Empirical Investigation for Diagnosis of Knowledge Gaps: A Case Study in Industrial Companies

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Abstract

The term knowledge management (KM) is difficult to define. This is because its domain as identified in research and practice has roots in many fields. This has led to the use of different methodologies and strategies that are based on the type of evaluation required in the work. Therefore, the study argues that this problem is leading to important gaps in understanding and identifying the conditions and the needs required for KM systems (KMS), as well as the methods divergent and inadequate in KM implementation. Six kinds of gap within the firms of the study topic are explained. Meanwhile, the study has used grounded theory to classification of the information in field interviews with senior managers and employees of four companies for diagnoses of the particular gaps in KMS, with a supported intensified analysis of the literature. In view of that, this paper has explored the role of KM in the industrial firms' and the limitation of obstacles to avoid the gaps. Furthermore, this study has suggested a businesslike framework and creative method, explaining comprehensively how KM must adjust for aligning employees' ideas with the firm's larger goals effectively and strategically, which will reduce the lack of harmonization between the polarization and implementation of KMS to those firms.

Keywords: Knowledge gaps, Industrial companies, Empirical investigation

1. Introduction

Every year we get a chance to be acquainted with the companies' knowledge. We believe most in exemplifying the ideals of true knowledge management. This is the required adoption of practical insights and experiences, including the insights and experiences comprised in knowledge that were embodied in employees or embedded in organizational processes or practice through learning and innovation developed. In other words, KMSs have appeared in various formats in different industries. Indeed, there is no single model for knowledge management system. There is no single role of IT in knowledge management just as there is no single technology comprising KMSs[1].

Consequently, some of authors have seeing that there is some of the common applications of KMS are: (1) organising and sharing/transferring internal benchmarks/best practices; (2) constructing corporate knowledge directories, such as corporate yellow pages and a 'people information' archive; and (3) creating knowledge networks and knowledge maps. Accordingly, the proposed research will diagnoses KMS gaps in the firms processes is practically, and aspect of the application of KM to reduce these gaps.

2. Knowledge Sharing and Organizational Learning

According to Ackerman the three phases or 'moments' can be discerned during the institutionalisation of knowledge: externalising, objectifying and internalising. Externalising knowledge refers to the process through which personal knowledge is exchanged with others. Objectifying knowledge describes the process through which knowledge becomes an objective reality [2]. During internalising knowledge, this objectified knowledge is used by individuals in the course of their socialisation. In relation to organisational learning processes, knowledge-sharing can be analysed as consisting of these three knowledge-sharing activities [3].

Also, this includes the externalising individual knowledge so that knowledge becomes communicated. Furthermore, it implies the objectifying this knowledge into organisational knowledge, thus, knowledge becomes taken for granted and internalising organisational knowledge by members of the organisation [3].

In view of that, KM focuses on the creation of new knowledge or knowledge development. The various processes that make up innovation and institutionalisation, or knowledge creation and recreation can be made visual by the use of a knowledge-sharing cycle. Fig.1 explains a simplification of knowledge-sharing in organisations and is meant to help analyse the KM sharing [4].
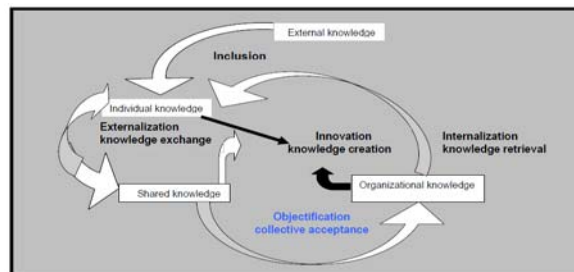
Fig.1: Internal organizational learning and knowledge sharing (Source: [3].

By and large, Organisational knowledge introduces a framework that identifies major classes of organisational knowledge resources and outlines knowledge attributing dimensions that cut across these classes. The knowledge systems of an organisation's DSSs belong to one of these classes, but there are many other essential knowledge resources that are not technologically based. All these resource classes are ingredients for an organisation's processors, human and computer. They are used in the course of KM episodes such as decision-making and problem-solving, culminating in the satisfaction of knowledge needs. As one factor affecting the performance and outcomes of these episodes, an organisation's portfolio of knowledge resources is seen as affecting its competitiveness [5].

3. Knowledge Acquisition

Knowledge acquisition of a range of techniques is used to obtain a scope in knowledge and for the purpose of explanation and configuration of the data for constructing an expert system. This work is aimed to reduce the communication gap between the expert or knowledge worker and the knowledge engineer in the companies. This is because in finding knowledge, in order to come of it the sources must be independent. Therefore, the customary incentives for knowledge acquisition require underlining the development of any expert system. In other words, knowledge acquisition covers all forms of knowledge and any method by which they may be obtained. That means it is complemented by other aims in software engineering, the precise capturing of users' requirements, KM-collecting, and sharing of the information of knowledge workers in the firms [6].

Also, knowledge acquisition has defined as transfer and transformation of potential problem-solving expertise from some knowledge source to a program [7].

Accordingly, Chandrasekaran has seen that one of the more clear-cut relations between knowledge acquisition and learning is that learning is one of the resources of knowledge acquisition [8]. This is because learning is coming from training when employees are given time for a sufficient training before representing new knowledge within organizations [9].

Generally, new knowledge acquisition is indispensable in the development and improvement of new skills in work. That is because ease of understanding and effectiveness in learning by employees are significant considerations for organizations in corporate knowledge acquisition [10].

Furthermore, for many organizations, at present innovation is a required and fundamental element of the firms' sustainability in marketplaces. This is because it considers significant and complex dimensions of learning in work due to using a mix of rationale, the spontaneous processes affecting practising communities [11].

However, knowledge acquisition and creation are considered internally in the companies as the first steps in acquiring knowledge from the external environment, to turn it into effective action that can be applied or used within organizations. Consequently the companies must work hard and quickly in disseminating knowledge practically in the all of its districts to create innovation among employees [12].

Ultimately, it is believed that the organizational learning process during knowledge acquisition is considering as 'grafting', for the purpose is to acquire complex patterns of information or knowledge. This is because knowledge-grafting through imitation is faster from knowledge acquisition with experience, and therefore the firms are lunged towards a grafting of the new capabilities at the organizations' current knowledge base in order to develop the processes of the manufacturing [13].

4. The Knowledge Gap

Almost all the aforementioned studies focused on description and identification of knowledge from the point of view of the formation of knowledge and its related problems. Negative influences from people, procedures and competitors may occur in the processes of socialisation, externalisation, combination and internalisation (SECI) of knowledge and are difficult to diagnose. Hence, an enterprise must make great efforts to deal with such problems in order to facilitate the implementation of its KMS [14].

One of these problems is a knowledge gap in the firms that have a go. KM takes an organisational perspective on learning, and the main problem it tries to address is the lack of sharing of knowledge among members of the organisation. Its solutions try to enable and encourage the individuals to make explicit their knowledge by creating knowledge assets or engaging in discussion forums [15].This is because KM can 'learn' that the context of individual matters and delivery of information pieces does not help if the individual matter is ignored in the current state of knowledge, the new pieces of knowledge should be integrated as the most efficient form of learning, which will probably include more than just a document.

In view of that, the firm's intellectual capital represents the only ongoing source of competitiveness. It manifests itself, predominantly, in the individual and collective competencies of employees in organisations. Thus, the ability to learn and to manage learning becomes critical to the success of organisations. The firm's adopting of KM initiatives seeks to facilitate the sharing and integration of knowledge [16]. Hence, firms need to be adaptable and flexible, but also stable and controlled. Hence, there needs to be growth, resource acquisition and external support, but also tight internal information management and formal communication in the firm [17].

In other words, there must be focus on 'knowledge as a resource' and 'learning, strategic

'people-oriented' approach to the management of learning is now emerging in many organisations and a new breed of information system (IS). The 'Learning Management System' (LMS) is being used to manage organisational learning. As with previous IS innovations, such as enterprise resource-planning systems, industry practitioners and IT vendors are addressing the 'Learning Management' in the firms to face the challenges of the environment of manufacturing [16].

However, it see how organisational learning (acquisition, processing, storage, and application of knowledge) is interdependent with innovation, market, leadership and executive capacity to attain high performance, and at the same time in different stages of the organisation learning process, different core competitive capabilities have different impacts on it [18]. Consequently, there will be gaps originating from lower degrees of fitness between an enterprise's KM activities, as well as external and internal environments confronting the enterprise [19]. As a result, this is requiring from the companies are that get enough intelligence to plan these operation procedures, the knowledge repository should be built for storing and providing the required knowledge where it will help bridging the knowledge gap in the firms [20].

5. Research Method

The study in the methodology has adopted the Personal Interview Method (Closed questions), as well as the telephone Interview Method. This is because good interview questions should be crafted to allow the employees to demonstrate their competency levels related to identify knowledge gaps and the critical elements criteria in its implementations. Furthermore, the respondents are asked a set list of questions relevant to the study.

