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A Proposed Management Response Framework for Competitive Advantage Based On Knowledge Growth

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Abstract The main aim of this paper is to propose management response framework to analyze the effects of knowledge growth on services and products competitive advantages. The proposed framework is developed based on literature review of knowledge growth and competitive advantage value chain. The proposed framework validated through brainstorming technique using questionnaire and practical example of knowledge in business organizations. The significant findings showed that knowledge growth benefits could be analyzed based on two stages which are effect of knowledge growth on businesses operations and the relation between business operations improvements and competitive advantages enhancing.

Keywords: *knowledge growth, businesses operations, competitive advantages, business organizations*

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1. Introduction

The growth of knowledge in the organizations is important to improve businesses operations such as decision making and problem solving in order to improve competitive advantages of services and products (i.e. fast delivery, quality, and costs). Knowledge grows through the gained and applied knowledge by knowledge workers while performing tasks associated with several work categories such as emails and meetings. The knowledge base, which is a table-like structure, stores data entered by knowledge workers via systems or tools such as user input interface. Some interfaces allow access of the stored knowledge to other knowledge workers, manifesting the KM's knowledge sharing process. However, information that could be generated from the knowledge base presents a significant resource to the organization and should be harnessed for potential knowledge and competitive advantage. The analysis of knowledge growth added benefits to competitive advantages is difficult due to many reasons such as intelligibility of knowledge resources.

In previous work we developed Knowledge Growth Elicitation and Measurement Tool (KGEMT) which captures work episodes of knowledge workers in organizations; organizing the knowledge into explicit and tacit knowledge, and enumerating such knowledge to produce a measure of knowledge growth within the duration of measurement.

It should be noted that KGEMT measures an organization's knowledge growth by virtue of its operational goals i.e., whether the applied knowledge is adequate and relevant to achieve the goals. Meanwhile, the general idea behind this tool is to capture knowledge of episodes that are performed by knowledge workers and measure explicit and tacit knowledge from there. We consider explicit and tacit knowledge as 'knowledge object' i.e. a tangible entity that is produced by virtue of the organization's products and/or services. By enumerating the number of knowledge objects, we can directly measure the knowledge growth, such as number of emails contents that are produced on by knowledge workers.

Moreover, KGEMT processes are in two main folds: Firstly, we attempted to formulate the growth of knowledge within organizations. Such a task was initially considered difficult or practically impossible due to the trouble in enumerating actual knowledge that is gained by knowledge workers. Our strategy in this area was the consideration of the two types of knowledge - explicit and tacit - but is further simplified for enumeration as knowledge objects. Secondly, we were analyzed the theory of organizational knowledge growth and subsequently, conceived a knowledge growth formula based on the enumeration of knowledge objects. While explicit knowledge is easily enumerated, we came up with a simple formula for enumeration of tacit knowledge based on the use of tacit knowledge in any episodes that associated with explicit knowledge. While knowledge objects are enumerated, we also considered redundancy and irrelevance of knowledge objects that are captured in the process of enumeration. Consequently, the knowledge growth formula also contains factors for removing such redundant knowledge.

The KGEMT measures knowledge growth based on elicitation of new knowledge from various sources such as emails, meetings, and discussions in daily work activities. The KGEMT has the features to support the contriving of competitive advantages for organizations.

However, the enhancements on competitive advantage using KGEMT is difficult to be analyzed due to intangibility of knowledge. Consequently, this study proposes a management strategy that exploits and utilizes the KGEMT features for the benefit of organizations. To implement this strategy, we propose a Management Response Framework (MRF) that analyzes the knowledge that has been elicited as new knowledge by knowledge workers to see if that knowledge could be useful and how could add a competitive advantage for organizations.

2. Related Works

This section provides many related works to clarify the knowledge growth importance, relation between knowledge growth and businesses operations, and relation between business operations and competitive advantages.

2.1. Knowledge Growth

The effectiveness of building knowledge within any organization depends on the firm's ability to monitor and absorb newly acquired knowledge from many sources and integrate this knowledge into the existing knowledge base [14,15]. Internal knowledge management systems can also be thought of as organizational memory. According to [10], the knowledge management system should be supported by reliable knowledge in order to ensure effective knowledge sharing in the context of a working environment. Therefore, organizations must understand the business needs of knowledge workers and formulate these needs as a knowledge base before developing a knowledge management system.

In this respect, Stein [32] mentioned that there are three main processes to support the formulation of an organizational knowledge base, which are: (i) acquisition of the knowledge from diverse resources, (ii) retention of the acquired knowledge for short and long terms, and (iii) modification of the retained knowledge continually to be compatible with changes in working context. Furthermore, [10], argued that knowledge acquisition supports innovation by producing new knowledge in the development of products and services of the organization. Intuitively, the added value from the new knowledge increases competitive advantage of the products over similar products provided by competitors. On the other hand, knowledge retention (or organizational memory process) could be deployed to reduce costs of some business processes as a consequence of reduced development or manufacturing time. Consequently, KGEMT was developed in order to measure the growth of knowledge in organizations based on eliciting knowledge from various work categories such as emails, meetings, and discussions. It should be recalled that the knowledge modification process of the KGEMT provides added advantage to update the stored knowledge based on the changes in business operations and contexts which would sustain the competitive advantages.

