presentations, and solving assignments. Likewise, this transfer of knowledge is also evident when lecturers interact amongst themselves during conferences, workshops, and training courses. Indeed, new types of knowledge are constantly developed through such academic activities which promotes enhancement on existing knowledge [16]. However, the learning process should not merely be restricted to interaction between lecturers and student only, but instead include the administrative staff. For instance, the administrative team are also involved in the

learning process as they are responsible for conducting and accomplishing various tasks such as handling registration, human resources management, and financial departments. Inevitably, these specified responsibilities, require knowledge to be utilized, created, and implemented in many innovative ways. Consequently, the term university in the preceding statements highlight the significance of embracing all staff and students in the university instead of representing top management and stakeholders alone. Therefore, this collaborative perspective on knowledge sharing and transferring will be able to direct universities on how to manage and implement KM transferring and creating processes efficiently and effectively to enhance university environment [17].

Surprisingly, even though KM is a concept which was recently implemented in higher education institutions, its presence has sparked interest among education policy makers and stakeholders. As emphasised by a previous study, the implementation of KM processes such as sharing, creating, utilization and transferring of both tacit and explicit knowledge in higher education is crucial as it can lead to significant improvements [18].

2.2 INFORMATION TECHNOLOGY TOOLS FOR KM IN HEIs

In this 21st century, IT tools have been identified as a source to fulfil the demand of delivering appropriate knowledge to the right person at the right time. Essentially, IT tools provide the necessary connectivity and accessibility to facilitate knowledge transferring, storing, disseminating and retrieving in order to reuse it again. With respect to this undeniable necessity, IT is viewed as the backbone to support KM implementations in any organization [19],[20],[21].

Similarly, the presence of IT is also influential in HEIs as it enables universities to upgrade their services quality and stimulate the creation and dissemination of knowledge [22]. For instance, IT tools can connect universities users with each other and within the needed knowledge simultaneously. Clearly, IT provides the key to enhance overall learning processes, strategies, and competitive advantage. Besides, when processes can operate automatically and systematically, the total cost for provided services and demanded strategies can be minimized while optimizing general performance [15]. In other words, HEIs could utilise IT tools to improve organizations' strategies, enhance the preservation of knowledge assets, and encourage knowledge creation processes that are used for teaching, researching, supervision, and administration tasks [23],[24],[25]. In addition, [15] reiterated that IT tools are suitable instruments to support KM implementation in HEIs since they have been proven to improve administration services, efforts of development, administrative decentralization, administrative policies, and responsiveness and communication capabilities.

Despite previous studies emphasizing on the derived benefits from implemented IT tools, the role of IT concerning KM in HEIs remains arguable. In this context, the issues concerning the need to expand more opportunities for lecturers, administrative staff, and students to practice collaboration and communication with each other and with outside global institutions were highlighted [26],[27].

Furthermore, universities commonly incorporate IT tools to share access and store various kinds of knowledge such as electronic mails, portals and blogs [28],[29]. Even though these tools are being utilised at present, they have yet to be formally recognized as an integral source which could provide support for KM implementations. In this respect, further clarification is needed to highlight this neglected aspect[8].

For the purpose of this study, the SECI model which is one of the most well-known KM models was employed. Concisely, the name SECI is derived from the combination of the following words: socialization (S), externalization (E), combination (C), and internalization (I). In a broader context, SECI model places emphasis on the possible probabilities to transfer the knowledge between its types (tacit and explicit) throughout the previous four phases[7]. Unfortunately, IT tools that could be utilised to support knowledge transfer in each SECI phase have not gained formal approval as it was previously neglected[8].

2.3 KM SECI MODEL IN HEIS

Generally, SECI Model has been applied by many researchers as a KM model to facilitate knowledge transfer precisely and knowledge creation implicitly [30],[31],[32],[33]. Primarily, this model is unique because of its universality which enables it to be adopted for various industries and disciplines such as in higher education, manufacturing, finance, and business[34]. However, in order to fully comprehend the significance of SECI model in knowledge transferring process, the dynamic nature of its paradigm must be explained beforehand.

In this particular SECI model, there are four phases which constitutes the knowledge conversion process[7]. First and foremost, the first component is the socialization phase, in which tacit knowledge of individuals is exchanged. This is followed by an externalization phase whereby new tacit knowledge is translated into explicit knowledge. Thirdly, this explicit knowledge is then combined with existing explicit knowledge. Finally, in the fourth phase which is the internalization phase, new explicit knowledge is acquired and registered by individuals, thus enriching their tacit knowledge base. Once these four stages have been completed, the cycle of tacit knowledge is repeated as knowledge creation is an inexhaustible process in the SECI model. In this study, SECI as knowledge transferring is illustrated in Figure 1.

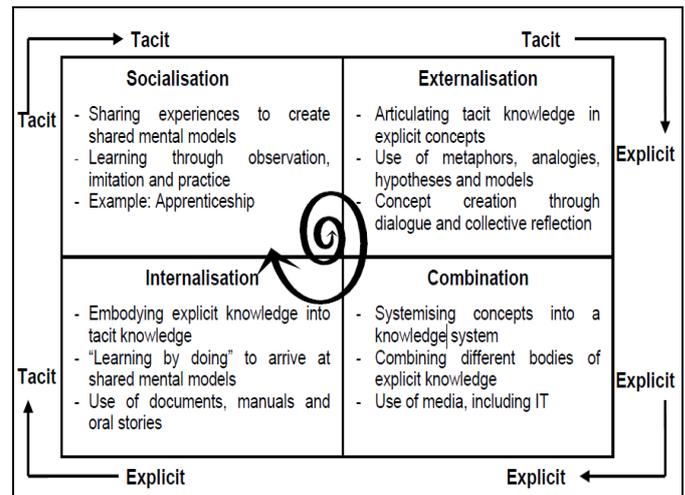


Fig -1: Knowledge Transferring Model [7].