Accordingly, this study has adopted in-depth and face-to-face interviews with top managers and senior knowledge workers for concept-building and transcripts about the diagnosis of knowledge gaps at four manufacturing firms, consisting of two phases. The research process stages are explained in Fig. 2.
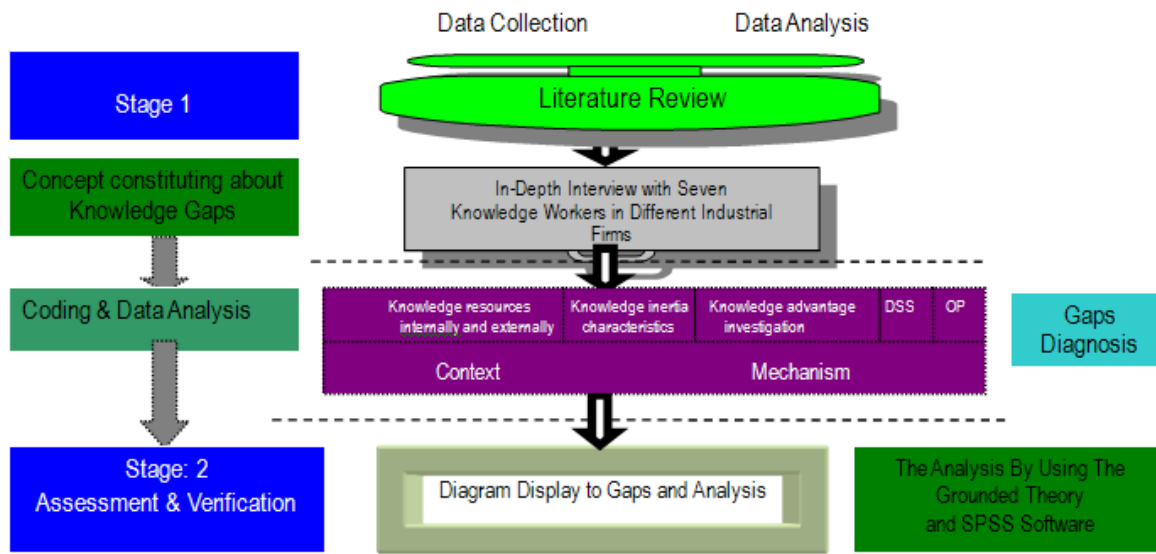
Fig. 2: Research Process stages

The first phase included the literature review, while the second involved in-depth interviews to explore the mechanisms and implementation of KMS in those firms, as well as knowledge flow and KM activity. To achieve the study's aims the researcher used grounded theory.

The grounded theory was used as a foundation for generating valid theories through triangulating data from different sources [21]. This is a form of content analysis to find and conceptualise the underlying issues amongst the 'noise' of the data.

During the analysis of an interview, the researcher will become aware that the interviewee is using words and phrases that highlight an issue of importance or interest to the research [22]. For that reason, it is noted and described in a short phrase. This issue may be mentioned again in the same or similar words and is again noted [23].This process is called coding and the short descriptor phrase is a code [24].

However, the study used micro-analysis coding for the answers of the interviewees as shown. The interview text in the left-hand column and the right-hand column shows the codes used by the researcher in this case at two appendixes (2 and 3 respectively). According to that and to achieve its aims, the study has made use of an official website   containing a database of most registered Iraq manufacturing companies and the sectors of the manufacturing and services, e.g. Food sector, Engineering sector, Utilities sector, Construction sector, Chemical sector, and Textile sector, also the information centre and scientific knowledge centre [25]. Furthermore, the Arvia Technology and Food Company at the UK were also included to find details about KMS gaps.

In conclusion, the list contained different questions in order to identify current knowledge gaps and the problems that hinder the application of KMS in the companies. This method allowed both the researcher and interviewee the flexibility to probe for details and discuss the issues thereby arising.

The questions were asked and analysed according to general aspects, as follows: 1) Using of knowledge resources internally and externally in companies as a means to the learning. 2) Knowledge inertia characteristics in companies/innovation. 3) Knowledge advantage investigation to companies/ innovation. 4)   DSS.   5) OP.

6. Data Collection

Data-collection techniques allow us to systematically collect information about our objects of study (people, objects, phenomena) and about the settings in which they occur. In the collection of data we have to be systematic. If data is collected haphazardly, it will be difficult to answer research questions in a conclusive way.

Consequently, a semi-structured interview has been used as a data collection tool. In conclusion, most questions were already designed in advance, because personal interview provides an opportunity for each knowledge worker to clarify or expand on information provided in application or resume. Also for the purpose of the data-collection process, the interviewees were asked to touch upon the most significant points in the areas of the research enquiry, amongst the study main variables. For that reason, our list contains of different questions in order to identify a current knowledge gaps and the Problems that hinder the application of knowledge management systems in the companies.

An assessment on significant terms will be conducted at each interview for a limitation and to elicit perspectives about the main variables to study. Most of the respondents deliberated heavily on the first, second and thirteenth questions.

Most of the interview time was spent with interviewees comparing themselves with the other parties. There was less deliberation over part tow; consequently the data rate was much less. A total of 1310 items of data were collected from the seven interviews.

7. Processing of Data

Data processing is any process that uses a computer program to enter data and summarise, analyse or otherwise convert data into usable information. The process may be automated and run on a computer. It involves recording, analysing, sorting, summarising, calculating, disseminating and storing data [26].

In other words, manipulation of data by a computer. It includes the conversion of raw data to machine-readable form, flow of data through the central process unit and memory to output devices, and formatting or transformation of output. Any use of computers to perform defined operations on data can be included under data processing. In the commercial world, data processing refers to the processing of data required to run organisations and businesses [27].

In view of that, data can be analysed in many ways. An alternative strategy from the 'line by line' approach advocated by some researchers for data analysis is to start with an general understanding of the data and from this point, using a more holistic approach, progress to a more detailed categorisation to the data involved in interviews [28]. Accordingly, important issues are here involved with the interviews:

It is very important to point out that the interviewees were requested to generalise and address the most important factors leading to support of KM and sub-variables from KM, DSS and OP. If any data is explained repeatedly from a number of respondents, its significance increases in direct proportion to the frequency of occurrence.

When the researcher attempts to break down the data into appropriate categories, a sub-category is created, i.e. KM 'factors'. Some interviewees' phrases were not clear, so they were rephrased.

The data was categorised according to where the KM gaps were. Some of this data may seem to be categorised as a source of KM from which it did not originate—if KM arises when increasing reliance on knowledge inertia after the organisational learning (OL) and the database in the firms does not include details of how to deal with such a situation.

In this instance, the data will be categorised as a lack of 'cross-pollination' to ideas. This is because the staff are on different sites it is not readily accessible to all, depending on practical experience during the work.

In conclusion, preliminary data was distributed across sources of KM and other variables as indicated in Appendix 3. Where this data occurred (see Appendix 2) depended on the information provided by interviewees about questions to diagnoses of knowledge gaps that related to the firms of the study sample.

Tables 3–8 have shown a summary of the results of the preliminary study where data concerning KM and other variables has been distributed under six categories as explained previously.

Table 3: Identification of knowledge resources

Factor	Respondent	No. data items
Explicit - Surfacing assumptions; Codifying that which is known	Dr. Andrew, Mrs. Michelle Eng. Mohammed, Eng. Suheir, Mr. Ismail Mr. Alaa, Mrs. Lammia	23
Systematic - Leaving things to Serendipity will not achieve the benefits	Dr. Andrew, Mrs. Michelle Eng. Mohammed, Eng. Suheir, Mr. Ismail , Mr. Alaa	17
Vital Knowledge – the firm's need to focus; It don't have unlimited resources.	Dr. Andrew, Mrs. Michelle Eng. Mohammed, Eng.Suheir, Mr. Ismail,Mr.Alaa, Mrs.Lammia	49
Processes - Knowledge management is a set of activities with its own tools and technique	Dr. Andrew, Mrs. Michelle Eng. Mohammed, Eng. Suheir, Mr. Ismail,Mr.Alaa,Mrs.Lammia	46
Tacit: cross-pollination to Ideas.	Andrew, Mrs. Michelle Eng. Mohammed, Eng. Suheir, Mr. Ismail	28
Total		163

Table 4: Identification of information needs

Factor	Respondent	No. data items
Creation of knowledge teams.	Dr. Andrew, Mrs. Michelle, Eng. Mohammed, Eng. Suheir, Mr. Ismail, Mr. Alaa, Mrs. Lammia	25
Sharing of best practices.	Dr. Andrew, Mrs. Michelle, Eng. Mohammed, Eng. Suheir, Mr. Ismail, Mr. Alaa, Mrs. Lammia	39
Creation of Knowledge centres	Dr. Andrew, Mrs. Michelle, Eng. Mohammed, Eng. Suheir, Mr. Ismail, Mr. Alaa, Mrs. Lammia	33
Collaborative Technologies.	Dr. Andrew, Mrs. Michelle, Eng. Mohammed, Eng. Suheir, Mr. Ismail, Mr. Alaa, Mrs. Lammia	15
Intellectual Capital teams	Dr. Andrew, Mrs. Michelle, Eng. Mohammed, Eng. Suheir, Mr. Ismail, Alaa	23
Total		135

Table 5: Acquisition and creation of knowledge (knowledge cognition)