Moreover, Prahalad and Hamel [28] claimed that the building, growing, and updating processes of knowledge based on organization offer many features of competitive advantages such as the following:

- Save knowledge from loss by storing it as structured and accessible forms. When experts leave organizations, they take their knowledge and their informal knowledge network with them, which can be damaging to a firm's competitiveness.
- Increase the advantage of sharing knowledge between knowledge workers through transfer of explicit and tacit knowledge, i.e. experiences of explicit knowledge and vice versa.
- Allow organizations to update their knowledge through updating of knowledge base contents based on changes.

Consequently, the processes of knowledge acquisition, storage, and modification could be useful in contriving competitive advantages by formulating strategies to exploit the knowledge base.

2.2. Knowledge Growth and Business Operations

In business organizations, business operations are implemented by knowledge workers using their tacit and explicit knowledge. Wei [38] mentioned that the knowledge of solving a problem is actually a matter of personal interpretation, ability and skill. While the techniques of problem solving can be learned through various knowledge sources, the solution created by one knowledge worker for others can enable them to benefit from him/her. Knowledge workers may not have the tacit knowledge, i.e. skills and experiences to perform their tasks effectively [12]. Therefore, they look for other knowledge sources to solve problems related to their tasks. For example, they could ask their colleagues, attend training courses, access knowledge from Internet sources, (i.e. emails or multimedia applications), or try to solve the problem by self-trying (i.e., idea generation). But these approaches to knowledge acquisition require effort and time which delay the process of completing the tasks.

On the other hand, knowledge workers often need to make their decisions immediately. Thus, the business faces many operational challenges which minimize the competitive advantages of providing quality products and services [11]. The main challenge of decision-making is the difficulty of making accurate decisions quickly and making better decisions to improve the efficiency of business operations. The quality of decisions is affected directly by the quality of tacit knowledge applied by knowledge workers [16]. Knowledge workers who have advanced knowledge can make better and faster decisions and they can choose the best decision for any problems they face.

According to Lock [18], organizational learning is one of the most important factors in developing the tacit knowledge of knowledge workers to improve business operations. Knowledge workers often face difficulties to learn the needed knowledge in real time due to varieties of knowledge sources. Therefore, organizations are concerned about having and implementing organized methods that deliver knowledge to knowledge workers to support their daily activities. Training courses are good examples of organizational learning to satisfy the knowledge workers' need of knowledge. However, training courses have many drawbacks such as costs they are and time consuming and often only offer general solutions or knowledge rather than exact solutions for specific problems that knowledge workers face in their daily working activities [21].

In conclusion, there are many challenges that organizations face in the daily work activities of business operations, such as creative and adaptive problem solving, quick response to decision-making, and the methods of organizational learning to support knowledge workers in their working tasks.

2.3. Businesses Operations and Competitive Advantages

Over the last ten decades, the competition in the global market has become aggressive, where the product complexity is growing day by day and the progress in technology is rapidly advancing. All these factors force companies to be more capable in terms of their performance and ensure delivery of value [23]. The significance of knowledge resources as well the management is not recognized by companies and they tend to look for differentiators and drivers to improve performance in order to gain a competitive advantage [20,23,26,34].

With respect to the main strategic ideas gained through the resources based-view (RBV) as well as the knowledge based-view (KBV), companies and organizations now understand that their Competitive Advantage results that are derived through the possession of resources that are not easy to transfer, collect, and are tacit and inimitable in nature [30]. The significance of the knowledge resources and its exploitation and deployment had been realized by companies [6]. These aforementioned knowledge resources work as a driving force and a support to improve the performance of organizations.

It should be noted that there are plenty of empirical researches and case studies in the knowledge management research [6,9,19]. These researches and studies investigate and illustrate the interest of managers with respect to knowledge management in different organizations. However, despite the richness of a case record, it is not easy to find out the reason why companies can show improvement in their performances and progress through managing knowledge. Moreover, it is quite complicated to show the return on investments gained by knowledge management initiatives as it is difficult to explain and demonstrate the benefits associated with the knowledge resource development.

When an organization needs to make a difference within its structure and dynamics, it is essential that it understands the requirements of the knowledge resource development and the application of knowledge initiatives [1]. There is a need to clarify the knowledge process and knowledge resource roles in order to embed it within the dynamics of value creation [35]. Also, the direct and indirect relationship networks should be explored which connects the organization process, performance, strategic value, objectives and capabilities to the knowledge resources [35].

