

PROMOTING SUCCESSFUL KNOWLEDGE MANAGEMENT PROCESSES INTEGRATED INTO INFORMATION TECHNOLOGY IN HIGHER EDUCATION UNIVERSITIES IN IRAQ

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ABSTRACT

Knowledge is an important asset in many fields, such as business, health sector and higher education. The incremental concern towards knowledge leads to the formulation of knowledge management (KM). Universities are knowledge-intensive organizations. Knowledge assets should be managed efficiently and effectively to promote the education level and overall performance of universities. Information technology plays vital task in sustaining knowledge management processes, such as acquisition, sharing, conversion and application of knowledge. This study explores the real situation of knowledge management processes. This study also examines related IT systems that could be deployed to support successful KM processes in Basra University, which is used as the case study for higher institutions in Iraq. Quantitative method in the form of a questionnaire survey was used to obtain data from 217 technical employees in Basra University. The findings show weaknesses in the KM processes in Basra University. Basra does not have clear KM processes for acquiring, converting, sharing and applying knowledge. Moreover, an IT system was not integrated with KM processes to create a knowledge management system. This study advocates top management in Basra University to adopt policies for the successful implementation of KM processes with an integrated IT system. This integration could help enhance daily activities in the university, such as teaching, research and administration.

Keywords: *Knowledge Management, Knowledge Management System, Knowledge Management Processes and Information Technology.*

1. INTRODUCTION

Knowledge is an important aspect in many fields, such as business, health sector and higher education. The deployment of knowledge in these fields led to the establishment of knowledge management (KM) and knowledge management systems (KMS) [1]. KM is considered the art of deploying knowledge asset by utilizing KM activities, such as creating, collecting, sharing and aggregating valuable knowledge in any organization to enhance organizational competency. KMS is defined as an information system that promotes effective and efficient KM activities [2]. The concept of knowledge should be examined to understand the purpose of KM roles. Knowledge is generally interpreted as a collection of valuable expertise, thoughts, concepts and insights that enhance existing knowledge and create more valuable knowledge [3]. Knowledge is classified into two basic types, namely, explicit and tacit knowledge. Explicit knowledge is defined as

knowledge that could be seen and touched, such as papers, articles, books, copyright and form of manual documents; by contrast, tacit knowledge is intangible in nature, embedded in the human mind and difficult to extract and transfer [4]. These two types of knowledge can be transferred inversely; transfer is implemented by deploying socialization, externalization, combination and internalization processes (SECI) [5]. The SECI model involves four processes of transferring knowledge:

1. Socialization: transferring tacit knowledge to another form of tacit knowledge
2. Externalization: transferring tacit knowledge to explicit knowledge
3. Combination: transferring explicit knowledge to another form of explicit knowledge
4. Internalization: transferring explicit knowledge to tacit knowledge

KM is an important method in any organization for alternately converting knowledge types. Organizations support and utilize KM activities to improve income and maintain competitive advantage.

Several existing studies investigated the taxonomy of KM processes. For instance, [6] identified KM activities as acquisition, identification, dissemination and application. Furthermore, [7] identified the basic processes of KM, which are acquiring current knowledge, generating new knowledge, aggregating generated knowledge and enhancing collected knowledge for reuse. However, the role of information systems should be highlighted to achieve successful KM processes. Information systems are formatted and designed in knowledge-intensive organizations to improve the momentum of KM activities. For instance, many industrial organizations such as Siemens, Dell and Hewlett Packard deploy information technology (IT) implantations like information systems to enable efficient utilization of KM activities. These organizations rely on the IT as a vital enabler of successful KM implantations. For instance, IT can be used to allocate experts through the experts map techniques or help access information or record knowledge base to retain employee expertise. However, the role of IT in enabling KM activities in higher learning institutions remains an issue. Empirical studies on how IT can enable successful KM activities in higher education institutions are neglected. [8] Studied the potential support that IT could provide to enhance the KM in higher education from a theoretical view. Hence, the main purpose of this study is to empirically examine the role of IT in enabling successful KM activities in Basra University as one of the higher education institutions in Iraq. This study investigates the real situation of KM activities and the IT systems that enable these activities in the Iraqi environment.