Factor	Respondent	No. data items
Is Done for Building the Cognitive Capacity.	Dr. Andrew, Mrs. Michelle, Eng. Mohammed, Eng. Suheir, Mr. Ismail, Mr. Alaa, Mrs. Lammia.	78
The Firm Interaction with Experts and Employees through Retrospective or Concurrent enquiry in the company.	Dr. Andrew, Mrs. Michelle, Eng. Mohammed, Eng. Suheir, Mr. Ismail, Mr. Alaa, Mrs. Lammia .	58
Classification Techniques to Identify the Terms and Concepts of the Knowledge Domains.	Dr. Andrew, Mrs. Michelle, Eng. Mohammed, Eng. Suheir, Mr. Alaa.Mrs. Lammia	33
The Cases Exploit Recorded in Knowledge Acquisition.	Dr. Andrew, Mrs. Michelle Eng. Mohammed, Eng. Suheir, Mr. Ismail,Mr. Alaa, Mrs. Lammia	32
Extracting Cause-Effect Relations.	Dr. Andrew, Mrs. Michelle, Eng. Mohammed, Eng. Suheir, Mr. Ismail, Mr. Alaa, Mrs. Lammia	18
Identifying the reasoning path Eng. Mohammed, Eng. Suheir, Mr. Ismail, Mr, Alaa, Mrs. Lammia.	Dr. Andrew, Mrs. Michelle,	63
Total		282

Table 6:The organization and storage of information (knowledge inertia)

Factor	Respondent	No. data items
The knowledge codifiable.	Dr. Andrew, Mrs. Michelle, Eng. Mohammed Eng. Suheir, Mr. Ismail, Mr. Alaa, Mrs. Lammia	23
The looking outside the organization When it comes to change or renewal.	Dr. Andrew, Mrs. Michelle, Eng. Mohammed,Eng. Suher, Mr. Ismail , Mr. Alaa, Mrs. Lammia	29
Is using mechanism of creating, sharing, and cumulating organizational knowledge.	Dr. Andrew, Mrs. Michelle,Eng. Mohammed, Eng. Suheir, Mr. Ismail, Mr.Alaa, Mrs. Lammia	57
Individual human knowledge resources/ Co-opting specialists for knowledge integration.	Dr. Andrew, Mrs. Michelle Eng. Mohammed, Eng. Suheir, Mr. Ismail, Mr. Alaa, Mrs. Lammia,	43
Making resources available.	Dr. Andrew, Eng. Mohammed, Eng. Suheir Mr. Ismail, Mr. Alaa, Mrs. Lammia	23
Knowledge creation pathways	Mrs, Michelle, Eng.Mohammed Eng. Suheir, Mr. Ismail, Mr, Alaa, Mrs. Lammia	30
Total		205

Table 7: Knowledge dissemination (knowledge advantage investigation)

Factor	Respondent	No. data items
Knowledge Dissemination Structures. What is being the forms which knowledge takes (e.g. Intellectual Property or human expertise).	Dr. Andrew, Mrs. Michelle, Eng. Mohammed, Eng. Suheir, Mr. Ismail, Mr. Alaa, Mrs. Lammia.	(IP: 56) (HE: 47)
Methods Usage to Knowledge. Transfer. How knowledge is, disseminated, closely linked to the forms of knowledge (e.g. Licensing or other methods)	Dr. Andrew, Mrs. Michelle, Eng. Mohammed, Eng. Suheir, Mr. Ismail, Mr. Alaa, Mrs. Lammia,	(licensing: 59) (other: 13)
There are Knowledge Assets. The place from which the knowledge originates inside the organization.	Dr. Andrew, Mrs. Michelle, Eng. Mohammed, Eng. Suheir, Mr. Ismail, Mr. Alaa, Mrs. Lammia,	(KM: 25) (other: 24)
Knowledge Dissemination Departments: the knowledge departments itself or other intermediaries, which transfer knowledge from the originator	Dr. Andrew, Mrs. Michelle, Eng. Mohammed, Eng. Suheir, Mr. Ismail, Mr. Alaa, Mrs. Lammia,	(itself: 16) (Other: 37)

to the recipients, making use
of relationship Management
strategies to connect knowledge
to the employees across the
ideas pollination chain.

Demand Environment. The external factors which can affect demand for the disseminated knowledge (e.g. other Community initiatives)	Dr. Andrew, Mrs. Michelle, Eng. Mohammed, Eng. Suheir, Mr. Ismail, Mr. Alaa, Mrs. Lammia,	(Community: 32) (initiatives: 29)
Transfer Recipients. The organization departments as a whole, which receive the disseminated knowledge (e.g. R & D, production Lines, research and marketing, and processes reengineering).	Dr. Andrew, Mrs. Michelle, Eng. Mohammed, Eng. Suheir, Mr. Ismail, Mr. Alaa, Mrs. Lammia,	(whole: 53) (part: 7)
The Total for each part The total for the all variable (398)		(241) (157)

Table 8: Knowledge use to support DSS by its three types (GDSS, ESS and ES. where that reflect positively on OP

Factor	Respondent	No. data items
Expert Systems (ES) system has more potential with various information forms in multiple-systems. This will lead to new concepts not yet considered and enhance performance.	Dr. Andrew, Mrs. Michelle, Eng. Mohammed, Eng. Suheir, Mr. Ismail, Mr. Alaa, Mrs. Lammia,	40
GDSS: Is facilitate the organized integration and synthesis of ideas generated during brainstorming which reflect positively.	Dr. Andrew, Mrs, Michelle, Eng. Mohammed, Eng. Suheir, Mr. Ismail, Mr. Alaa, Mrs. Lammia,	52
ESS: provide information that must be blending along with personal experience, knowledge, education, and understanding of the corporation and the business environment as a whole to make- decisions and performance improvement.	Dr. Andrew, Mrs. Michelle, Eng. Suheir, Mr. Ismail, Mr. Alaa, Mrs. Lammia,	35
Total		127

8. Statistical Tests

8.1. Standard Deviation

In probability theory and statistics, the standard deviation of a statistical population, a data set, or a probability distribution is the square root of its variance. Standard deviation is a widely used measure of the variability or dispersion, being algebraically more tractable though practically less robust than the expected deviation or average absolute deviation, and defined as in eqn. (1) [29].

$$\delta N = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \overline{X})^2}$$

(1)

The questions is validated for its reliability, where its standard deviation found is 18.1 (N = 7). This value enabled to proceed further in this research areas, as the reliability of the questions found is very high. While, Cronbach's alpha test results were as in the Table 9 according to eqn. (2), [30].

$$\alpha = \frac{k}{k-1}\left(1 - \frac{\sum_{i=1}^{k}\sigma^2 y_i}{\sigma^2 x}\right)$$

(2)

The Cronbach's alpha is widely believed to indirectly indicate the degree to which a set of items measures a single unidimensional latent construct. However, alpha shown that it can take on quite high values even when the set of items measures several unrelated latent constructs [31].

Table 9: No. of Questions for each Construct and its Cronbach's α

Variables	Statistical Tests	
	Valid	Cronbach's α
1	83%	0.75
2	83%	0.76
3	100%	0.62
4	100%	0.70
5	100%	0.88
6	75%	0.75

As a result alpha is most appropriately used when the items measure different substantive areas within a single construct. When the set of items measures more than one construct, coefficient omega hierarchical is more appropriate [32].

For that reason, Cronbach's (α) test has explained to us that the questions is validated for

its reliability, where   Cronbach's alpha found are as is shown at Table 8 .This is the values enabled to proceed further in this research areas, as the reliability of the questions found is very high.

8.2. Measurements of Correlation, Regression and the Other Tests

As it can be seen in the table 10, the analysis of the model indicates well level of fit. Where are all the statistical indicators of indicate good fit to the study variables. Where, these variables have driven to diagnoses knowledge gaps in the firms of study scope greatly, we will see is more details in the analysis later about those gaps.

Where is dependence on Present knowledge in the era of express and pervasive change can lead these gaps to lagging behind the competitors. Therefore, it have came the variables convey correlation and regression coefficient are positive and with a high level from confidence it was 95%. This indicates that the variables data are correlated and supported the implication which lies in this specific context that these constructs to limitation of gaps were orthogonal and a touchable correlation among them.

Table 10: Statistics Matrix of Correlation, Regression and Other Statistical Tests of Constructs Source: Tables 3-8

Var.	Mean	SD	R	rxy	C	CID
1	2.80	.64	.81	.69	.95	L= 14.9832
						U= 50.2168
2	3.00	.58	.58	.56	.95	L= 15.4853
						U= 38.5147
3	3.50	.87	.50	.69	95	L= 23.0692
						U= 70.9308
4	3.50	.87	.53	.76	.95	L= 20.1432
						U= 48.902
5	3.50	.88	.70	.54	.95	L= 45.7508
						U= 86.9158
6	2.00	.87	1.0	.82	.95	L= 20.6297
						U= 64.0370

8.3. Factor Analysis

Factor analysis is a statistical method used to describe variability among observed variables in terms of a potentially lower number of unobserved variables called factors. In other words, it is possible, for example, that variations in three or four observed variables mainly reflect the variations in a single unobserved variable, or in a reduced number of unobserved variables. Factor analysis searches for such joint variations in response to unobserved latent variables [33] (Hatcher, L. 1994).

Therefore, in factor analysis to the companies of the study domain has found that all the employees of confirm on the first variable that is inviting to the identification of knowledge resources, and is creating of knowledge depository. Where was obtain percentage (80%) from other variables, as Table 11 has explained the component matrix.

This is because a major concern for employees is the identification of appropriate knowledge resources for their works and how are learn within the corporation. Where is their focus on knowledge transfer perspective, that is, focusing more on facilitation of internal knowledge flows rather than observing initiatives in knowledge identification [36].