The strategic relevance of knowledge resources is different for each organization and this level of importance may also change as time progresses. Hence, it is considered an important issue for consideration specifically when the organization evolves and its business progresses [22]. Several organizations consider knowledge resources to be of critical source of value but there are some who believe that it is merely a commodity. The strategic assets of the organization are of high relevance as they play the main role of the business and performance objectives achievement which is why the management must focus upon those knowledge resources which are related to strategic assets [27]. The knowledge resources have a strategic relevance with the organization and this has to be understood in order to present knowledge management strategies which are focuses and link the achievements, execution and planning of strategy to the knowledge resources.

For the creation of valuable output and achievement of Competitive Advantage, the specific and distinctive competencies and resources of the firm are bundled and revitalized. The product and service quality improvement could be enhanced through Competitive Advantage along with the cost and production reduction, the service and product speedy delivery and be able to provide accuracy in the production and services [31]. The knowledge workers' tacit knowledge is the main aspect behind the improvement of the service and product quality or the level of innovation [2]. The knowledge workers (KW) should perform and complete their tasks in an accurate manner within the appropriate time using the knowledge they possess [13]. In improving business operations, the main challenge faced by organization is to apply the relevant and essential knowledge [13,24].

For decision-making and problem-solving, useful knowledge must be attained by the workers [33]. The required knowledge must be acquired and shared in order to support the operations of the business and for this purpose organizational learning (OL) is essential to reduce the level of effort and time [25]. Through OL, it is possible to use diverse sources and acquire knowledge, use the central knowledgebase to store knowledge, share knowledge amongst all KW as well as allow changes to the stored knowledge by the KW using their prior experiences. The knowledge acquisition and KW time could be saved through OL which is dependent upon the central knowledgebase [10]. The KW has the abilities to attain specific knowledge from the different sources over the Internet like the discussions, meetings and emails. He/She spends much time and effort in order to achieve accurate decisions within the appropriate time period. Creative thinking activities could be attained when KW extracts the relevant and useful knowledge from the KB in order to carry out the problem-solving and other work tasks. The idea is to improve the product and quality of services by fixing the issues [36,37]. It is now possible to reduce the costs related to mistakes at work and the organization is able to increase its profits by resolving these mistakes. Collaboration and continuous knowledge learning would also take place if new knowledge is shared with the rest of the employees of the organization. The knowledge present in the knowledgebase must be used in such a manner that the employees are able to make informed decisions in their problem-solving and decision-making activities which in return reduce the costs and time for the organization at large [22].

3. Management Analysis Technique

KGEMT measure the knowledge growth depend on the knowledge objects rather than set of knowledge i.e. repository. However, this requires useful and suitable

measurement technique to analyse the knowledge growth based KGEMT vision. The main question here is what are the most suitable and useful techniques to analyse the benefits knowledge growth based on knowledge objects?

For the purpose of management analysis of KGEMT, brainstorming is considered is the most useful analysis technique. The brainstorming technique is an unstructured, consensus-based approach to generating ideas about a problem. The 'problem' in this case is the identified knowledge object from the KGEMT that is worth pursuing and could be analysed further to manifest a potential competitive advantage. The technique is suitable for multiple experts and all possible solutions from the experts are considered equally. The emphasis of the session is getting high frequency of responses from the experts during the session on issues relating to the subject matter [3]:

At the end of a brainstorming technique, a considerable list of ideas is produced. From this list, the facilitator needs to separate the 'good' ideas from the 'bad' ones and create a manageable list of feasible ideas that are worthy of further investigation, as follows [8]:

(i) Clarify idea: Make sure everyone understands what each idea means.

(ii) Categorize ideas: Combine related ideas by rewriting the list or rearranging using post-it notes.

(iii) Rank ideas: Rank the ideas to focus the group's efforts to find workable solutions to the issue at hand. Sometimes it is obvious to prioritize the ideas and this step can be done on the fly. In other cases, the complexity and scope of the issue is such that additional tools may be required to complete this phase. Two tools that are often used are the Nominal Group Technique [3,17] which is a group process involving problem identification, solution generation, and decision making, and the Prioritization Matrix [29] which is A prioritization matrix is a simple tool that provides a way to sort a diverse set of items into an order of importance. It also identifies their relative importance by deriving a numerical value for the priority of each item.