In connection with HEIs domain, SECI model is acknowledged as a source which can provide various opportunities towards knowledge dissemination, transferring, and creation among universities users (students, academic staff and administrative staff)[35]. Additionally, SECI model also functions as a catalyst by accelerating knowledge growth through different forms of knowledge transfer. In view of the impact of the SECI model, its usability could be further diversified by utilizing appropriate components of IT for each SECI phase [33], [36],[37]. With respect to this study, the focus highlighted in this paper revolves about the objective of identifying the most appropriate IT tools that could be incorporated into the existing structure to support each phase of SECI model in Basra University.

2.3.1 Socialization

In this context, socialization denotes the process of transferring tacit knowledge between individuals through observations and collaborating with more skilled people (tacit to tacit). Primarily, knowledge is disseminated through practice, guidance, imitation and observation.

With respect to HEIs, this phase occurs among lecturers, students and other administrative staff. For instance, this phase is set into motion when lecturers exchange tacit knowledge with students throughout the class's environment. As a matter of fact, during this process, new knowledge would be acquired and reused repetitively which contributes to the enhancement of current knowledge level for both lecturers and students. In addition, socialization also ensures smooth transition when the administrative team to transfers their experiences, technical skills and other problem solutions.

2.3.2 Externalization

In specific terms, externalization refers to the process in which a person converts his or her tacit knowledge (personal experiences, ideas, beliefs) into explicit knowledge through documentation and verbalization (tacit to explicit). Once knowledge conversion is completed, tacit knowledge is codified into documents, manuals, web pages and et cetera. As a result, this phase facilitates the dissemination process throughout the organization.

Moreover, with respect to HEIs environment, this phase provides efficient transfer of tacit knowledge to avoid loss tacit knowledge by externalizing it permanently. For instance, lecturers can record their lectures in video form and make them available for other lecturers and students. Besides, knowledge repository is also a fundamental component of this phase as it stores policies, regulations, and solutions of universities. Consequently, employees at present or in the near future can gain access, adjust, retrieve, and reuse this knowledge again.

2.3.3 Combination

Combination which is the third phase of SECI involves the process of converting explicit knowledge into more complex and systematic sets of explicit knowledge. Specifically, it primarily focuses on the combination of different types of explicit knowledge (explicit to explicit) whereby explicit knowledge is collected from inside or outside the organisation and then combined edited or processed to form new knowledge.

Furthermore, this phase emphasises on creating new ideas and improving innovation for both lecturers and students. In this context, lecturers are encouraged to explore diverse academic materials ranging from surfing and reading different kinds of explicit knowledge such as eBooks, scientific publication, or any documented researches. Indeed, this initiative is beneficial as it enables lecturers to significantly refine their own ideas and construct indispensable knowledge. Likewise, a similar outcome is expected of students during the exchange of previous assignments solutions and ideas. Inevitably, this platform for sharing and discussion will ultimately enhance their tacit knowledge. As a result, new explicit knowledge will be generated to improve the learning process and thus produce students with higher intelligence.

2.3.4 Internalization

The internalization phase is the fourth and final stage of SECI. Precisely, it refers to the process of individuals internalizing explicit knowledge to create tacit knowledge (explicit to tacit). In this perspective, explicit knowledge which is created is propagated throughout an organisation and converted into tacit knowledge by individuals. As a

matter of fact, since explicit sources are utilised for the purpose of learning, the acquired knowledge is then to refine the user's existing tacit knowledge.

With regards to HEIs, this phase includes acquiring knowledge from various explicit knowledge mediums such as books, journals, and knowledge based materials. Subsequently, the acquired knowledge is adopted and adapted to fit into the practices and actions in the university working environment. For instance, feedback from students at the end of semesters are taken into consideration as a form of evaluation in order to scrutinize a lecturer's performance. Consequently, this method of evaluation will contribute to an increase in productivity which enriches their current tacit knowledge level and effectiveness of the teacher's teaching performance in the following semesters. On the other hand, the administrator's staff will be exposed to experiential learning which can be cultivated through hands-on experiences. For instance, training programmes provide relevant and in-depth exposure which can assist administrators in aligning their preparations to support university policies, required services and strategies.

2.4 THE INTEGRATION OF IT TOOLS WITHIN KM SECI MODEL IN HEIS

Throughout the evolution of technology, universities have always been considered as a major contributor of creativity and innovation. Based on previous researches, knowledge was identified to be a key component in universities environment and must be activated at a certain time and in a shared space [28],[38]. For instance, the SECI model is acknowledged as a catalyst which propagates and encourages knowledge creation and transferring. Specifically, it ensures and fulfils the prerequisites of a conducive climate for users to create, transfer, and reuse knowledge. However, like any other KM Model, SECI model is dependent on three fundamental aspects which are people, processes and information technology[2]. In particular, the first condition requires people to be effectively managed according to their respective characteristics, namely work responsibility and experiences. Secondly, impactful processes are required to manage KM implementations successfully. Thirdly, suitable IT tools must be adopted to optimise people performance and operate KM processes efficiently. In this respect, SECI model must source and incorporate suitable IT tools beforehand by replacing manual traditional methods with modern automatic IT tools [23],[36],[39].