2. LITERATURE REVIEW

2.1 KM in Universities as Higher Education Institutions

Universities are recognized as organizations of knowledge creation. Most of the basic activities of universities involve knowledge implantations, such as creating knowledge when a lecturer delivers a lecture, transferring knowledge during the lecture and converting knowledge between the lecturer and students from tacit to explicit form or vice versa. Universities engage in natural KM activities that

are implemented spontaneously during daily activities. However, universities do not conduct standard KM activities that are implemented officially. Thus, these activities should be recognized to transform them into standard processes that can enhance the overall performance of universities [9].

Standard KM implantations can bring many advantages to the higher education sector; these advantages include reduced time in conducting research, reduced effort and cost in administrative processes and enhanced competitive advantage through the deployment of an e-learning system and a library system [10]. However, KM has limited implementation in higher education sector. KM processes should be identified and standardized as an organizational unit in universities. Main KM processes, such as knowledge creation, conversion, utilization and sharing can save knowledge assets from potential loss. Knowledge could be lost due to the lack of KMS that can systematically retain knowledge. Thus, universities should adopt KM activities as official processes to optimize the performance and reputation of universities.

2.2 KMS in Universities as Higher Education Institutions

IT is a robust enabler that can aid the efficient implementation of KM activities [11]. IT optimizes theoretical KM processes and activities with electronic architecture or KMS [2]. KMS enhances work flow in many sectors, such as industrial, healthcare, business and higher education sectors. KMS facilitates the generation, dissemination, and utilization of knowledge to create and sustain competency in organizations. Researchers argued that KMS can improve the acquisition, sharing and usage of information in universities; KMS can also provide a systematic method for reducing research costs and efforts and aid the university staff to become highly innovative and creative [12]. The most popular tools in KMS are categorized into business intelligence, knowledge base, collaboration, content and document management, portals, customer relationship management, data mining, workflow and search [13]. However, KMS is not applied formally in the higher education institutions in Iraq. IT tools are commonly used in daily university activities, such as intranets, network services, email and blogs, but these tools are not formally identified as KMS. KMS should be established officially in universities to obtain its benefits and

advantages. The practical application of KMS could facilitate the continuous creation of knowledge, improved decision making, enhanced learning and advanced strategy and planning [14]. KMS can bring great benefits to universities, such as cost reduction, time saving, and utilization of overall performance.

2.3 Main KM Processes

KM is a modern approach that supports the knowledge assets of organizations, thereby enabling them to keep pace with their competitors. To achieve this goal, organizations should manage knowledge assets throughout systematic processes [7]. Previous studies identified various processes and phases, such as acquisition, transfer, retrieval, dissemination and conversion of knowledge types. These processes can be deployed to maximize organizational performance and add value to the workplace [15]. According to Darroch (2003), acquisition is the first phase of KM processes. Acquisition represents the creation of new knowledge from existing ones. Knowledge generation requires a high level of endeavour and valuable expertise for creating and retaining new knowledge [16]. New knowledge should be converted into different knowledge trends and patterns to facilitate use in all organizational units and functions. This process is called conversion [17]. Converted knowledge must be accessible to all employees inside the organization to enhance their personal skills and expertise. This process is called knowledge sharing [18]. An organization will then apply this knowledge in practical operations throughout the knowledge application process [19]. The following sections explain each process separately.

a. Knowledge Acquisition

Knowledge acquisition is the most critical KM process. Knowledge acquisition can be described as the process of obtaining knowledge from different sources to provide organizations with core competencies and values [20]. Knowledge can be obtained through various methods and activities, such as learning by example, informal training inside organization, and searching and aggregating knowledge from external sources outside organizations. Knowledge is classified as external and internal. External knowledge source is important in maintaining benchmarking and collaboration capabilities for the organisation. Sources, such as suppliers, competitors, clients and

experts that are hired outside the organization represent the main external knowledge sources. Internal knowledge consists of operations and procedures that are used to aggregate knowledge that exist within the organization. A high level of collected knowledge in an organization can increase organizational competency [20].