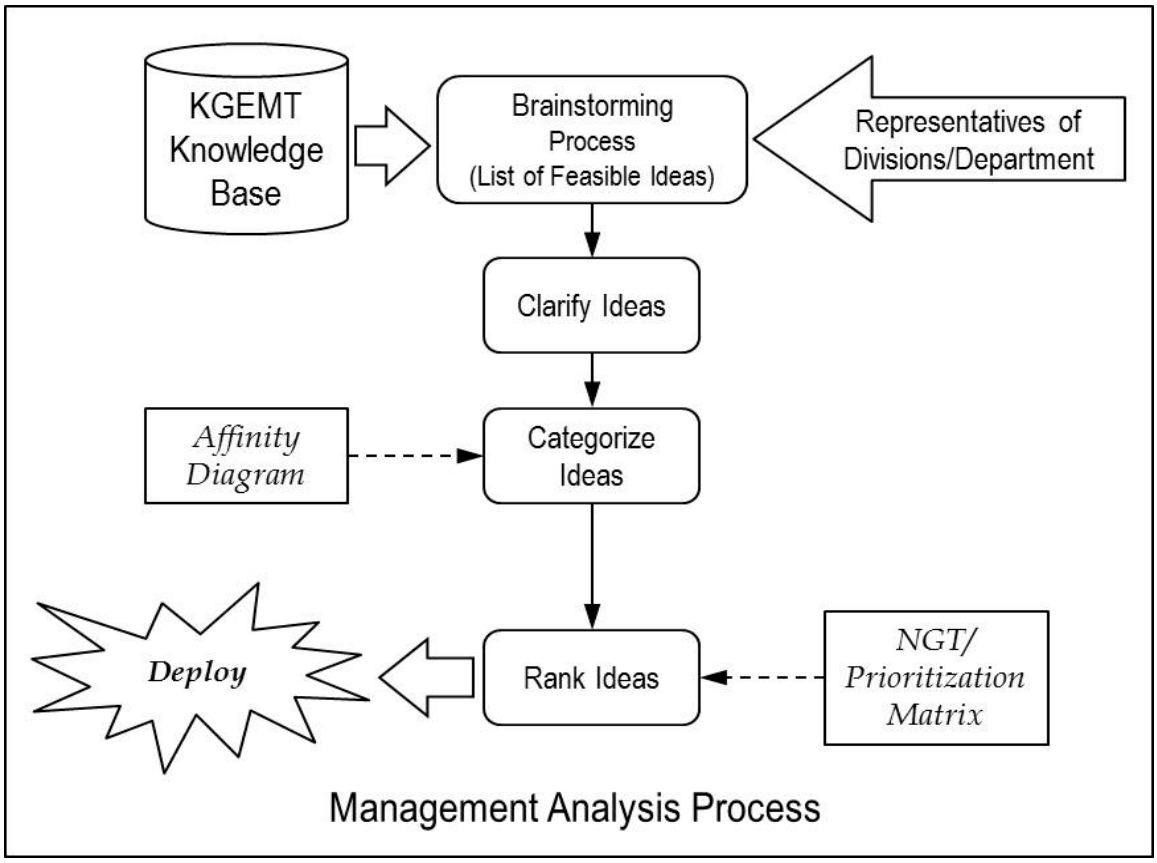

Figure 1. Management Analysis Process of the KGEMT Knowledge Base

The brainstorming technique is conducted through two main methods which are; (1) questionnaire with 28 knowledge workers (employees are used KGEMT in Jun, July and Aug) from four organizations in Saudi Arabia (King Fahd Medical City, Ministry of Commerce and Industry, Zain Company, and Swisslog Company (SC), and (2) practical example that provided by expert knowledge workers (Zain Company). Most of the respondents with more than four years' experiences and they are qualified to answer the questions and they are from deferent management levels (low, middle, high level).

4. Framework Development

We propose the development of a management response framework to exploit the corpus of knowledge stored in the KGEMT's knowledge base. To develop the framework, we identify several operational factors (components) that contribute to enhance organizational competitive advantages. We choose the components of the framework intuitively, and from our experiences most organizations look at those factors, such as cost savings,

time savings, improved business processes and faster product delivery and other potential features of a framework that provides business advantages for organizations.

KGEMT contains potential solutions to problems knowledge workers face that could provide many advantages of business operations such as the following:

- Improve organizational learning: The knowledge base contents reflect knowledge workers learning of knowledge from diverse sources in daily work activities. The knowledge base could save the knowledge workers time in searching for specific knowledge. It provides potential solutions collected from the knowledge workers based on their work activities so that other knowledge workers can find potential solutions directly from the knowledge base. Consequently, there is an opportunity to learn new knowledge from the knowledge base and it is more structured than learning from unstructured resources. The fast pace of organizational learning has the potential to speed up the delivery of products and improve the quality of services which increase the competitive advantage of organizations.
- Reduced training: Training is one important aspect of knowledge growth that is adapted by organizations to develop the tacit knowledge of knowledge workers. Formal training could be expensive and if not carefully monitored or irrelevant to the needs of the organization, trainees could fail to achieve the expected performance from training programs. With the KGEMT, organizations have the resources that could reduce the training costs by providing the needed knowledge and solutions from the knowledge base.
- Enhanced decision-making: Knowledge workers' decision-making could be enhanced based on knowledge that is gathered from other knowledge workers' experiences. Enhanced decision-making has a profound effect on many aspects of business operations. Depending on the type of knowledge that is shared in the KGEMT, improvements on task completion times and costs related to products and services could be achieved.
- Problem solving: When knowledge workers find potential solutions in the knowledge base to solve problems, they could be able to improve the problem resolution by finding new ways to fix the problems via cross-fertilization of knowledge. On the other hand, these solutions could be useful in producing creative and innovative solutions to improve the quality of products and services.