In particular, this paper encompasses the issue of recent studies pertaining to the identification of suitable IT tools that can be employed during each phase of SECI model for the purpose of supporting knowledge transferring process. Based on the literature reviewed, there are eight common IT tools. These tools are as follows:

1. First and foremost, blog is a frequently updated online journal or diary. In fact, it serves as a platform for users to vocalize their thoughts regarding anything to the world. Basically, it consists of a hierarchy of text, images, media objects and data, arranged chronologically, which can be viewed in a web browser. Additionally, blogs can be utilised as a teaching tools in universities. In fact, it is a tool with great potential within the educational process that can facilitate information sharing processing for users[40].
2. Second, e-mail is the most frequently used application of the Internet and has become an important aspect of the communication process within higher education. It allows messages to be stored, manipulated and processed. Besides, messages can be edited and forwarded to other parties, while the attachment feature allows other types of data to be sent. In other words, email provides convenience for users by allowing them to determine the preferred choice of written communication. With respect to its versatility, e-mail is also deemed to be an economical and steadfast method of communication. For instance, email messages can be sent to a single receiver or broadcasted to groups simultaneously and almost instantly [41].
3. Third, video conferencing is a medium which allows two or more users at different locations to interact via two-ways video and audio transmissions simultaneously. Indeed, video conferencing has provided many opportunities for learning to take place in the Higher Education. In this context, opportunities are created when video conferencing enables learning through dialogue which is significantly more effective than working in isolation. Moreover, it can also be considered as a part of an online long-distance education system commonly utilised for lectures, tutorials, students, project reviews, remote visits and etc. Additionally, a videoconference also boasts its sophisticated feature of being able to be operated either from point-to-point or multipoint, linking three or more sites with sound and video in real time. Its practicality also includes data sharing through an electronic whiteboard which participants can draw on, or real-time text-based mail (similar to e-mail but it appears instantly on recipients' screens). Thus, this feature allows users to operate on the same file simultaneously [26],[39],[42].
4. Fourth, mobile technology can be used as a tool in education as it provides educators with the opportunity to refine teaching and learning in the context of 21st century learning. Precisely, this establishes a more flexible learning model which grants both faculty members and students access to multiple information sources and a transition from an authority based learning structure to a learner-community structure[43]. In fact, mobile technology also improves students' perceptions on collaborative learning. For instance, teachers are using mobile applications to permit students' replies to questions posed by the instructor based on course content. With respect to this context, this method has been shown to improve student perceptions of learning, engagement, and actual assessment scores [44],[45]. In summary, the presence of mobile technology maximizes the opportunity for lecturers to the teaching and learning process.
5. Fifth, community of practices (CoPs) is also recognized as a tool for the purpose of creating and maintaining knowledge within organizations[46]. Specifically, CoPs involves the process of sharing information and experiences with the group which allows members to learn from each other, and have the opportunity to develop themselves individually and professionally[47]. In fact, CoPs is capable of connecting academicians across sites, divisions, countries and functions as a network of experts over the Internet. For example, lecturers who teach programming languages can conduct their own CoPs worldwide to discuss methods on how to improve programming among students. In this context, CoPs enables academicians to construct and gain access to accumulated knowledge of experts directly [48].
6. Sixth, social media contains separable types of information (text, video, audio, PDF, PowerPoint etc.)[49]. In this respect, social media revolves is about internet user-sets which establishes a bridge between the internet users with the assistance of their own created and shared content. In other words, social media can be viewed as a tool-set of software which allows users to share information, interact and to create social groups[50].
7. Seven, portal can be viewed as a method to access disseminated information within a company since information chunks are commonly stored in various systems using different formats. For example, lecturers can create his or her portal to convert all his or her teaching documents which include notes, syllabi, assignments, grades, case studies, and references into different formats[51].
8. Eight, Electronic Document Management Systems (EDMS) primarily allows users to store codified information in the database which is easily

assessable when the desired knowledge is required. Consequently, the retrieved knowledge is then used to modify the user’s existing tacit knowledge by reading the stored documents. In return, users will then internalize their tacit knowledge and try to create new knowledge [52].As a matter of fact, it should be noted that the electronic document management system allows editing, modifying and updating of the stored information to align itself with the progress of user’s tacit knowledge level. Besides, Electronic Document Management Systems is useful for storing syllabus of all courses, thus ensuring easy access of syllabus which would expedite curriculum revision and updating processes.

Based on the related work of the interrelation between KM implementations and the adopted IT infrastructures, the possible IT tools that could be used to transfer and create knowledge in each phase in SECI model have been identified clearly as shown in Table 1.

Table -1: Information Technology Tools Interrelated To SECI Phases

SECI phase	Possible IT Tools	Author
S	Video Conferencing	[8] ,[36] ,[39]
	Community of Practice	[8],[33], [36]
	Blogs	[8],[33], [36],[37], [53]
	Mobile Technology	[37], [39],[53]
	Social Media	[9],[36]
E	Email	[37], [39],[53]
	Community of Practice	[32]
	Email	[33], [36], [37]
	Blogs	[33], [36], [37]
	Mobile Technology	[33], [36], [37]
C	Social Media	[9]
	Portal	[8], [36]
	Blogs	[8], [36],[37]
	Electronic Document Management Systems	[8], [53], [36],[37],[39]
	Community of Practice	[32]
	Email	[37]
I	Social Media	[9]
	Blog	[8], [36],[37]
	Social Media	[8],[9]
	Email	[36],[37]
	Community of Practice	[32]

Based on the findings above, the purpose of this study is to investigate the most feasible and versatile IT tools that could be adopted to support KM SECI model in Basra University.