Table 11: Statistics Matrix of Correlation, Regression and Other Statistical Tests of Constructs

component	Initial Eigenavalues			Extraction Sums of Squared Loading		Factor Analysis Rate
	Total	% of	Cumulative	% of	Cumulative	
	0.73	0.64	63.6	0.64	0.64	0.80

As well as that the learning behaviour of evolves through time, because Knowledge exchanges tend to occur between employees that appear to have Capabilities to the learning quickly during the cross-pollination to ideas in the work place.

9. Discussion of the Results

Currently, organisations increasingly recognise that to remain competitive they must effectively use and manage employees' knowledge. Executives in numerous companies are viewing the KM as a strategic imperative. In fact, they list KM as one of the top managerial issues that chief information officers must address; to a great extent, culture and management

issues that affect the success of KM initiatives in companies.

The survey results for each of the potential and current knowledge elements affect the implementation of KM as well as help in knowledge gaps when there is not any software to KMS, depending on database reports and knowledge of the company that could be found on paper stored for easy access. And yet there is not cross-pollination to ideas between the staff as seen with the results represented in Fig.3. The above summary of factors is by no means exhaustive, and the study does intend to elaborate them in detail in the results context explained in Appendix 2, showing why management issues are critical for KM planning and implementation.
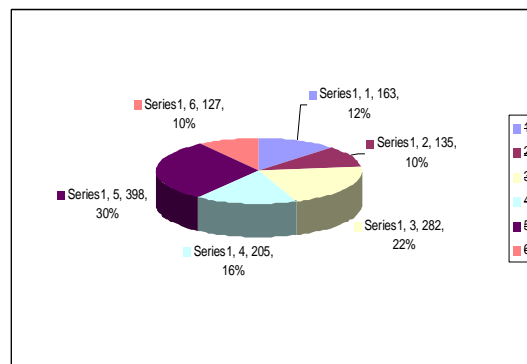

Fig. 3: The relative importance to elements of KM in the manufacturing firms (Source: Tables 3–8)

As indicated, relative to other situations, KM about knowledge dissemination (knowledge advantage investigation) was the most common in the manufacturing organisations. It was the category with the greatest number of KM elements (398 items), knowledge dissemination structures, the forms that knowledge takes, e.g. Intellectual Property or human expertise accounting for 103 data items, intellectual property (57 items) and human expertise (47).

This shows that knowledge is transferred between all levels of the organisation, the continual creation and development of ideas—'ongoing innovation'. This requires the implementation of OL allowing the firm to develop learning processes, e.g. knowledge resources, strategic and structural characteristics. But this requires the identifying of conditions and the need for quick decisions and analytical decision processes, as well as limitation of the managerial needs for action and the need for the safest execution of decisions that may be bold and risky to the top management and the organisation.

This relies on a person's capacity to carry out a particular task. It is thought to be composed of codified knowledge (information) and tacit knowledge which encompasses experience, skill and attitude. It is a participatory process particularly useful for workers in the operational core of the organisation.

The bases and standards that could be used in this evaluation are, for example: 1) the ability to generate new creative ideas; 2) Continuous contact with the customer; 3) The contact with similar companies in different countries over the world; 4) A number of scientific symposia

and debates that occur among employees at their own level of work.

In other words, it is done by keeping a personal knowledge base, building up on the experience of past employees who retire from work by using them as consul tasks, using mind maps to efficiently and effectively capture their knowledge and also accoutring their knowledge prior to retirement—building a framework of business based on a methodology that captures suitable aspects within the context of the organisational culture of the firms.

The second element is acquisition and creation of knowledge (knowledge cognition). It has obtained 282 items (22%). This indicates depending on practical experience during the work, and the concentrating on trials with customers, i.e. adopting feedback from the external environmental. Furthermore, existing modern knowledge distribution systems, e.g. applying expert systems in conjunction with other software communications technologies, is helping many companies turn information into knowledge by building interactive help systems, using a mind-mapping method.

This task involves understanding what people need to know to do the job right. That can create new capabilities through employees' support to achieve and enable superior performance, encourage innovation in the firm and the clients for adoption of KM ideas, practices, attitudes, values and characteristics for the purpose of the connection and implementation of supplier management practices to intra-firm implementation. This means, there has to be product push.

The producers of research knowledge explicitly plan based on the problems in firms and implement strategies to push knowledge towards new employees (the inexperienced). Knowledge Pull: the firm's implicit knowledge is pulled explicitly from seniors (by the formation of databases of past experience).

A plan to implement strategies to pull knowledge from sources that are identified as sources useful for decision-making. Also knowledge there is exchange among knowledge workers: relationships should be built and nurtured between those who produce knowledge and those who might use knowledge to enable an exchange of information, ideas and past experiences that can bring about a cultural shift that facilitates the ongoing use of knowledge among decision-makers and a decision-culture.

In other words there must be a focus on the firms' culture, which focuses on two parts: knowledge sharing and the share of innovation. The firm must develop a framework and process for identifying, capturing and diffusing important knowledge in a structured way within the organisation culture. The third element is the organisation and storage of information (knowledge inertia); it has obtained 205 items (16%) from 1310 items.

That means that the firms rely on senior management from a point of view of KM; also there is virtually no cross-fertilisation between middle managers. For that reason, the firms depend on introducing KM software to the senior managers, travelling between sites and maintaining an overview, then keeping everyone informed as appropriate for it, but manufacturing people as if all together, which will make cross-fertilisation of knowledge much easier.

Conversely, the top management must acknowledge that staff members are more than just employees; they have interests and responsibilities in their jobs via flexible work options offering creative approaches for completing work, promoting cooperation between employees in the work via teamwork. This requires establishing a Centre for the Public Awareness of Knowledge (CPAK) with research and development. This could assume more advisory roles by combining traditional services with consulting services, or research about new ways to excite the imagination of the employees (any brainstorm) about knowledge and to encourage informed decisions about actual issues that will concern problems of the future firm, the ability of the business firm to monitor the internal and external environment, and strategically adopt and manage new technologies.

  Finally, it could adopt a framework linking the technical knowledge of a firm's managers to its ability to gain and hold competitive advantage. At the same time the fourth element of Identification of knowledge resource has explained that the value was 163 items (12%). This indicates the relying of the organisations for the purpose of evaluation of knowledge resources on: 1) the accumulated experience of leading the work; 2) Doc-umentation of the work and experience; 3) Communication resources (portals) through updating operations of manufacturing that are used in the production.

There is also depending on clients to evaluate products, and the research and development to improve processes to climb the ladder of new technology and knowledge of the industry—let alone planting the commitment spirit in employees through developing administrative and technical sessions for the purpose of evaluation of their efficiency. They should be given annual incentives, where this situation leads to mutual pollination of ideas, and reduces the knowledge gap within firms. At same time, the knowledge pulls everyone in the same direction as the firm.

By and large, the fifth element from where arrangement of identification of information needs has been obtained was of 135 items (12%) and the element of sharing of best practices for the KM (29%). That means that the knowledge workers tend to share their knowledge, looking at KM as a set of concepts that could be tailored to meet business needs in all the organisation departments. Therefore, today's firms search for employees with the new basic skills, the mix of hard and soft skills that are required in its works to avoid a gap in the knowledge.

However, this crosses the chasm between information processing and the relevance in the changes of external and internal competitive environments. So there must not be a delay to changes with organisational needs, whilst analysing its implications on knowledge design and development to deal with the emergent nature of operational systems in the firm.

  In this case, the knowledge principles require detail and the functions of the memory system present in the firm to regenerate and reflect changes in the system over time through training, workshops, seminars and teamwork, with technical doc-umentation of previous experiences by experienced personnel, and benefiting from their ideas in solving previous problems that have supported prior decisions.

This means experience inertia in DSS. This adds a value to the managers' information base,

because that means   clarity of work instructions to reach for the desired goals, motivating them to increase the generation of creative ideas at work, concentrating on the local market, more open to new technology giving easier access to global markets. There is a greater openness   to new KMS technology.

Finally, it turned out that results analysis of the element of knowledge used to support DSS by its three types (GDSS, ESS and ES), DSS became practical with the development of operations, sharing operating systems and distributing knowledge.

This element obtained 127 items (10%). DSS applications have related to model and data-oriented systems, expert systems, multidimensional data analysis, and analytical processes. Anthony has described management activities as consisting of strategic planning in executive decisions regarding overall mission and goals, management control of middle management guiding the organisation to goals (ESS), and operational control first-line supervisors directing specific tasks [35].

This is because when management creates working conditions based on support and teamwork cohesion, the OP must be improved within firms. In addition to that, when the firm has a vision about how to manage innovation and creative learning as a way to achieve a competitive advantage, an ongoing advantage to the firm might create greater organisational wealth and enhance OP at the same time, as well as reducing the innovation gap (both technological and administrative). And it will help in increasing the organisation's value, because it will be troubleshooting conflicts among leadership and employees at different administrative levels. This is because they feel they are sharing in the critical decisions of the organisation. Therefore, the firm must work to acquire process, store and apply knowledge because it has a significant positive effect on the OP for any firm.