It is considered that the key elements that would manifest competitive advantages if a knowledge object derived from the KGEMT's knowledge base could improve the effect of these elements. While having the KGEMT itself is an advantage, a more systematic approach to manifesting competitive advantage is necessary to realize the full benefits of the KGEMT. The following scenarios of potential manifestation of competitive advantages in business operations are considered:

(i) Scenario 1 - Cost savings: Cost saving or cost reduction is the process used by organizations to reduce their costs and increase profits. Depending on an organization's products and/or services, the strategies can vary. Every decision in the product development process affects cost. Organizations typically launch a new product without focusing too much on the cost. Cost becomes more important when competition increases and price becomes a differentiator in the market. The KGEMT addresses this issue by providing a platform for implementing cost saving initiatives if such knowledge is elicited.

(ii) Scenario 2 - Time savings: The time saving philosophy is simple. The storage of unused knowledge inventory is a waste of resources. Time saving could be achieved via the Knowledge Growth Elicitation and Measurement Tool (KGEMT) when readily available knowledge is accessible 24/7. The organization should have an array of methods to manage the time of accessing the knowledge as a consequence of changes. Using the KGEMT, this time-saving philosophy defines communication in a competitive perspective using knowledge in a timely manner as and when it is needed.

(iii) Scenario 3 - Faster delivery of products and services: Delivery is the process of transporting goods from a source location to a predefined destination. There are different delivery types. The general process of delivering goods is known as distribution. The study of effective processes for delivery and distribution of goods and personnel is called logistics. Firms that specialize in delivering commercial goods from point of production or storage to point of sale are generally known as distributors, while those that specialize in the delivery of goods to the consumer are known as delivery services.

Most consumer goods are delivered from a point of production through one or more points of storage to a point of sale, where the consumer buys the goods and is responsible for transportation to the point of consumption. However, there are many variations on this model for specific types of goods and modes of sale. Depending on the products and services, the KGEMT can help to identify issues relating to product and service delivery via sharing of knowledge and the growth of such knowledge.

(iv) Scenario 4 - Improve quality of products and services: Improvement of products or services can fundamentally be defined through product innovation, which is the creation and subsequent introduction of a product or service that is either new or improved. This is actually the development of new products, changes in design of established products, or use of new materials or components in the manufacture of established products. Thus product innovation can be divided into two categories of innovation: radical innovation which aims at developing new products, and incremental innovation which aims at improving existing products.

The preceding discussions lead to the synthesis of Figure 1, a layout of the proposed framework, which is called the Management Response Framework (MRF). The framework's ultimate target is to manifest competitive advantages for any organization. Organizations could adopt this proposed framework for the systematic improvement of knowledge-related business operations derived from management analysis, such as enhanced decision-making and organizational learning, and for processes employed in problem solving and reduced training. The management response framework has been synthesized to explicitly, deliberately and purposely look at the knowledge that is elicited and stored in the KGEMT knowledge base and to analyze that knowledge for organizational competitive advantage.

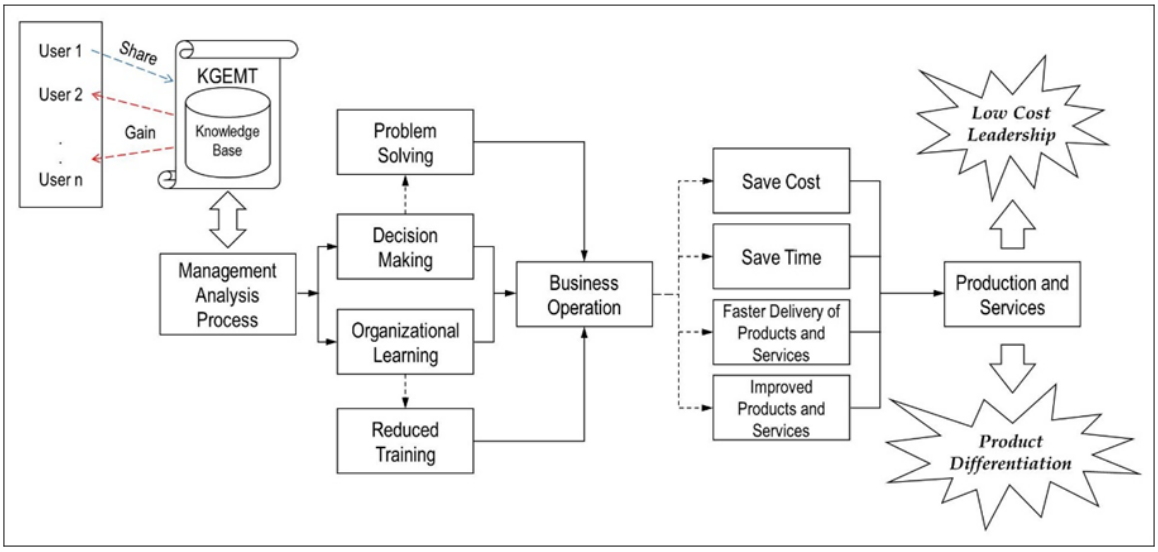

Figure 2. The Management Response Framework

Referring to the above figure, there are two basic outcomes observed: (i) those that could affect better decision-making, and the benefit of which is better problem solving, and (ii) those that affect organizational learning and the benefit of which reduces the workers' training needs.