b. Knowledge Conversion

Knowledge conversion represents the ability of an organization to make existing knowledge useful. Knowledge conversion is the process of conversion of knowledge types from tacit knowledge to explicit knowledge or vice versa [5]. Converting tacit knowledge into explicit knowledge is more difficult than the opposite because of the intangible nature of tacit knowledge. Four approaches can be used to convert knowledge types efficiently. These processes are categorised to socialisation (from tacit to tacit), wherein employees obtain knowledge from others through dialogue, face-to-face conversations and observations. Externalisation (from tacit to explicit) entails the transfer of knowledge into tangible documents and knowledge base through archiving and documenting the expertise and skills of employees. Combination (from explicit to explicit) is the process of aggregating different types of explicit knowledge, such as books or documents. Internalisation (from explicit to tacit) is the process of internalising explicit knowledge, such as manuals and documents, into tacit knowledge in the minds of employees; an example of this approach is the principle of “learning by doing” [5].

c. Knowledge Sharing

Knowledge sharing is a vital process in successful KM implementation. Knowledge sharing is composed of various sub-activities, such as exchange of knowledge skills, experience and understanding [21]. The main function of knowledge sharing is the distribution of knowledge among employees and stakeholders. The spread of knowledge can help employees access and use knowledge more easily. Distribution of knowledge will enable the generation of new knowledge and help organizations formulate solutions and develop expertise. However, knowledge sharing requires the readiness of employees to share their own knowledge. Therefore, promoting the knowledge sharing process requires a culture of sharing knowledge among employees [21]. Through this process, organizations can maximize business

productivity and increase revenue from the creation of new products and services and optimisation of organisational achievements and employee competence.

d. Knowledge Application

Knowledge application is described as the ability of an organization to create knowledge and apply it in actual situations. Knowledge application involves the process of converting knowledge into a workable asset [2]. IT infrastructures are the basic enabler of knowledge application by transforming manual routines and processes of knowledge to automatic functions. IT-based knowledge application can improve the process of capturing, updating and accessing knowledge. Three main methods are used to combine existing knowledge and create organizational capability:

1. Directives: specific set of rules, standards, procedures and instructions developed through conversion of specialists' tacit knowledge to explicit and integrated knowledge for efficient communication to non-specialists
2. Organizational routines: development of task performance and coordination patterns, interaction protocols and process specifications that allow individuals to apply and integrate their specialised knowledge without the need to communicate what they know to others
3. Self-contained task: teams of individuals with prerequisite knowledge and specialty are formed to facilitate for problem solving in situations, wherein task uncertainty and complexity prevent the specification of directives and organisational routines [2].

Therefore, the effective application of knowledge can help organizations reduce product cost and enhance work efficiency.

3. RESEARCH PURPOSE

This study aims to examine the current situation of KM processes alongside relevant IT system in Basra University. To achieve this objective, this study identifies the main KM processes that must be implemented successfully. This study also examines standard KMS that will promote efficient and systematic KM processes. However, many barriers can prevent successful KM implementations in Basra University. Thus, this

study investigates the actual condition of KM processes and KMS in the university environment.

4. DATA COLLECTION AND ANALYSIS

This study obtained data from the technical staff of Basra University in Iraq. The contact details of the respondents were obtained from the university. A total of 311 questionnaires were emailed to Basra technical staff. The respondents were given four weeks to answer the questionnaires. Follow up emails were sent in the second and third week to remind respondents to fill in the questionnaires. A total of 217 questionnaires were received and qualified as complete and usable. A seven-point Likert scale was used with the following items: 1 for "Strongly Disagree" (SD), 2 for "Disagree" (D), 3 for "Trend to Disagree" (TD), 4 for "Neutral" (N), 5 for "Trend to Agree" (TA), 6 for "Agree" (A) and 7 for "Strongly Agree" (SA). The distributed questionnaire is composed of 44 items categorized into five parts, namely, knowledge acquisition, knowledge conversion, knowledge sharing, and knowledge application/utilization and information technology. The Statistical Package for Social Sciences (SPSS) version 20.0 was used to analyze the collected data. Several analytical techniques, such as frequency, descriptive, and reliability analyses, were applied to achieve the research purpose.

5. FINDINGS

5.1 Validity and Reliability Analysis

Four KM experts were consulted to confirm the validity level of questionnaire items and scales. The experts' comments and adjustment were used to enhance the interconnections amongst the items and the overall cohesion of the questionnaire structure. The reliability of the measurements was examined by asking the technical employees to answer the questionnaire items. The Cronbach's alpha for the reliability study and for final data collection is 0.93, which is considered acceptable.