Thus, based on the concept of Holsapple [36], knowledge value chain and Nonaka's [37], spiral of knowledge, the study proposes a conceptual model for the 'KM gap' to fully explain the management gaps that might occur during the implementation of KMS. As shown in Fig. 4, there are six elements of KM that were referred to earlier in the study that can be viewed from four different viewpoints: strategy of organisation, integration and balancing of leadership, planning and Information technology, and the cognition of organisational culture. These are the detailed descriptions of the four points:

- Strategy of organisation: for a limitation and diminishing of gaps 1 and 4 depending on senior management from the view of KM. It would be useful to have a KM tool that would promote the transfer of data and ideas between different levels to devise the appropriate strategies within the firm, there being a lack of much cross-fertilisation between middle managers. Also this action allows using different methodologies and strategies that could be based on the type of evaluation required in the work for the acquisition of a cutting edge technology to develop a reliable product before going to markets.

Both variables can be seen as a response to changes in the environment and as a basis for obtaining competitive advantage. Also this method is leading to the creation of a strategic

business unit to recognise the interaction between KM and innovation in the firm. As creating new knowledge always occurs within the firm via team-works, it is done in such a way that the individual is recognised as a primary source for learning through social interaction among them in the practice communities laying new ideas.

Therefore, the employees should be equipped with information about the activities and performance throughout the organisation to achieve and enable superior performance. They try to mix two methods of thinking, both personally and as a team. They also believe there is a need to preserve and nurture intellectual assets in the firm in order to not become dependent on a few individuals for their knowledge of process details, and to optimise the benefits of unleashed tacit knowledge.
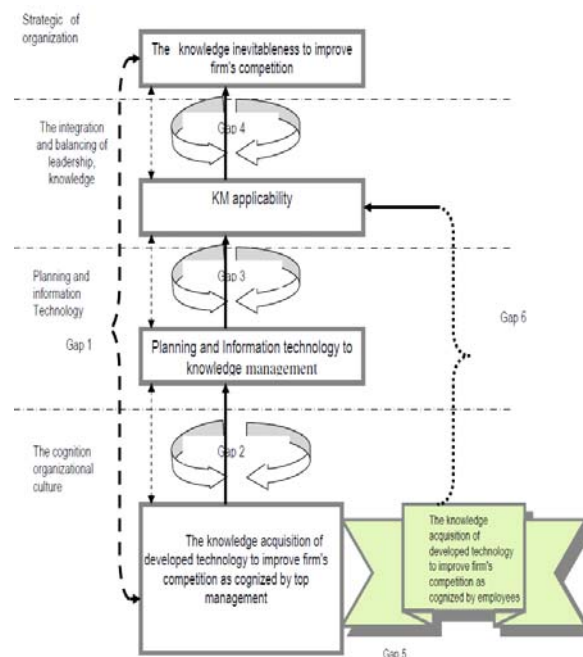

Fig. F4: Conceptual model about knowledge gaps (Source: interviewers' answers)

- The cognition and organisational culture: for a limitation and diminishing of gaps 2 and 5 the plan top management adopts is turning pretty KM for aligning strategically the employees' ideas with the firm's larger goals, managing human capital effectively for the purpose of achieving strategic success to the firm and individuals. This will create self-motivated creativity or the motivation and adaptability for success, and will make employees proficient in their skills and knowledge continuously. Giving the pass to teamwork is to create cross-pollination in ideas among the staff on different work sites, a dynamic modelling to knowledge in organisation, a collective ability to understand the implications of change and reflection on changes over time in the KMS. In this situation, the availability of effective modelling and simulation enables

avoiding hidden pitfalls.

Additionally, there is the transfer of knowledge from one person to another through training, the focus on KM tools and new technology in manufacturing, and the receiving of customers' reaction to products establishing an effective KMS.

Hence, a culture of top management must encourage a high level of participation among organisational levels to enhance operation efficiency, and the continual striving to create a suitable knowledge and technology base for the company to get best practices in works. The firm should also create consistency among the goals of KM (e.g. a physical layout in the firm that includes KM goals, the appropriate KM functions and units, cross-functional and cross-locational teamwork, and centres of excellence in the company to support the rewarding of the creative minds, whether financially or through advanced training courses outside the company.

This ultimately establishes an atmosphere emphasising the sharing of knowledge through the exchange of roles and active creativity to improve performance, the creation of capable employees (experts) to make cross-fertilisation of knowledge much easier in production lines and among sectors. Ultimately that means diminishing gap 6, because it indicates the acquisition of developed technology to improve firm's competition as cognised by employees.

There also may be knowledge acquisition by the top management via: 1) An ES that can supply the summarised information that executives need and yet provide the opportunity to drill down to more detail if necessary; 2) GDSS are able to link data from various sources, both internal and external, to provide the amount and type of information executives find useful as an easy way to manipulate information; 3) ESS provides information that must be blending with personal experience, knowledge, education, and understanding of the corporation and the business environment as a whole to make decisions right [38].

- Planning and IT: Planning and IT should involve the databases for projects, research of past experience representing clear knowledge in the company, stored and easily accessible to employees to complete labour tasks.

This requires the creation of a database for the acquisition of experience from experts in the company before retirement and movement. To be successful in the future the firm must benefit from experts doing the selling and the expertise of the people actually doing the manufacturing. For that reason, gaps' 2 and 3 could be diminished if there is continuous development in the manufacturing operations. This is because for operations to be efficient they cannot be viable in every situation, since new assessments and developments are essential for the advancement of knowledge in any company that desires the progression of knowledge for the better. This requires that all the staff must be contributing to narrowing the knowledge gap and thus remaining open to new practices on an ongoing basis.

- The integration and balancing of leadership (KM applicability): there is a growing belief that the   public value to the firm requires balancing of the leadership role with an integration of the interests of multiple stakeholders in the enterprise;   employees,

customers , suppliers, and the various communities within which the enterprise operates and with which it interacts, involving the values, objectives, knowledge requirements, knowledge sources, prioritisation, and resource allocation of the organisation's knowledge assets.

This stresses the need for integrative management principles and techniques, primarily based on the system's thinking and approaches [39]. Furthermore, it requires monitoring trends in KM, including process, technology and culture, to identify new methods, tools and change management initiatives that support the realisation of the firm's knowledge vision. Also it needs awareness of the importance and role of external and internal content and to be familiar with KM tools such as the Internet, search engine and information retrieval, data mining, document management and enterprise portals and software selection [40]. This also requires coordination and assessment of new efforts to pilot and implement new processes and capabilities that incorporate feedback from the practice's communities, to support the demonstration of the firm's knowledge capabilities in specific client and prospect meetings. It must establish the metrics and measurement of it that will enable an assessment of the firm's knowledge assets and communicate its progress to senior management.

Additionally it adopts a framework linking the technical knowledge of a firm's managers to its ability to gain and hold competitive advantage. That means that gaps 2 and 4 can be diminished. When this position is ensured over time there is cross-fertilisation between top management and the workers.   According to the above, an analysis could identify the following knowledge gaps, as displayed   Appendix 2 and 3.

Gap 1: The gap between the necessary knowledge to improve a firm's competition and the actual acquisition of knowledge of developed technology to improve the firm's competition as cognised by senior management. The interviewees have emphasised that the companies are needed to adopt the past expertise and past knowledge of the staff, as well as depend on practical experience during the work, concentrating on trials with customers.

Additionally, the interviewees point out that using modern knowledge distribution systems, e.g. applying expert systems in conjunction with other software, communications technologies, are helping many companies turn information into knowledge by building interactive help systems. Using a mind mapping method, this task involves understanding what people need to know to do the job right, requiring cross-pollination and fertilisation revitalisation to ideas between the staff so that knowledge is readily accessible to all. This may be restricted for the following primary reasons, leaving gap1:

- Most employees and those administrative levels tend to resist change rather than embrace it. Lacking cross-fertilisation for the knowledge between administrative levels and the workers, is one of the principal barriers to KM.

- The employees fail to realise all the details and the preparation required to work for the purpose of increasing their knowledge and expertise.

- Failure to understand the changes in the environment, the world markets and the customers' preferences which are dynamic over time is caused by the older

employees' reluctance to undergo development in some cases, and this decreases the knowledge base. The firms in the future need to work on added value for the customer.

- A failure in building a framework of business based on a methodology that captures suitable aspects to knowledge within the context of organisational culture of the firms.

According to these implications, top management needs awareness of new KM tools and ideas that focus on the ease with which information can be made available, improving search engines, and supporting the general desire to manage and present the overwhelming amount of data available to the user in a manageable format [41].

Accordingly, a KM program can be pursued and successful if there is a clear strategy and benefit to the company. As with many (IT) and large projects, basic project management skills tied with strategic direction and a clear business case can lead to a successful outcome.

However, it suggests that presenting the results of KM software daily, monthly and yearly. That is to say, what has been achieved must be examined and then used in development programmes for improving processes of the firm [42]. This should form fertilisation of knowledge which is transferred among the departments and the employees in a firm that will support DSS. Overall, some of the following core ideas could be used to reduce and remove gap 1:

- Focusing on Knowledge Resources: In conclusion, some authors point to a general consensus concerning the importance of both explicit and tacit knowledge, also web-based systems which customers could see for all the results of their samples and trials, depending on database reports and knowledge of the company that could be on paper, stored for easy access [43, 44].