All those benefits (decision-making, problem solving, organizational learning, and reduced training) are directed to improve the business operation in terms of cost savings, time savings, faster delivery of products and services and improved products and services.

5. Framework Validation

The main aim of the framework validation is to verify that the framework could be utilized for its intended purpose, i.e., to manifest the competitive advantages arising from analyzing the knowledge stored in the KGEMT. As mentioned in Section 6.3, the proposed framework supports the business operations using KGEMT in order to generate competitive advantages in products and services, reduce production costs, reduce production time, give faster delivery of products and services and improve the quality of products and services

Two validation processes are offered to verify the proposed framework: (i) validation based on statistical analysis of the questionnaire survey results, and (ii) validation based on practical analysis of the KGEMT's knowledge.

5.1. Validation based on Statistical Analysis of Questionnaire Survey Results

According to Bryman [5], descriptive analysis of quantitative data using a questionnaire is considered an efficient approach to validate the implementations of theoretical models and frameworks. Therefore, the questionnaire survey technique is used to collect quantitative data in order to analyze the validity of the proposed management response framework. The questionnaire items are designed to analyze the expected benefits of the framework to support various businesses operations: decision-making, problem solving, organizational learning and reduced training. All those benefits are provided as a direction to improve the business operation in terms of saving cost, saving time, faster delivery of products and services and improved products and services

31 responses were collected from employees in various organizations; there were 28 responses considered as valid responses for the purpose of data analysis; there were three rejected responses due to incomplete answers. Therefore, the valid responses represent 90% of all collected responses. Based on the collected data, two types of statistical analysis are made using SPSS: (i) reliability analysis to ensure the consistency of the collected data, and (ii) descriptive analysis to analyze the knowledge workers' opinions of the proposed management response framework.

According to Cortina [7], questionnaire reliability is an important indicator of the responses' consistency with the questionnaire items. The Cronbach alpha is an efficient statistical test to measure the reliability of the questionnaire responses. The acceptable coefficient of Cronbach alpha should be more than 0.7 [7]. Table 1 shows that the Cronbach alpha is 0.78 based on 28 responses of 16 scaled items. Therefore, the collected responses of the questionnaire are considered as reliable responses for the validation purpose of the proposed management response framework.

Table 1. Questionnaire Reliability

Questionnaire Items	Number of Responses	Cronbach alpha
16	28	0.78

Table 2 shows the descriptive analysis of the items that are designed to validate the proposed management response framework for competitive advantage. Data is collected based on a 5-Likert scale; 1 for Strongly Disagree (SD), 2 for Disagree (D), 3 for Neutral (N), 4 for Agree (A), and 5 for Strongly Agree (SA).

Table 2. Descriptive Analysis of management response framework validation

Item No.	Item	SD	D	N	A	SA	Mean
1	Management analysis of the KGEMT's stored knowledge is crucial in attaining competitive advantage for the organization.	0	0	0	9	19	4.68
2	Make better decisions.	0	0	0	6	22	4.79
3	Improve organizational learning.	0	0	0	3	25	4.89
4	Better decision-making translates into better problem solving	0	0	0	10	18	4.64
5	An important and crucial outcome of improved organizational learning is the reduction in staff (re)training	0	0	2	5	21	4.68
6	Knowledge that has been captured in the KGEMT should be leveraged to improve the organization's business operations.	0	0	1	12	15	4.50
7	Knowledge that has been captured in the KGEMT should be utilized to discover opportunities for cost savings in the organizations business operation.	0	0	0	12	16	4.57
8	Reduced training.	0	1	1	5	21	4.64
9	Reduced and rapid response to breakdowns.	0	1	5	4	18	4.39
10	Shorter processing/manufacturing time and/or steps.	0	1	3	14	10	4.18
11	Innovations in business operations (technology, process)	0	0	5	11	12	4.25
12	Knowledge that has been captured in the KGEMT should be exploited to improve business processes by reducing processing time and steps.	0	0	4	14	10	4.21
13	Knowledge that has been captured in the KGEMT should also be exploited to strategize faster product delivery.	0	0	3	17	8	4.18
14	Knowledge that has been captured in the KGEMT should be utilized to improve the quality of products and/or services.	0	0	6	15	7	4.04
15	The framework should contribute positively to the organizations income.	0	0	4	17	7	4.11
16	Generally, the framework works well in analyzing the KGEMT's knowledge base for the organization's competitive advantage	0	0	0	10	18	4.64

According to item 1, a majority of the respondents strongly agree that the management analysis of the KGEMT's stored knowledge is crucial in attaining competitive advantage for the organization due to many reasons. The respondents strongly agree that the competitive advantage could be achieved by management analysis of the KGEMT's stored knowledge through making better decisions (item #2), and improving the organizational learning (item #3). Knowledge sharing depends on organized knowledge that is collected and validated based on working contexts.