5.2 Descriptive Analysis

Descriptive analysis was conducted for the five parts of the questionnaire (knowledge acquisition, knowledge conversion, knowledge sharing, and knowledge application/utilization and information technology) for precise interpretation of the responses. The purpose of the descriptive information is to identify the level where the

respondents agree on the items of the statement. This approach was also used to understand the respondents' opinions regarding the implantation of KM processes along with IT and to provide recommendations based on the findings of the descriptive information.

5.2.1 Knowledge acquisition

The descriptive analysis showed that the majority of respondents tend to agree with the knowledge acquisition items. However, some respondents only agree with Items 1, 5 and 9. Thus, the overall mean value of Knowledge Acquisition is 5.40. Table 1 shows the mean values of the knowledge acquisition part and its items.

Table 1: Mean Values of Knowledge Acquisition.

No	Item	Mean	Interpretation
1	Our organization has processes for acquiring knowledge.	5.61	Agree
2	Our organization has processes for generating new knowledge from existing knowledge.	5.37	Trend to Agree
3	Our organization has processes for acquiring knowledge about our suppliers.	5.11	Trend to Agree
4	Our organization uses feedback from projects to improve subsequent projects.	5.36	Trend to Agree
5	Our organization generates new knowledge through collaboration with business partners.	5.63	Agree
6	Our organization has processes for acquiring knowledge about new products and services within our industry.	5.37	Trend to Agree
7	Our organization has processes for acquiring the knowledge about competitors within our industry.	5.31	Trend to Agree
8	Our organization has processes for benchmarking performance.	5.33	Trend to Agree
9	Our organization has teams devoted to identifying best practice.	5.82	Agree
10	We regularly carry out environmental scanning for the purpose of acquiring knowledge.	5.33	Trend to Agree
11	We encourage employees to document their experiences.	5.37	Trend to Agree
12	We routinely benchmark ourselves against our competitors.	5.29	Trend to Agree
	Overall mean score value of knowledge acquisition	5.40	Trend to Agree

The mean values of Items 1, 5 and 9 indicate that Basra University have processes to obtain

knowledge. Thus, Basra University can create new knowledge by obtaining external knowledge outside the university. The university can identify best practices via expertise teams. However, the majority of responses totally indicate that the respondents are unsure of the efficiency of knowledge-acquiring processes even if these processes exist. In addition, the majority of the respondents also are unsure of how the university use feedback from operating procedures and processes. The process of acquiring knowledge from external sources and competitors are also ambiguous for the respondents. Similarly, the respondents are unsure of the quality and efficiency of knowledge-acquiring processes even if the university encourages the retention of acquired knowledge. Finally, the mean values prove that Basra University have existing knowledge-acquiring processes. Nevertheless, the efficiency and productivity of these processes are unclear for the employees.

5.2.2 Knowledge conversion

Descriptive analysis showed that the majority of respondents trend to agree with the knowledge conversion items. However, some respondents only agree with Items 3 and 7. Thus, the overall mean value of knowledge conversion is 5.34. Table 1 shows the mean values of knowledge conversion and its items.

Table 2: Mean Values of Knowledge Conversion

No	Item	Mean	Interpretation
1	In our organization, knowledge of individual is recorded in a structured way, so that other members of the organization may be benefit from it.	5.21	Trend to Agree
2	In our organization, knowledge is represented in standard way.	5.30	Trend to Agree
3	In our organization, knowledge is catalogued for easy retrieval.	5.47	Agree
4	Our organization has process for integrating knowledge from different resources.	5.16	Trend to Agree
5	In our organization, knowledge is organized in a useful way.	5.27	Trend to Agree
6	Our organization has process for replacing outdated knowledge.	5.10	Trend to Agree
7	Our organization has process for filtering knowledge.	5.89	Agree
	Overall mean score value of knowledge conversion	5.34	Trend to Agree

The mean values of Items 3 and 7 indicate that Basra University have knowledge processes for

retrieving and filtering required knowledge. However, the majority of responses reveal that the respondents are unsure of how knowledge is recorded and its usefulness. Moreover, the respondents are unsure if the knowledge is stored randomly or through standard methods. In addition, the respondents are unsure of how knowledge is integrated from different resources and how it is replaced and updated. Finally, the overall mean value indicate that the respondents are unsure of most knowledge-conversion activities that support the operations of Basra University.