Specifically, this research data analysis is crucial to comprehend the current situations and dimensions of knowledge transferring processes, and determine the possible IT tools that could be used to improve these situations and processes.

3. RESEARCH METHODOLOGY

3.1 Population and Sampling

For the purpose of this study, an online based questionnaire was administered to gather information from the respondents. Specifically, the population of this study is comprised of full time academic staff, administrative staff and students of Basra University. Upon further consideration, this university was chosen as a case study since it has 19 colleges, 16 research centers and offer programs from Bachelor to Ph.D. In addition, it was established in 1987 and considered as the largest university in south of Iraq. According to the university’s website, the total enrolment of students is 30166 students while there are 2848 academic staff and 1839 administrative staff (Basra University Website, 2017).

On the other hand, a sample refers to a group that is selected from a population to represent the whole[54]. In this particular study, the proportional stratified sampling method was used to obtain the number of samples from each group of users. Additionally, due to the fact that the population of this study consists of three different groups with different characteristics; therefore, the sample that fulfilled certain criteria were selected to represent the whole population. In other words, the groups of the population in this study are considered as a stratum. Table 2 shows the process of sampling whereby each group was derived from the total population. Then, the actual size of sample was determined to represent the group based on the size of the population.

Table -2: Stratified Sampling Process

Group	Population size	Population percentage	Actual sample size
Student	30166	86.5%	328
Academic Staff	2848	8.1%	31
administrative staff	1839	5.2%	20
Total	34853	100%	379

3.2 Research Instrument

Furthermore, this study also applied questionnaire as a tool for data collection. In this study, the questionnaire was divided into five parts. Basically, Part A poses questions regarding background information of the respondents which includes particulars such as age, gender, occupation and

educational level. Next, Part B asks questions revolving the importance of SECI model in HEIs. Thirdly, Part C clarifies the role of IT tools in higher education institutions to enable more opportunities for users to collaborate and interact effectively within the universities' environment. Last but not least, Part D investigates on the most suitable IT tools that could be used for SECI model phases. Specifically, a five-point Likert scale was used where (1) refers to 'strongly disagree' and (5) is 'strongly agree'. Table 3 below illustrates the flow of the questionnaire parts and their respective sources.

Table -3: Questionnaire Parts

Part	Items	No of Items	Items Type	Source
Part A : Demographic Data	Gender, Age, Qualifications, Experiences, job role.	5	Ordinal	Hashim et al. (2015)
Part B : The importance of KM SECI Model in HEIs	B1: Socialization	6	Scaled	Lopez-Nicolas (2010)
	B2: Externalization	6		
	B3: Combination	6		
	B4: Internalization	6		
Part C: The importance of IT tools in HEIs		6	Scaled	Lopez-Nicolas (2010)
Part D: The integration of IT tools in HEIs with KM SECI Model	D1: Socialization	6	Scaled	*Developed by researcher
	D2: Externalization	5		
	D3: Combination	6		
	D4: Internalization	5		

3.3 Reliability and Validity

On top of that, the reliability of the questionnaire was examined by four experts from Basra University and Tenaga National University. During the examination, they conducted a pre-test on the content of these questions and evaluated the findings. Indeed, their feedbacks and comments were taken into account when correcting and adjusting the instrument. From the test, it was ascertained that the Cronbach's alpha concerning the reliability of data collection was acceptable. Table 4 below shows the reliability of the field study.

Table -4: Reliability of Field Study

Cronbach's Alpha	No of Items
0.867	52

On the other hand, the validity of the questionnaire was tested by analyzing the interrelationship between items

within each questionnaire part based on the responses collected.

Precisely, the Factor Analysis using Kaiser-Meyer-Olkin (KMO) was applied to measure the interrelation adequacy between the items of each questionnaire part. In this study, it was determined that the accepted coefficient of KMO should be more 0.5. Table 5 tabulates the findings which supports the notion that the interrelation between all items in each questionnaire part is adequate. As a result, this agreement primarily highlights the effective design of questionnaire items and parts.

Table -5: Factor Analysis Of Questionnaire

Questionnaire Part	KMO	No of Respondents	No of Items
Part B1: Importance of KM SECI Model In HEIs In Socialization Phase	0.641	228	6
Part B2: Importance Of KM SECI Model In HEIs In Externalization Phase	0.650	228	6
Part B3: Importance of KM SECI Model In HEIs In Combination Phase	0.613	228	6
Part B4: Importance of KM SECI Model In HEIs In Internalization Phase	0.612	228	6
Part C: The Importance of IT Tools in HEIs	0.718	228	6
Part D1: The Integration Of IT Tools in HEIs with KM SECI Model (Socialization)	0.672	228	6
Part D2: The Integration Of IT Tools in HEIs with KM (Externalization)	0.621	228	5
Part D3: The Integration Of IT Tools in HEIs with KM (Combination)	0.608	228	6
Part D4: The Integration Of IT Tools in HEIs with KM (Internalization)	0.611	228	5

4. DATA COLLECTION

Data of this study was collected from academic staff, administrative staff, and students at Basra University, Iraq. In the process of obtaining permission to coordinate this collection, contact details of respondents were obtained from the university beforehand. Upon agreement and further disclosure regarding the purpose of this collection, a total of 379 questionnaires were emailed to the selected respondents. For this particular collection, the respondents were given five weeks to complete the questionnaires. From a total of 379 questionnaires distributed, a total of 228 complete and usable data sets were then registered into SPSS version 22.0.