Hence, the company strives to manage knowledge more effectively and efficiently to improve its performance as a basis for competitive advantage and superior operational effectiveness via flexible work options offering creative approaches for completing work. It promotes cooperation between employees in the work via teamwork [45].

However, the knowledge must be intensive, processing all knowledge necessary for business success, because it will turn fine as KM, when there is harmony between an employee's ideas and the firm's larger goals strategically [46]. This will create self-motivated creativity or the motivation and adaptability for success, and will make employees proficient in their skills and knowledge continuously.

- The Infrastructure for the IT: Thus, it is confirming that the main role of IT in KM is to accelerate the speed of knowledge transfer. KM software supports knowledge flows through networks and communities [44]. Today's firms search for employees with the New Basic Skills, a mix of hard and soft skills that require its works in order to avoid a gap in the knowledge through social interaction among them in the practice communities for laying new ideas, with emphasis on the dynamic modelling of

knowledge in organisation.

This objective is helping in the knowledge conversion intimately within organisations, a process that amplifies the creation of knowledge by individuals and adds its results to the knowledge network of the organisation. The basis of knowledge creation in organisations is a continuous interaction (transfer) among individuals, and continuous conversion from tacit into explicit knowledge (and vice versa) by individuals, supported by the teamwork [37].

- Knowledge Scope: KM is a process of creating, storing, sharing, applying and reusing organisational knowledge to enable an organisation to achieve its goals and the firm's objectives [47]. This means that the KM does not function in isolation from its environment but interacts with other related areas which can rely on the firm's strategy that includes directions for information and KM [48].

Gap 2: The interviewees confirmed the significance of the Planning and IT to KM. This is because it can create new capabilities through employees' support in achieving and enabling superior performance, encouraging innovation in the firm and the clients for the adoption of KM ideas, practices, attitudes, values and characteristics for the connection with and intra-firm implementation of supplier management practices. Meanwhile, all KMS requires a certain level of technology and infrastructure support to be effective, as business processes become increasingly complex.

As a result, KM can be fully implemented only when top management has the appropriate information and communication technologies available to support the acquisition, management, and transfer of tacit and explicit organisational knowledge during the KM implementation plan via knowledge standardisation. It is done through discussion with teamwork and combing the web to see what everyone else is doing [46]. This working allows for generating new ideas in the firm. Uncodifiable, personal, situated and complex knowledge that is hard to imitate is of high strategic value for the firm. However, several reasons can be given in diagnosing gap 2 as follows:

1. Untenable capacity of the firms to adopt a framework linking the technical knowledge of a firm's managers to its ability to gain and hold competitive advantage.

2. Lack of a transfer process of tacit knowledge to the explicit, which are the interplay of shaping organisational knowledge, through balancing work and personal roles in the work. This is because there is not standardisation in trying to mix both methods of thinking both personally and as a team. Also the intellectual assets in the firms should not be dependent on only a few individuals for their knowledge process.

3. The KM target it is not part of the operational system needed to supply information about the activities and performance throughout the organisation.

4. There is no existed congruence between the environment of rapid development and when the technologies of the firms are unsuitable. This creates difficulty in transferring the necessary knowledge to the KM plan to bridge the knowledge gap in the firms. This means, the top management has inabilities due to the limitation of the core information requirements

to deal with critical functions and the understanding of the knowledge transfer process by considering development of processes, and the transfer of knowledge among the employees. Since technology is developing continuously, this creates a difficulty in dealing with the environment due to new requirements.

The firm's desire is to be well established in the industry for the purpose of good branding. This requires dealing carefully with the environmental problem to systematise, enhance and expedite intra and inter firm KM to devise and implement value-enhancing strategy that is not concurrently being followed by any existing or possible competitors [49]. Ultimately, the limitation of gap 2 is related to the following elements:

- The concepts of inertia and innovation are seen as opposites: innovation is generally considered as a contradiction of inertia. Moreover inertia is often regarded as an obstacle to innovation. In order to succeed and have a chance it is believed that innovations have to destroy, or at least, overcome inertia. Our argument is that manufacturing people all together will make cross-fertilisation of knowledge much easier, with the acquisition and polarisation of cutting edge technology to develop reliable products before going to markets, and the effective application of scientific knowledge to lead the firm and its staff to creativity. If all ideas come from past experience and knowledge without revision and update, the method for problem-solving will be predictable inertia. If, in a highly competitive environment, someone can predict the trajectory of what you are thinking or doing, tracking and reaching of predictive action from others could cause failures and loss [11].

- Knowledge Methods: the target of KM is to create value to the firms through position in the competition field and is acquisition of developed technology. This requires using different methodologies and strategies that will be innovative knowledge, requiring domination of an industry by changing the basis for competition through creation of new processes and products to sustain competitive advantage [50].   All this inevitably confirms that firms need to analyse the employees' orientations and to gain full support from the top managers for change when the employees are not well suited for their positions in manufacturing.

- Decision-Making: Depending on the senior managers moving between sites and maintaining an overview, to identify conditions and needs for quick decisions and the need for analytical decision processes, in addition to limiting managerial needs for action and the need for the safest execution of decisions that may be bold and risky to the top management and the organisation. That means, a need to find the process of indexing people, skills, expertise, or know-how that are needed to build the knowledge assets that will become decision support, and then to make what has been learned quickly and easily available to anyone who will be involved in the next business decision[51]

Gap 3: The interviewees confirm that the capacity for KM applicability requires planning, and IT for KM to drive learning and improvement in the company. Meanwhile, top management has to be pushing by direction of transfer of knowledge about sites' trials to the

R & D.

At same time, the interviewees emphasise shopping for knowledge outside the organisation rather than trying to invent everything themselves. This is because every day that a better idea goes unused is a lost opportunity. Therefore, the firms have to share more, and have to share faster [52]. That would be a good situation and would give more knowledge about the work to top management who benefit from that information by the flow of new ideas for devising the appropriate strategies and filling the gaps. We can diagnose the following reasons for gap 3:

- There is little or slow transfer of knowledge with the staff on different sites in the work.

- Top management ignores the requirement of new update designs. That means, a pushing of development all the time but as yet with no finalised product.

- The weakness in collective ability to understand the implications of change over time in KMS by employees. Knowledge principles require detail and the functions of the memory system present in the firm to regenerate reflection on changes in the system over time.

- The chasm between information processing and the relevance in the changes of external and internal competitive environments.

- The defectiveness in creating a database for acquisition of experience of experts in the company before retirement and movement.

We have noted that both competitive spirit and a spirit of cooperation of factors are very important to the company and its employees. This is because the firm work requires training employees to share their job knowledge within the job environment, at the same time retaining the knowledge for the benefit of the organisation as a whole. The firm wants to see its employees performing and contributing their best for the benefit of the organisation.

Thus, senior workers should pass on their assets of experiences, skills and work by training the new workers who are less experienced to benefit from their knowledge along with the company that is constantly seeking new knowledge in its field. It needs to overcome manufacturing weakness and to concentrate on the goal of creation of an end value. This gap is a need for common function between management and employees as explained below to bridge gap 3:

1. Guidance of Employees: the top management must acknowledge that staff members are the most important factor in the business and are more than just employees; they have interests and responsibilities in their jobs via flexible work options offer creative approaches for completing work [53]. Furthermore, KM can be used to support the strategy process. For example, an organisation's core competency can be identified by analysing employees' competency. Sometimes the strategy is formulated around the core competency. On the other hand, KM activities can be used to implement

strategic objectives, such as the decrease in costs by more effective knowledge-sharing, or the gain in new know-how among the employees of the organisation [54]

2. Top Management's obligation toward knowledge: top management's obligation becomes a reality when a manager of a company or division accepts the responsibility for the successful implementation of the business plan. The manager should get involved and add the expertise and special talent that made him president. It is surprising how much 'common sense' will prevail and how useful it is in the dynamic modelling to knowledge in organisation. This is because it will limit offshore company information resources, to complete labour tasks, creating a database for acquisition of experience of experts and managers also in the company [55].

3. Principle of standard processes: to get best practice in works, believing that the concept of process-management would be helpful in creating more value to the customer with less work due to processes that produce high performance [56, 57]. This is because with a paucity of process standards, it would be risky to do otherwise, unless with IT system development. Accordingly, many leading organisations are using industrialisation principles to achieve what seems to be impossible: reducing costs while enhancing business performance.

Gap 4: The interviewees confirmed that the knowledge for improving a firm's competition as anticipated requires inevitably preparing software for applying KM. Accordingly, they have seen that reports of significant factors give a sustainable advantage to top management, depending upon the board's members for the overall direction of the company and on part-time sales through marketing strategies for using new idea-flows, devising the appropriate strategies for creating new knowledge in the firms. Where this is pointed if there is not existing congruence between the environment of rapid development and the technology of the firms will create difficult problems at work in the future.

Therefore, this requirement should be available as a valuable resource for understanding the general behaviour of clients and competitive companies. To be discovering the regularities and anomalies of what is currently happening in the firm, and controlling the evolution process of the products is important. Accordingly, we can diagnose the following reasons for gap 4:

1. Disregard of valuable resources for understanding the general behaviour of clients and competitive companies, discovering the anomalies of what is currently happening in the firms.