5.2.3 Knowledge sharing

Descriptive analysis demonstrates that all respondents trend to agree with the knowledge sharing items. The overall mean value of Knowledge sharing is 5.02. Table 3 shows the mean values of knowledge sharing and its items

Table 3: Mean Values of Knowledge Sharing

No	Item	Mean	Interpretation
1	Our organization has systems and venues for people to share their knowledge with others in the company.	5.05	Trend to Agree
2	Our employees regularly share knowledge with their superiors.	4.09	Trend to Agree
3	Our employees regularly share knowledge with their subordinates.	5.04	Trend to Agree
4	Our employees regularly share ideas with other employees even if they are based in different departments.	5.32	Trend to Agree
5	Our organization has processes for distributing knowledge throughout the organization.	5.25	Trend to Agree
6	Our organization has processes for exchanging knowledge between individuals.	5.24	Trend to Agree
7	Our organization makes knowledge accessible to those who need it.	5.17	Trend to Agree
8	Our organization promotes sharing of knowledge between work groups/teams.	5.01	Trend to Agree
	Overall mean score value of knowledge sharing	5.02	Trend to Agree

The mean values in Table 3 show that all respondents are totally unsure of the efficiency of knowledge-sharing process and its subroutines. Respondents believe that a clear system was not established to share their knowledge inside the organisation, no regular meeting to share their knowledge with superiors, no standard process for inter-employee knowledge exchange, no

mechanism to make knowledge easy to access and use and no practice for promoting knowledge sharing amongst employees. Finally, the mean values of responses reveal that Basra University severely lacks knowledge-sharing processes.

5.2.4 Knowledge application/utilisation

Descriptive analysis indicates that all respondents trend to agree with all the knowledge application items except Item 7, in which they agree with. Thus, the overall mean value of knowledge sharing is 5.05. Table 4 shows the mean values of knowledge application and its items.

Table 4: Mean Values of Knowledge Application/Utilization

No	Item	Mean	Interpretation
1	Our organization has process for applying knowledge learned from experiences.	5.01	Trend to Agree
2	Our organization has process for using knowledge to solve new problems.	4.08	Trend to Agree
3	Our organization matches sources of knowledge to problems and challenges.	5.04	Trend to Agree
4	In our organization, knowledge is used to improve efficiency.	5.09	Trend to Agree
5	Our organization effectively applies knowledge to deal with changing competitive conditions.	5.25	Trend to Agree
6	Our organization quickly applies knowledge to critical competitive needs.	5.14	Trend to Agree
7	We use our organization assets to solve problem quickly.	5.79	Agree
8	Our organization has process for using knowledge in the development of new products and services.	5.06	Trend to Agree
9	Our organization has process for converting knowledge into action plans.	5.07	Trend to Agree
	Overall mean score value of knowledge application/utilization.	5.05	Trend to Agree

Table 4 shows the mean values of responses, which suggests that the majority of respondents believe that Basra University can solve existing problems quickly. However, the respondents also believe that Basra University has no clear vision in terms of improving the efficiency and competitive advantage of knowledge application processes. The respondents also assume that Basra University has no efficient process to apply knowledge in solving existing problems. Finally, the overall mean values indicate Basra University's lack of service and

mechanism to develop, convert and improve required knowledge.

5.2.5 IT

Descriptive analysis indicates that all respondents trend to agree with all information technology items except in Item 6, in which they agree with. Thus, the overall mean value of information technology is 5.17. Table 5 shows the mean values of information technology and its items.

Table 4: Mean Values of Information Technology

No	Item	Mean	Interpretation
1	Our IT systems are modular.	5.23	Trend to Agree
2	Our IT systems use commonly agreed IT standards.	4.24	Trend to Agree
3	We have a high degree of integration amongst our IT applications.	5.30	Trend to Agree
4	Our IT system support conference meetings amongst employees	5.22	Trend to Agree
5	There are electronic Blogs to share the knowledge for employees.	5.21	Trend to Agree
6	The notifications of knowledge delivered using electronic contacts, such as emails and mobiles.	5.70	Agree
7	The knowledge delivered through employees accounts of university.	5.30	Trend to Agree
8	The employees trained to use knowledge management systems practically i.e. workshops.	5.20	Trend to Agree
	Overall mean score value of information technology	5.17	Trend to Agree

Table 5 shows the means value of all responses, which indicates that Basra University use information technology tools, such as emails and mobile applications, to deliver knowledge and notify employees of the delivery process. However, the respondents are unsure of all the issues concerning the implementation of information technology. These neglected issues are the following: Basra University uses modular information system; Basra University have conference meeting techniques; Basra University provides blogs for knowledge-sharing process; and Basra University have knowledge management system to support work activities. Overall, the respondents believe that no standard information technology system is used currently to support knowledge processes practically and university's main services and processes generally.