5. FINDINGS

5.1 Demographics of Respondents

In this study, a total of 228 respondents volunteered to be participants. In fact, 128 respondents were identified to be within the range of 21 to 40 years old which is approximately 56% of the total. Additionally, the 228 respondents comprised of 144 (63.2%) males and 84 (36.8%) females. Besides, the respondents were mainly students (144 or 63.2%) while 100 possess a bachelor's degree which constitutes about 43.9% of the total. Also, in this study, findings also noted that a total of 160 (70.2%) respondents have experience more than seven years in the university. As shown below, Table 6 illustrates the demographic information of the respondents.

Table -6: Respondents' Demographic Information

N= 228	Label	Frequency	Percent
Age	21-30 years	48	21.1
	31-40 years	80	35.1
	41-50 years	68	29.8
	More than 50 years	32	14.0
Gender	Male	144	63.2
	Female	84	36.8
Occupation	Student	144	63.2
	Academic staff	44	19.3
	administrative staff	40	17.5
Education	Bachelor	100	43.9
	Master	40	17.5
	PhD	88	38.6
Experience	Less than 2 years	40	17.5
	2-4 years	8	3.5
	5-7 years	20	8.8
	More than 7 years	160	70.2

5.2 Descriptive Analysis

1. The Importance of KM SECI Model in HEIs:

Next, this section provides insights regarding the 24 items which were divided equally into four subparts. In particular, each subpart was formulated to demonstrate the importance of each SECI Model phase in HEIs. With respect to this study, the overall value of the mean score was 3.96 which is in agreement for all the items.

In connection with the socialization phase, the results indicated that the respondents were able to achieve consensus on the significance of this phase in enriching the working environment of the university with effective activities. As a matter of fact, some of the activities proposed

were related to creating, gathering and sharing of knowledge. However, according to the mean score values obtained, there are three elements which should be prioritised. First and foremost, the first essential which was discovered to be motivated by the socialisation phase was the stress on engaging in dialogue with authors (Mean= 4.46). This is followed by the stress on sharing of experience with other users (Mean= 4.43). Lastly, the item with the third highest mean of 4.39 was regarding the university's stress on gathering information from academic sites. Based on these findings, it can be implied that users at Basra University perceived the socialization phase as an important phase which empowers them to collaborate with each other regardless of place and time. Table 7 shows the descriptive analysis of importance of KM SECI Model in HEIs in (Socialization) Phase.

Table -7: Descriptive Analysis of Socialization Phase

Item	Means	Interpretation
Our university stresses on gathering information from academic sites.	4.39	agree
Our university stresses on sharing experience with other users.	4.43	agree
Our university stresses on engaging in dialogue with authors	4.46	agree
Our university stresses on finding new ways to share knowledge inside and outside the campus	3.34	Neutral
Our university stresses on creating a working environment that allows users to understand the experiences.	3.42	Agree
Summary of experience and learned subjects are suggested to related users in written and integrated method.	3.37	Neutral

Similarly, the results obtained from the externalization phase also indicate that the respondents fully acknowledge the importance of this role in the knowledge transferring process. Nevertheless, for the purpose of this study, only the top three activities with the highest mean score values were highlighted. Firstly, the university supported this phase by stressing on delivering subjective opinions (Mean= 4.67). This is followed by the university's stress on exchanging various ideas and dialogues (Mean= 4.42). Lastly, the third item which has a mean of 4.30 which is the stress on users displaying the trend to clarify for others by objective samples (Mean= 4.30). Based on these findings, it can be deduced that users at Basra University considered the externalization phase as a fundamental approach that could enable them to exchange various ideas, dialogues, and subjective opinions. As shown below, Table 8 tabulates the descriptive analysis of importance of KM SECI Model in HEIs in (externalization) Phase.

Table -8: Descriptive Analysis of Externalization Phase

Item	Means	Interpretation
Our university stresses on creative and essential dialogues.	2.71	Neutral
Our university stresses on the use of deductive and inductive thinking.	3.58	Agree
Our university stresses on exchanging various ideas and dialogues.	4.42	Agree
Our university stresses on subjective opinions.	4.67	Agree
Users often have trends to clarify for others by objective samples.	4.30	Agree
In our university, users are encouraged to use network and web for identifying tasks.	2.79	Neutral

Furthermore, an equally positive result was also produced in the combination phase which indicates that respondents are in favour of its significance. Based on the mean score values of the externalization phase, there were three most notable activities. The first activity was users are encouraged to transfer their professional knowledge to less experienced and new employees (Mean= 4.60). This is followed by the university’s stress on building up materials by gathering management figures and technical information (Mean= 4.54). Lastly, the third activity was about the university’s stress on creating manuals and documents of strategies and services (Mean= 4.42). In this perspective, the results showed that users from Basra University perceive that the combination phase is capable of enabling them to create new knowledge as well as to share their previous and existing knowledge to new student and staff. Table 9 shows the descriptive analysis of importance of KM SECI Model in HEIs in (combination) Phase.