The KGEMT organizes the knowledge that is collected from various sources, i.e. emails, meetings and discussions based on employees' working activities. Thus, the KGEMT is considered as an important source for learning to satisfy the knowledge workers' needs for knowledge. The KGEMT reduces the knowledge workers' time and efforts to learn new knowledge which could improve decision-making in real-time rather than expend efforts and time to collect the needed knowledge from unstructured sources. This matches directly with the agreement of respondents on item 10 (Shorter processing/manufacturing time and/or steps) and item 12 (Knowledge that has been captured in the KGEMT should be exploited to improve business processes by reducing processing time and steps). The experience gathered through using the KGEMT develops knowledge workers' knowledge from other knowledge workers' experiences. Thus, in the future, the knowledge worker will be able to adopt their own decisions to solve the problem they face at work. This matches directly with the respondents' agreement on item 11 (Innovations in business operations (technology, process).

Item 4 shows that the respondents strongly agree that Better decision-making translates into better problem solving. Problems face by knowledge workers in their tasks need to be solved in real-time. Consequently, the KGEMT is important in providing the structured knowledge to support the knowledge workers; decisions in problem solving. This matches directly with the agreement of respondents on item 9 (Reduced and rapid response to breakdowns), item 10 (Shorter processing/manufacturing time and/or steps), and item 12 (Knowledge that has been captured in the KGEMT should be exploited to improve business processes by reducing processing time and steps).

The respondents strongly agree with item 5 (An important and crucial outcome of improved organizational learning is the reduction in staff (re)training). Training is considered as an important approach to organizational learning. Organizations focus on developing their knowledge workers; knowledge through training. However, training is expensive; using KGEMT could reduce the costs of training hence reducing the costs of products and services. The savings in costs could be redirected to improve the quality of products and services. The products and services quality improvement manifests a competitive advantage for the organization. This matches directly with the respondents' strong agreement of item 7 (Knowledge that has been captured in the KGEMT should be utilized to discover opportunities for cost savings in the organizations business operation), and item 8 (Reduced training).

Item 6 clarifies the strong agreement of respondents that the knowledge that has been captured in the KGEMT should be leveraged to improve the organization's business operations, organizational learning, decision-making, problem solving, and reduced training. The respondents agree that expected business operations improvements include faster product delivery (item 13), improve the quality of products and/or services (item 14), and contribute positively to the organization's income (item 15). The respondents strongly agree that the proposed management response framework works well in analyzing the KGEMT's knowledge base for the organization's competitive advantage (item 16).

5.2. Validation Based on a Practical Example

In the previous section, the validation of the proposed management response framework using statistical analysis is discussed. This section discusses the framework validation based on a practical implementation example.

KGEMT was tested by knowledge workers in various organizations for three months (June, July, and August 2013). The knowledge workers used the KGEMT functions to add new knowledge based on the organizations working context. The new knowledge stored in the knowledge base was elicited from knowledge workers. Therefore, the stored knowledge can be used to support the organizational learning and decision making of knowledge workers. In order to analyze the practical benefits of the proposed management response framework, random new knowledge was selected from the KGEMT storage. The selected knowledge was elicited from an expert in the Zain Telecommunication Company; the expert's position is a Software Engineering team leader with 12 years of experience. The expected benefits are analyzed based on the competitive value chain of the proposed knowledge management response framework. Table 3 illustrates the selected new knowledge properties.

Table 3. Selected New Knowledge Example

Category	Multimedia/System
Title	Document management system improvement
Description	Enhance the performance of documents management.
Knowledge using	Document Archiving
Knowledge gained	1. Improve the document archiving functionality 2. Avoid system replacement resulting in saving of money Satisfy end user for document management system.
Knowledge Body (Management Analysis)	1. The expert with set end users to check their problem. 2. The expert also collects the requirement from end users. 3. The expert set with vendor for current system to check problems and requirements.

Based on the selected example, a procedure was developed to validate the knowledge management response framework as follows:

(a) Extract the contact details of the knowledge worker that added the selected new knowledge.
(b) Arrange an interview appointment with him through Skype for the purpose of framework validation.
(c) Explain the details and components of the framework to him in order to collect accurate responses.
(d) Ask questions and collect answers from him to analyze the benefits of the new knowledge that is added to KGEMT based on the framework flow.
(e) Practically analyze the collected data to clarify how the KGEMT generates competitive advantages for the organization through the knowledge management value chain.

The new knowledge that is added by the knowledge worker is a problem solving knowledge of the difficulties that are faced by the organization in document management and archiving system. The main aim of the new knowledge is to enhance the performance of documents management system through many procedures such as improve the document archiving functionality, avoid system replacement resulting in saving of money, and satisfy end user for document management system. The enhancement processes focuses on three main elements which are; (1) the expert with set end users to check their problem, (2) the expert also collects the requirement from end users, and (3) the expert set with vendor for current system to check problems and requirements. The organization decides to implement a new document management system to avoid various challenges such as data redundancy, limitations of archiving functions, and the delay of retrieving the needed data. Based on the decision made by the management to replace the current system with a new one; the new system costs the organization around 3 million USD. A piece of new knowledge from the knowledge worker using the KGEMT informs the management that they can improve (upgrade) the current system's functions without buying a new document management and archiving system. The cost of the current system improvement is 15 thousand USD only. In other words, the organization can save about 2.985 million USD using the new knowledge that is contributed by the knowledge worker.