6. DISCUSSION

Based on the data analysis results of the items in Part 5(1,2,3,4,5,7and 8) in conjunction with the items in Part 1(2,3,4,6,7,8,10,11and 12), a slight interrelation was observed between information technology infrastructure and knowledge acquisition process. Basra University does not support knowledge acquisition process. The university has no robust information system for acquiring internal knowledge, seeking and aggregate external knowledge, bringing useful feedback for knowledge acquisition process and regenerating new knowledge from the existing knowledge to support work activities. Thus, the current information technology tools cannot be considered as standard IT system with comprehensive tools and techniques.

Based on the data analysis results from the items in Part 5 (1,2,3,4,5,7and 8) in conjunction with the items in Part 2(1,2,4,5and 6), information technology tools and knowledge conversion process are poorly implemented. Thus, no activated information system is established currently to support knowledge conversion process. Basra University has not implemented standard system to represent required knowledge in organized categories. The university also did not implement any modern mechanism to integrate new knowledge and update old knowledge. Thus, ambiguity is observed around how Basra University stores, integrates, enhances and retrieves knowledge via practical information systems.

Based on the data analysis of the results from the items in Part 5(1,2,3,4,5,6,7and 8) in conjunction with the items in Part 3(1,2,3,4,5,6,7and 8), a weak connection was observed between current information technology infrastructures and activation of knowledge-sharing process. Thus, the current information technology tools, such as emails and mobile applications, are barely able to provide simple support to the knowledge-sharing process in Basra University. Essentially, no standard system is used to support knowledge sharing amongst employees and between the employees and their superiors. In addition, employees notably lack knowledge-sharing culture. Thus, Basra University neglected the standard practices of promoting knowledge-sharing process by using advanced information technology tools and socialization by encourage their employees to share knowledge within the university.

Based on the data analysis results from the items in Part 5 in conjunction with items in Part 4(1, 2, 3, 4, 5, 6, 8 and 9), simple information technology infrastructures, such as emails and mobiles applications, are used currently in Basra University. However, IT does not clearly support the knowledge application process. Thus, the current information technology tools are unable to solve new problems, convert knowledge into practical actions and develop new products and services. Accordingly, Basra University suffers from the absence of standard information technology system that could support knowledge application and overall processes in the university

7. RECOMMENDATIONS

This study shows the existing situations of KM processes and supported IT systems. Data analysis shows that Basra University have limited KM processes, but a KM process was not implemented formally in the university. Furthermore, they use IT tools that are very primitive and simple. No advanced IT system has been applied clearly to support KM implementation. To solve these problems, Basra University should adopt certain policies to implement KM processes successfully. These policies include the following:

1. Identify formal KM processes that are aligned with Basra University's needs and requirements
2. Use standard IT system to implement the KMS
3. Use IT system that is compatible with Basra University's objectives and strategies
4. Increase the level of employee's awareness of KM processes and implementations
5. Maximise the interactivity amongst employees and KM processes and implementations

8. CONCLUSION

Universities should implement KM processes successfully to enhance their daily activities, such as teaching, research and administration. Basra University has weak KM processes. The university has no clear KM processes to acquire, convert, share and apply the knowledge. Furthermore, the university has no IT system integrated with KM processes to create KMS. These barriers must be

addressed to deliver the promised advantages of implementing KMS. This study provides various recommendations to implement successful KM system in Basra University. Basra University should focus on encouraging employees to implement KM processes, use clear and unified IT system to support KM and create a knowledge repository to store and classify acquired knowledge based on disciplines. They should also allow employees to access knowledge repositories to gain the required knowledge based on their disciplines. These recommendations must trigger practical actions toward successful KM implementations that could prompt the learning, research and innovation capacities of Basra University.

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