Table -9: Descriptive Analysis of Combination Phase

Item	Means	Interpretation
Our university stresses on planning strategies using the published literature, computer simulation and forecasting.	3.36	Neutral
Our university stresses on creating manuals and documents of strategies and services	4.42	Neutral
Our university stresses on building databases of expert’s experience (learn from lessons) and organized knowledge.	3.20	Neutral
Our university stresses on building up materials by gathering management figures and technical information.	4.54	Neutral
In our university, the important and vital rules and standards are identified and stored well.	3.45	Agree
Users are encouraged to transfer their professional knowledge to less experienced and new employees.	4.60	Agree

In the same context, the internalization phase also produced results which clearly demonstrated the respondents’ agreement towards the importance of this phase. Based on the mean score values, two activities were taken into account. With respect to the results, the first

activity was the university’s stress on “searching and sharing new values and thoughts” (Mean= 4.82) while the second was “obtained results are recorded and documented after formal evidences” (Mean= 4.77). Indeed, these results reiterate that users at Basra University perceive the internalization phase as an effective stage to store the required knowledge in formatted documents and subsequently absorbed by users at their convenience. Table 10 shows the descriptive analysis of importance of KM SECI Model in HEIs in (internalization) Phase.

Table -10: Descriptive Analysis of Internalization Phase

Item	means	Interpretation
Our university stresses on active liaising activities with functional departments by cross-functional development teams.	3.23	Neutral
Our university stresses on forming teams as a model and conducting experiments, and sharing results with entire departments.	3.12	Neutral
Our university stresses on searching and sharing new values and thoughts.	4.42	Agree
The obtained results are recorded and documented after formal evidences	4.77	Neutral
Discussion on ideas and results is organized during formal meeting.	3.47	Agree
In our university, the information is completely clear as required.	3.55	Agree

2. The Importance of IT Tools in HEIS : In this particular section, six items were determined to investigate the feasibility and practicality of IT tools in Basra University. Based on the results, the respondents have chosen neutral responses as their desired choice of answer for all the items with an overall mean score value of 3.19. As a matter of fact, the score values of this section revealed that the respondents were uncertain of whether their universities used IT tools effectively. Besides, the respondents were also doubtful towards the significance of IT in providing more opportunities for users to collaborate and communicate. Table 11 below shows the descriptive analysis of Importance of IT Tools in HEIs.

Table -11: Descriptive Analysis of IT Tools Importance in HEIs

Item	Means	Interpretation
Our university provides IT tools for systematic storing.	3.21	Neutral
Our university provides IT tools for simulation and prediction.	3.09	Neutral
Our university provides IT tools for communication among university’s members.	3.28	Neutral
Our university provides IT tools for internal collaborative works regardless of time and place.	3.21	Neutral
Our university provides IT tools for external collaborative works regardless of time and place.	3.19	Neutral

Our university provides IT tools for searching and accessing necessary Information.	3. 14	Neutral
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3. The Integration of It Tools in HEIS with KM SECI Model:

This section was composed of 22 items which were divided into four subparts. Specifically, each subpart was designed to investigate the interconnection between possible IT tools and each SECI Model phase in Basra’s university.

With respect to the integration of IT tools in the socialization phase (D1), the overall mean score was 3.42 with a general agreement on all items. Based on the mean scores, the most important tool in socialization phase was identified to be social media with a mean score of 4.33 mean score in item 5 (It is useful to transfer my tacit knowledge to other user’s tacit knowledge via Social Media). This item was then followed by items 6 and 2 which combined mobile technology and email and were regarded as important by the respondents to transfer knowledge. Nevertheless, respondents were unable to ascertain the level of necessity of tools such as video conference, Community of Practice (Cop), and Electronic Discussion Forum which can be integrated into the socialization phase items 1, 3, and 4. Table 12 shows the descriptive analysis for The Integration of IT Tools in HEIs with KM SECI Model (Socialisation).

Table -12: Descriptive Analysis For The Integration of IT Tools In HEIs With KM SECI Model (Socialisation)

Item	Means	Interpretation
It is useful to transfer my tacit knowledge to other user’s tacit knowledge via video conference.	2.87	Neutral
It is useful to transfer my tacit knowledge to other user’s tacit knowledge via Mobile Technology.	3.95	Agree
It is useful to transfer my tacit knowledge to other user’s tacit knowledge via Community of Practice (Cop).	2.85	Neutral
It is useful to transfer my tacit knowledge to other user’s tacit knowledge via Electronic Discussion Forum.	2.52	Neutral
It is useful to transfer my tacit knowledge to other user’s tacit knowledge via Social Media.	4.33	Strongly Agree
It is useful to transfer my tacit knowledge to other user’s tacit knowledge via Email.	3.97	Agree

Furthermore, in the integration of IT tools with externalization phase (D2), the overall mean score recorded was 3.40 whereby respondents agreed to all items. However, based on the mean scores, the most important tool in externalization phase was item 1 which is mobile technology with a mean score of 4.32 (It is useful to transfer my tacit knowledge to valuable explicit knowledge via Mobile Technology). In the same context, the respondents were also found to be in favour of item 4 and 5 which combined Social Media and Email. Nevertheless, the respondents’ responses remained uncertain whether blogs and community of

practice (COP) can correspond with the externalization phase items 2 and 3. Table 13 shows the descriptive analysis for The Integration of IT Tools in HEIs with KM SECI Model (integration).