Complete system replacement takes seven months for implementation and data conversion. However, solving the problem and implementing new requirements for the current system takes just one month. Therefore, the organization can save time by adopting the new knowledge provided by the KGEMT. The implementation of the new knowledge shared in the KGEMT could be useful to speed up products and services' delivery, solving problems and implementing requirements that help end users to deliver the documents in the shortest time. The products and services' quality could also be improved, saving time for end users in daily operational work and improving the reporting and commissioning team performance in scanning documents.

All of the above benefits would increase the organization's competitive advantage due to the value added to the business operations using the new knowledge

shared via the KGEMT. There are three business operations improvements based on the new knowledge; (i) the leaders update their decisions in real time for more accuracy, (ii) the management decides to create a department of application to gain expertise on a business sector to close the gap between business and IT for any system, i.e. organizational learning, and (iii) the application department trains end users and is ready to answer any system inquires, i.e. reduced training. Figure 2 illustrates the findings of the proposed knowledge management response framework validation based on the given practical example.

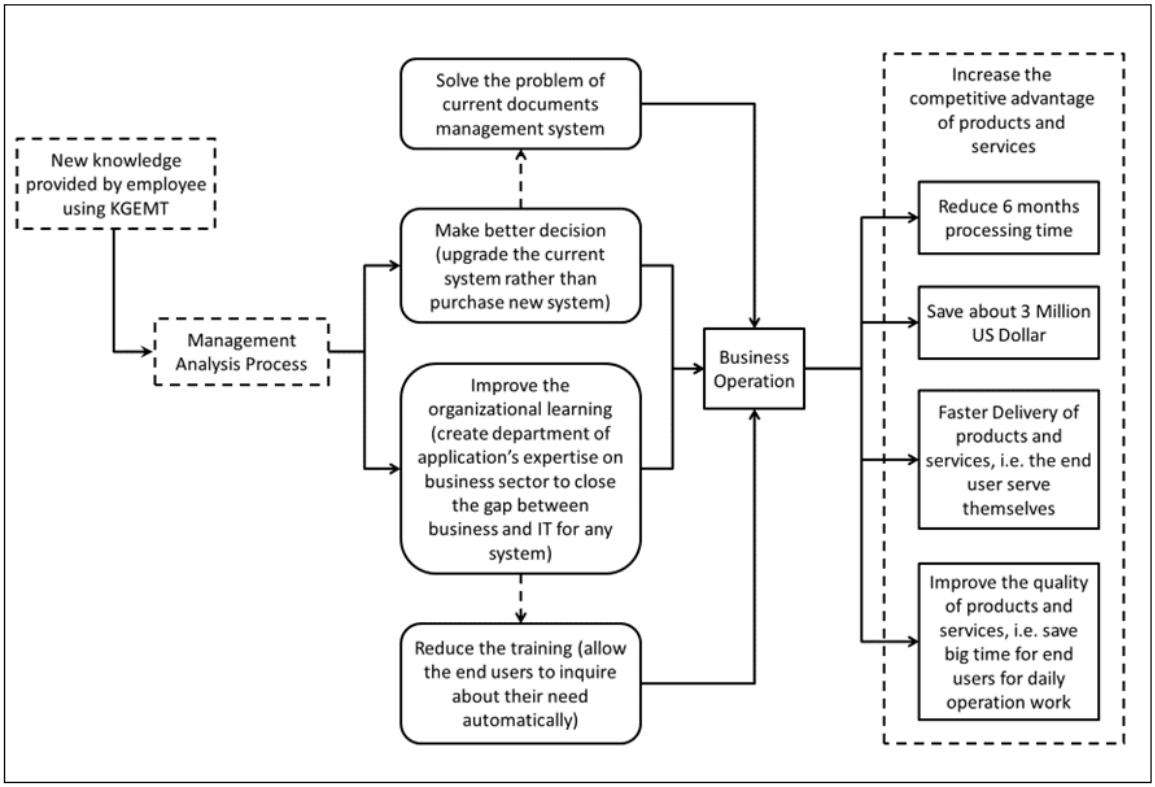

Figure 3. framework validation based on practical example

6. Conclusion

This paper discusses the development and validation of the knowledge management response framework in order to verify the role of the KGEMT in business operations; improvements in an organization and the benefits that could be gained from these improvements, especially in generating competitive advantage for the organization

The knowledge that has been captured in the KGEMT should be leveraged to improve the organization's business operations; organizational learning, decision making, problem solving, and reduced training. The business operations improvements would lead to savings in time and costs of products and services, faster product and services delivery, and improve the quality of products and services. Thus, such benefits generate competitive advantages for the organization.

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