2. Lacking focus on feedback of the customers to track and discover defects in the manufacturing first.

3. Weakness of links between systems within firms for avoiding the stagnation of knowledge.

However, the firms striving to create new capabilities through employees support to achieve and enable superior performance, encourage innovation in the firm and the clients for adoption of KM ideas. The focus will be on informal and tacit knowledge in their KM lifecycle. Rather than simply KM, they identify the main processes in a KM lifecycle as knowledge creation, dissemination, and embodiment.

Furthermore, they emphasise knowledge exploration for creating new knowledge, also exploiting existing knowledge. This situation will be the primary database to build its effective knowledge repository [37]. Overall, this gap can occur if the company is incapable of achieving design effective to KMS and an appropriate knowledge repository that the availability of effective modelling and simulation enables to avoid hidden pitfalls as explained below to bridge gap 4:

- Knowledge Repository: According to Lin,X., *et al*, knowledge repository, appears topic across-the-board in the literature of KM , particularly in subscription with KM outcomes that are be available to the businesses, this is because it refers to a system or system architecture that houses and manages a collection of corporate intellectual assets. In other words, it is a collaborative system with which people can query and browse both structured and unstructured information in order to retrieve and preserve organisational knowledge assets and facilitate collaborative working.

However, the focus of such systems tends to be on storing in an unstructured way, but nonetheless with explicit forms of knowledge such as unwritten local rules and procedures. The aim is to be able to retrieve data in a context-sensitive way rather than just through the use of simple keyword-based retrieval, whereby these systems claim to move beyond simple information retrieval and act like a true KMS . Some potential application areas for such systems are: 1) to identify relevant experts; 2) to identify potential areas for collaboration; 3) to identify Networks of Practice; 4) to uncover hidden knowledge[58]

- KM aim of exploiting and realising knowledge of the employees to build organisational culture where knowledge-sharing can thrive by the process of manufacturing to create new knowledge in the process [59]. Knowledge vision gives a direction to knowledge creation, sharing and reuse processes [60]. On this level KM refers to the process in which organisations assess the data and information that exist within them, and is a response to the concern that employees must be able to translate their learning into usable knowledge [61].

So in this case there should be appropriate mechanisms for validation and authentication of the knowledge encapsulated in the system [62]. At the same time, the organisations need to hire and keep knowledgeable people inside firms for access to an extensive pool of knowledge—whether this is their understanding of customers' needs and the business environment or the skills and experience of staff. Many companies still only pay attention to how to protect knowledge. One of the most clearly described forms of knowledge-protection is the non-compete and non-disclosure agreements, and these contracts are commonplace [63].

Gap 5: Interviewees confirm that the knowledge acquisition of developed technology to improve firm's competition depends on the capabilities of senior management to acquire developed core technology in KMS. This brings about consistent and reliable decision-making for technology acquisition and in large-scale manufacturing organisations is vitally important, an important tool to bring about a cultural shift that facilitates the ongoing use of knowledge among decision-makers and a decision culture.

On the other hand, a careful analysis should be conducted in technology acquisition decisions, because such decisions require a special type of knowledge and expertise in the work. The coherence of the team and leadership has a positive impact on learning and creativity. Reflection of that knowledge is transferred between all levels of the organisation but at the same time requires the implementation of organisational learning.

This allows the firm to develop learning processes by considering the role of OL through the capacity of capabilities of KM to drive the behavioural routines of OP: acquiring, conversion, and application. The firm's resources include all assets, capabilities, organisational processes, attributes, information, knowledge etc.—controlled by the firm. And ultimately, this enables the firm to conceive all implement strategies that improve its efficiency and effectiveness. Therefore, through the interviews the following reasons to gap 5 could be diagnosed:

1. The differences of views among senior management and members of staff firms concerning transfer of knowledge between all the organisational levels.

2. The incentive systems are very weak in the firms, which inhibits current staff skills from developing, limited to special careers only and not helping with innovation in the work.

3. The weakness in preparing to create new skills to work in team environments, ability to solve problems, and mentoring of new knowledge workers during the work to understand the requirements for critical functions.

4. Different perceptions of management about business strategy of organisation, goals, aspirations and KM initiatives for aligning employees' ideas with the firm's goals strategically.

Consequently, it see that this clearly shows there are gaps are creating between thinking   the senior management and the employees because of differences in the position, role, tasks and professional knowledge in a firm [13]. In other words, this concerns the view that KM is the explicit and systematic management of vital knowledge and its associated processes of creating, gathering, organising, diffusion, use and exploitation.

It requires turning personal knowledge into corporate knowledge that can be widely shared throughout an organisation and appropriately applied [64]. However, this gap can occur if the companies were incapable of a creating an effective practice community within the firm, at the same time adopting an incentive system to build up the skills for achieved strategic

success for both the firm and individuals, making employees proficient in their skills and knowledge over time, as explained below to bridge gap 5:

1. Practice Communities: it see that the acquisition of knowledge in practice communities is a social process in which people can participate by learning in different positions depending on their level of authority or seniority in the work—in other words, whether they are a newcomer or have been a member for a long time. Central to their idea of a person being a means of acquiring knowledge is the process by which a newcomer moves from peripheral to full participation in the community as they learn from others; they termed this process 'legitimate peripheral participation' [65]. This means explaining the nature of knowledge assets and strategies to the managing, as well as supporting the knowledge-based view of the firm and the theory of dynamic capabilities by explaining the dynamic processes of organisational knowledge creation [66].

The process of constructing knowledge is changing and exploring an individual's knowledge is an asset to exploring collective knowledge, which is situated and context-specific. In a community of practice, knowledge is constructed as individuals share ideas through collaborative mechanisms in work for interpreting complex activity. In other words, it is a process of constructing, which provides organisational members with identity and cohesiveness [67].

2. Incentives System: Dollman, says that employees contribute to organisations in response to the 'incentives' they are provided. Incentives can be classified as material, solidary, status, or purposive [68]. Dependence on particular incentive systems may determine the magnitude of organisational flexibility [69]. Therefore, often the issues of motivation generate strong debate about incentives for knowledge workers [44].

Accordingly, it is recognised that motivation relies to a great extent on the cultural standards in an organisation or group [70]. This is because when it comes to the effect of incentives on individuals one can differ between extrinsic and intrinsic motivation. Since the extrinsic incentives serve the indirect satisfaction of a need, the extrinsic approach is a means of satisfying needs. In this situation, something is done only to have positive outcomes or to avoid negative consequences. Therefore, the classic extrinsic motivations are monetary gratification, while intrinsic motivation is just the opposite: it means satisfaction is achieved immediately from the activity or its aim.

Gap 6: The interviewees confirm that the capacity of KM applicability requires acquisition of cutting edge technology to develop a reliable product as cognised by senior management and employees. Time must be found to develop creative solutions for developing a marketable reliable product that will help to create technology knowledge, and to go for another round of venturing into capital funding, to create value within the company. This is because both variables can be seen as a response to changes in the environment and as a basis for obtaining competitive advantage. When management creates working conditions based on support and teamwork cohesion, the OP must be improved within firms.

Moreover, when the firm has a vision of managing innovation and creative learning as a way to achieve a competitive advantage it might create greater organisational wealth and enhance OP at the same time, as well as reducing the innovation gap (both technological and administrative). It will help in increasing the organisation's value, because it will be troubleshooting conflicts among leadership and employees in different administrative levels [71].

This would be due to both conscious and unconscious insight from sharing it with all employees. This requires tacit knowledge and cognitive maps—cognition for each individual's knowledge based on cognition of the senior management to capture and transfer knowledge before any employee leaves an organisation and therefore is not new to the knowledge manager's agenda. The reason for this is the number of people expected to retire over the coming years being significantly high.

That means a mass exodus from the workforce and with it potentially crippling losses of knowledge. Thus, corporate KM provides ground for a conceptual study of its impact on the firm's innovation capability future that promotes the blending of new ideas and past experience of the employees. Therefore, through the interviews we could diagnose the following reasons for gap 6:

> 1. Lack of planning programmes that effectively implement KM goals, because of ignoring KM tools that promote the blending of new ideas between the employees.
>
> 2. Lack of constant and consistent communication methodologies to keep employees excited and informed, to share the current knowledge within firm.
>
> 3. Weakness of professional standards to create trustworthy teamwork encouraging quality contribution of information, due to excessive management demands of the work. The power of knowledge of the employees is represented by capacity in retaining the knowledge for the benefit of the organisation as a whole. This is because the knowledge has been considered an expensive commodity, which, if managed properly, means a major asset to the company. In the workplace of the future for firms, the fiercest competition apart from the customers may be for the hearts and minds of employees. Most companies will invest in their knowledge assets by recruiting knowledgeable people in the first instance and then further by training them. However, the companies can gain competitive advantage by retaining and managing the in-house knowledge to help exploit the business advantage [72]. Generally, this gap can occur if the companies were unable of a creating teamwork cohesion effective within the firm while adopting knowledge measurements to build up the skills and the capacity to adopt the innovation included in the firm to achieve objectives, minimising the loss of critical, valuable experience and information when an employee leaves the company as explained below, to bridge gap 6:

- Teamwork Cohesion: Some authors are explaining that successful teamwork proceeds from a climate of community and a new kind of leadership supporting the teamwork [73]. This OL and teamwork cohesion has good effect on organisations' capacity to use innovation (technical and administrative) to meet the changing needs in the environment, because it reflects cross-pollination of ideas and transfer of data between administrative levels and the employees that would be of great help in taking the company toward the global market [74].