Table -13: Descriptive Analysis For The Integration of IT Tools In HEIs With KM SECI Model (Externalization)

Item	Means	Interpretation
It is useful to transfer my tacit knowledge to valuable explicit knowledge via Mobile Technology.	4.32	Strongly Agree
It is useful to transfer my tacit knowledge to valuable explicit knowledge via Community of Practice (Cop).	2.71	Neutral
It is useful to transfer my tacit knowledge to valuable explicit knowledge via Blogs.	2.79	Neutral
It is useful to transfer my tacit knowledge to valuable explicit knowledge via Social Media.	3.58	Agree
It is useful to transfer my tacit knowledge to valuable explicit knowledge via Email.	3.60	Agree

Thirdly, the integration of IT tools with the combination phase (D3) produced an overall mean score of 3.08 with general neutrality for all items. However, based on the mean score, the most important tool identified in the externalization phase was Portal with a mean score of 4.12 for item 2 (It is useful to transfer my explicit knowledge to another explicit knowledge type via Portal). Apparently, the respondents also agreed on item 6 (It is useful to transfer my explicit knowledge to another explicit knowledge type via Email) while they disagreed on item 5 (It is useful to transfer my explicit knowledge to another explicit knowledge type Social Media). Besides, ambiguity was also present in the responses of respondents regarding the cohesion between Blogs & Community of Practice (Cop) tools with the combination phase items 3 and 4. Table 14 shows the descriptive analysis for the integration of IT tools in HEIs with KM(combination).

Table -14: Descriptive Analysis For The Integration of IT Tools In HEIs With KM SECI Model (Combination)

Item	Means	Interpretation
It is useful to transfer my explicit knowledge to another explicit knowledge type via Electronic Document Management Systems.	3.11	Neutral
It is useful to transfer my explicit knowledge to another explicit knowledge type via Portal.	4.12	Strongly Agree
It is useful to transfer my explicit knowledge to another explicit knowledge type Community of Practice (Cop).	3.20	Neutral
It is useful to transfer my explicit knowledge to another explicit knowledge type Blogs.	2.64	Neutral
It is useful to transfer my explicit knowledge to another explicit knowledge type Social Media.	1.94	Disagree
It is useful to transfer my explicit knowledge to another explicit knowledge type via Email.	3.50	Agree

In the internalization phase (D4), the integration of IT tools resulted in an overall mean score was 3.5 for item 1

whereby agreement was achieved for all items. Since the importance of IT tools in the externalisation phase was based on the mean scores calculated, it was discovered that E-mail achieved the highest mean score of 4.36 for item 5 (It is useful to transfer my explicit knowledge to other user's tacit knowledge via Email). Additionally, item 4 which highlights on the use of Social Media

(It is useful to transfer my explicit knowledge to other user's tacit knowledge via Social Media.) was also acknowledged by the respondents as an integral tool for this phase. However, the respondents were not confident whether the relationship between Blogs, Community of Practice (Cop), and Electronic Discussion Forum tools with internalization phase items 1, 2, and 3 would be viable. Table 15 shows the descriptive analysis for the integration of IT tools in HEIs with KM (internalization).

Table -15: Descriptive Analysis For The Integration of IT Tools In HEIs With KM SECI Model (Internalization)

Item	Means	Interpretation
It is useful to transfer my explicit knowledge to other user's tacit knowledge via Electronic Discussion Forum.	3.12	Neutral
It is useful to transfer my explicit knowledge to other user's tacit knowledge via Blogs.	2.75	Neutral
It is useful to transfer my explicit knowledge to other user's tacit knowledge via Community of Practice (Cop).	3.19	Neutral
It is useful to transfer my explicit knowledge to other user's tacit knowledge via Social Media.	4.14	Agree
It is useful to transfer my explicit knowledge to other user's tacit knowledge via Email.	4.36	Strongly Agree

5.3 CORRELATION ANALYSIS

In this study, the correlation between IT Tools and SECI Model phases was conducted to explore the relationships between these parts. Indeed, this analysis managed to highlight the significance of this research. In this respect, the correlation between IT tools part and the four SECI model phases was illustrated in Table 16. Based on the results shown, it can be implied that there is a strong and positive relationship between the Socialization phase(S) and the possible IT tools. Moreover, the results also suggested that there is a strong and positive relationship between Externalization phase (E) and the possible IT tools. Likewise, similar statements could be deduced regarding the positive relationship between the Combination phase(C) and Internalization phase (I) with the possible IT tools. In other words, the effective IT tools that could be applied in HEIs are crucial to activate KM SECI Model phases. Consequently, the efficiency of KM SECI Model phases can be optimised when connected to suitable IT tools.

Table -16: Correlation between IT Tools Part And The Four SECI Model Phases

		IT Tools	S	E	C	I
IT Tools	Pearson Correlation	1	.534**	.717**	.837**	.823**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	228	228	228	228	228
S	Pearson Correlation	.534**	1	.561**	.543**	.600**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	228	228	228	228	228
E	Pearson Correlation	.717**	.561**	1	.793**	.820**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	228	228	228	228	228
C	Pearson Correlation	.837**	.543**	.793**	1	.810**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	228	228	228	228	228
I	Pearson Correlation	.823**	.600**	.820**	.810**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	228	228	228	228	228

** . Correlation is significant at the 0.01 level (2-tailed).

6. DISCUSSION

According to the questionnaire results in part B, the respondents acknowledged the significance of SECI model in enhancing HEIs, specifically in Basra University. As a matter of fact, the respondents were able to visualise and perceive SECI model as a creative model in which would contribute more benefits to the learning processes in Basra University. For instance, the respondents believed that the SECI model can enhance basic activities in Basra University which includes teaching, researching, and supervision. Consequently, the findings suggest that the top management in Basra university stresses on the process of gathering information from academic sites, sharing experience with other users, exchanging various ideas and dialogues, and searching and sharing new values and thoughts. Despite of this positive initiative, the top management still faced setbacks as previous activities were handled theoretically. For instance, the standard system for saving, sharing, and retrieving data and services went missing which led to current activities in Basra University to being conducted informally.

In connection with the questionnaire results in part C, the respondents were uncertain about the role of IT in HEIs in Basra University. Specifically, the ambiguity was related to the influence of IT on the whole processes in Basra University. Empirically, the results indicate that the current IT infrastructures depend on simple tools such as email, and mobile technology. Also, the results suggested that the impact of these tools are limited and not linked to the current work activities. Ultimately, the results revealed that there is currently no standard IT system available which efficiently supports the activities in Basra University.

Furthermore, findings of the questionnaire results in part D also revealed that certain IT tools have an edge over the rest when integrated with SECI model phases. For an example, during the socialization phase, the results revealed that respondents considered social media as the most useful tool to activate this phase. In contrast, respondents were unable to arrive to a conclusion and queried about the effectiveness of other suggested tools such as video conference, Community of Practice (Cop), and Electronic Discussion Forum. On the other hand, the results for externalization phase revealed that mobile technology was the most interrelated tool. However, the respondents were uncertain about the relevance of Community of Practice (Cop) and Blogs as tools for this phase. In the context of combination phase, results showed that respondents considered portal as the most interconnected tool. Conversely, the respondents did not uphold the same point of view about Document Management Systems, Community of Practice (Cop), and Blogs. With connection to the previous phases, findings for the internalization phase suggest that Email is the most integrated tool in this phase. However, the respondents had contrasting opinions as they were equivocal about the practicality of Blogs, Electronic Discussion Forum, and Community of Practice (Cop) as IT tools for this particular phase.

Essentially, the findings of this study have primarily highlighted that the respondents perceive social media, mobile technology, portal, and email as the most interrelated and impactful tools to SECI model. In this respect, users will have a higher tendency to utilise these tools mentioned to facilitate activities. To sum up, it can be deduced from the results that there is still lack in the use of diverse IT tools besides the absence of a standard IT system which could be incorporated to activate the SECI model in Basra University.

On the other hand, the analysis on the correlation results reveal that positive relations were established between the IT role and KM SECI model role in maximizing competitive advantage and the overall performance in Basra University. Consequently, the correlation also highlighted the strong interconnection between IT role in each SECI model individually. In other words, IT tools were ascertained to be capable of enhancing knowledge creation and transferring processes throughout the SECI model if it is implemented efficiently. As a result, SECI model will be an integral asset to supplement knowledge implementations processes such as sharing, creating, transferring, and reserving knowledge if it is managed by effective IT tools and system.

7. RECOMMENDATION

In this particular study, the data analysis demonstrated that university users (academic staff, administrative staff, and students) are in favour to adopt the KM SECI Model in Basra University. Despite positive results, Basra University has

limitations in providing the required IT infrastructures and tools necessary to activate the SECI model. With respect to these circumstances, one solution which could be recommended is to urge and encourage the top management in Basra University to utilize an integrated IT system and relevant tools to support all the KM SECI model phases which are socialization, externalization, combination, and internalization.

Primarily, the main emphasis of this study is to initiate a standard IT system in order to accommodate the demands of basic activities and provide modern IT tools to implement SECI model phases in particular. For instance, top managements are advised to increase awareness and propagate the positive influence of modern IT tools which are Community of Practice (Cop), Blogs, video conference, Electronic Document Management Systems, and Electronic Discussion Forum. Besides, training courses and seminars should be conducted and made available to administrative university staff. Consequently, more users would be exposed on the mechanism of these tools and acquire the relevant skills to handle the services and operations. Additionally, the top management must be willing to provide initial courses to introduce lecturers and students to these tools and encourage them to use it. Likewise, the internet access must also be provided on campus where users can apply IT tools and infrastructures consistently. In this respect, the university could be able to utilize both of KM SECI phases and IT tools simultaneously. As a result, Basra University could elevate the quality of services as well as the teaching and learning processes, thus maximizing Basra University's competitive advantage among other rivals universities.

8. CONCLUSIONS AND FUTURE WORK

In conclusion, the purpose of this study was to determine the suitable IT tools that could be employed to operate the KM SECI model in Basra University in Iraq. Concisely, with respect to the findings, it can be concluded that users in the university acknowledge the significance of the SECI model in facilitating the communication and collaboration between university users, and the enhancement of commonly used knowledge processes within the university's working environment.

Despite certain challenges being revealed such as the absence of a standard IT system in Basra University, limited and out-dated IT tools, and unavailability of modern IT tools such as blogs, electronic system and community of practice, the findings also produced positive results. As a matter of fact, a number of IT tools were discovered to be intensively used in Basra University for the purpose of collaboration and communication. Among the tools identified were email, social media and mobile technology. Specifically, the results highlight the strong connection between these tools and each SECI model phase respectively. In summary, this study could be deemed successful as it managed

to discover suitable IT tools that are currently used in Basra University as well as the integration level of each tool with SECI model phases. In the same context, this study also accomplished in identifying the barriers that are withholding the university from a successful implementation of KM SECI model. Basically, the notable limitations were related to the lack of competent IT infrastructure (internet access, standard IT system and modern IT tools). Consequently, recommendations have been suggested to overcome these barriers in order to utilize IT tools to enhance knowledge processes throughout the SECI model. Indeed, the findings of this study were generalized for the purpose of standardizing the course of action among the universities in Iraq, which undoubtedly share similar characteristics with Basra University. Therefore, with respect to such conditions being taken into account, the challenges and the recommendations provided are exclusively designed for users in the educational institutions in Iraq.

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