Thus, one of the most important causes for the failure of teamwork, it is the absence of support from leadership [75]. Therefore, there must be motivation and integration of the opposing interests of the different people, forming a unit (cohesion) that enables activities to be carried out efficiently, taking advantage of the talent and intelligence of the teams to be well established in the industry [76].

- Knowledge measurement: the issue of measuring the value of knowledge (and of KM) remains one of the enduring challenges in KM. With the growing realisation that financial measures 'look backwards and at physical assets only', organisations need to get a grip on measuring what is perhaps their most valuable asset—knowledge [71].

During the last few years several methods have emerged that specifically focus on the measurement of intellectual capital. This comprises the intangibles of the business that underpin future growth. It includes assets such as brands, customer relationships, patents, trademarks [77].

For companies to achieve goals they have to measure. The measurement is the basis through which it is possible to control, evaluate and improve processes, because for the manufacturing operations to be efficient they cannot be viable in every situation; new assessments and developments are essential for the advancement of knowledge in any company that desires the development of knowledge for the better.

Therefore, more and more businesses have embarked upon KM programmes via creation of managerial positions with knowledge managers and knowledge teams, but the value of KM is difficult to pinpoint and the effectiveness of KM remains as yet to be proven [78]. However, the measurement here is widely understood, as various procedures that are believed to deliver information on   the size of the knowledge resources, the kind of knowledge and its usage in the realisation of the organisation's aims [79]. Overall, Table 12 summarizes the knowledge gaps with reasons and treatment that is reported previously in the findings.

Table 12: The Knowledge Gaps of Reasons and Treatments

Gaps	Statement of Gap	The Reasons for Gap	Core Ideas to Reduce and Remove Gap
1	The gap between the necessary knowledge to improve a firm's competition and the actual acquisition of knowledge of developed technology to improve the firm's competition as cognised by senior management	1. The administrative levels tend to resist change rather than embrace it. 2. The fail to realise all the details and the preparation required to work for the purpose of increasing knowledge and expertise by the employees. 3. Failure to understand the changes in the environment. 4. A failure in building a framework of business based on a methodology that captures suitable aspects to knowledge within the context of organisational culture of the firms.	1. Focusing on Knowledge Resources 2. The Infrastructure for the IT. 3. Knowledge Scope
2	the significance of the Planning and IT to KM	1. Untenable capacity of the firms to adopt a framework linking the technical knowledge of a firm's managers to its ability to gain and hold competitive advantage. 2. Lack of a transfer process of tacit knowledge to the explicit. 3. The KM target it is not part of the operational system needed to supply information about the activities and performance throughout the organisation. 4. There is no existed congruence between the environment of rapid development and when the technologies of the firms are unsuitable	1. The concepts of inertia and innovation are seen as opposites. 2. Firms need to analyse the employees' orientations and to gain full support from the top managers for change when the employees are not well suited for their positions in manufacturing 3. Decision-Making: Depending on the senior managers moving between sites and maintaining an overview
3	The capacity for KM applicability requires planning.	1. There is little or slow transfer of knowledge with the staff on different sites in the work.	1. Guidance of Employees: the top management must acknowledge that staff members are the most

		2. Top management ignores the requirement of new update designs. That means, a pushing of development all the time but as yet with no finalised product. 3. The weakness in collective ability to understand the implications of change over time in KMS by employees. 4. The chasm between information processing and the relevance in the changes of external and internal competitive environments. 5. The defectiveness in creating a database for acquisition of experience of experts in the company before retirement and movement	important factor in the business and are more than just employees. 2. Top Management's obligation toward knowledge. 3. Principle of standard processes: to get best practice in works, believing that the concept of process-management would be helpful in creating more value to the customer with less work due to processes that produce high performance.
4	A preparing the software for applying KM	1. Disregard of valuable resources for understanding the general behaviour of clients and competitive companies. 2. Lacking focus on feedback of the customers to track and discover defects in the manufacturing first. 3. Weakness of links between systems within firms for avoiding the stagnation of knowledge.	1. Knowledge Repository: this is because it refers to a system or system architecture that houses and manages a collection of corporate intellectual assets. 2. Realising knowledge of the employees to build organisational culture where knowledge-sharing can thrive by the process of manufacturing to create new knowledge in the process.
5	The capabilities of senior management to acquire developed core technology in KMS.	1. The differences of views among senior management and members of firms concerning transfer of knowledge between all the organisational levels. 2. The incentive systems very weak in the firms. 3. The weakness in preparing to create new skills to work in team environments.	1. Practice Communities: the participate by learning in different positions depending on their level of authority or seniority in the work. 2. The Incentives System: Dependence on particular incentive systems may determine the magnitude of

		4. Different perceptions of management about business strategy of organisation.	organisational flexibility.
6	The required acquisition of cutting edge technology to develop a reliable product as cognised by senior management and employees.	1. Lack of planning programmes that effectively implement KM goals. 2. Lack of constant and consistent communication methodologies to keep employees excited and informed, to share the current knowledge within firm. 3. Weakness of professional standards to create trustworthy teamwork encouraging quality contribution of information, due to excessive management demands of the work	1. Teamwork Cohesion. 2. Knowledge measurement: the issue of measuring the value of knowledge (and of KM) remains one of the enduring challenges in KM.

10. Conclusions

Six sources have determined the relative importance of elements in KM in the manufacturing firms under this study, which involved identification of knowledge resources, identification of information needs, acquisition and creation of knowledge (knowledge cognition), organisation and storage of information (knowledge inertia), knowledge dissemination (knowledge advantage investigation), and usage of knowledge to support DSS by its three types (GDSS, ESS and ES), where that reflects positively on OP.

The benefit of the structured interviews was that they helped us to build a good working relationship between the study variables. With the topic areas decided in advance, the specific questions have helped to provide a broad picture of the whole domain to clarify those elements or the specific parts of the knowledge base to those firms.

However, it has been found that knowledge dissemination (knowledge advantage investigation) has been represented as the first stage in conceptual model in study, reaching 30%. This indicates that both implicit and explicit knowledge are considered key resources to creation and innovation. This is because it involves learning organisation and purposefully constructing structures and strategies to enhance and maximise the way things are learned from their experiences and the experiences of others outside their organisations.

This encourages the firms to continually transform themselves through facilitating a climate in which members are incited to learn and share knowledge, linking learning opportunities in cross-pollination of ideas and adopting trials of customers through feedback. Development strategies for employees and the business are created centred upon learning and dissemination of information and knowledge by exchange between administrative levels and employees, tightly bound up in the practical experiences of seniors during the work.

Moreover, a sense of commitment to creating an innovative solution to challenges is necessary because a different competitive advantage generally relies on being unique or highly unusual so that it transcends the obvious or the 'norm' [80].

over and above that, the   commitment is fostered through an environment of trust and care where individuals feel positively obliged to share ideas and knowledge that benefits all within the organisation rather than the individual or small group concerned [81].

11.   Research implication

This preliminary study is detailed enough to be deemed completely reliable. In view of that, it provides data that can be used essentially as the basis of the main investigation. On this premise, this case study could be implemented on mechanical, systems engineering, and manufacturing industries. This is because the findings have been tested where the primary objectives to this research investigate KM gaps in the manufacturing industries generally. Additionally, the research has examined the current use of KM tools and assessed the most prominent methods. Furthermore, this paper has addressed the examined objectives by providing an explanation of several issues; identifying the key sources of KM and the corresponding factors.   Given that, the examining KM is found to occur most strongly over the stages of manufacturing and on which high level KM mainly occurs.

12.   Future work

One of the more significant findings emerging from this study is that six sources have been determined with the relative importance of KM elements in the manufacturing firms. These involve the identification of knowledge resources, information needs, acquisition and creation of knowledge (knowledge cognition). Additionally, the organisation and storage of information (knowledge inertia), dissemination (knowledge advantage investigation), and the knowledge usage to support DSS by its three types (GDSS, ESS and ES), reflects positively on OP.

Consequently, a semi-structured interview has been used as a data collection tool. Accordingly to achieve its aims, the study has made use of an official website containing a database of most registered Iraq manufacturing companies and the manufacturing sectors and services. These involve sectors such as: Food, Engineering, Utilities, Construction and Chemical sectors. The lists also include the Textile sector, information centre and the scientific knowledge centre [25]. Furthermore, the Arvia Technology and Food Company at the UK were also incorporated in finding details about KMS gaps and for validating the proposed framework of KM gaps.

Further experimental investigations are needed to estimate the knowledge gaps. That is, creating of models to enable companies identify the gaps and inadequacies in their knowledge management systems and processes. This should be considered both for the formal and informal knowledge transfer methods. In fact, it becomes pertinent for the modern employees to learn the knowledge from senior employees that display information in most cases. Given that, knowledge as acquired on an equitable basis is presented in a highly visible and accessible format.

More broadly, research is also needed to conduct survey, but with bigger size of the samples and companies to validate it experimentally. It would be interesting to assess the effects of new survey in gaining more powerful tools and then follow-up of the quantitative research findings analysis.

In other words, this analysis will provide   widely technical knowledge and expertise needed to select and apply the most appropriate knowledge in the organization. That means, through analysis of "knowledge gaps" the companies can be described with the difference between the enterprise's current capability and the capabilities required for knowledge management. These findings will allow for the development of tangible dimension indices for the KM gaps.

Acknowledgements

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