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The Use Management of the Knowledge Management and the Information Technologies in the Competitive Strategy of a Self-Propelling Industry

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***Abstract*—**This article presents the beginning of a wider study that intends to demonstrate how within organizations of the automotive industry from the city of Querétaro. Knowledge management and technological management are required, as well as people's initiative and the interaction embedded at the interior of it, with the appropriate environment that facilitates information conversion with wide information technologies management (ITM) range. A company was identified for the pilot study of this research, where descriptive and inferential research information was obtained. The results of the pilot suggest that some respondents did noted entity the knowledge management topic, even if staffs have access to information technology (IT) that serve to enhance access to knowledge (through internet, email, databases, external and internal company personnel, suppliers, customers and competitors) data, this implicates that there are Knowledge Management (KM) problems. The data shows that academically well-prepared organizations normally do not recognize the importance of knowledge in the business, nor in the implementation of it, which at the end is a great influence on how to manage it, so that it should guide the company to greater in sight towards a competitive strategy search, given that the company has an excellent technological infrastructure and KM was not exploited. Cultural diversity is another factor that was observed by the staff.

***Keywords*—**Knowledge management, technological knowledge management, technology information management.

I. Introduction

KNOWLEDGE management within organizations implies an imperious need for growth, lasting throughout time, and generating innovation and the development that will therefore create competitive advantage. For [13], the knowledge that takes place inside organizations must be kept, such as the tacit knowledge that is formed by emotive and perceptive factors; the explicit that is given through language to be able to be transmitted from a type of knowledge to another to create the necessary strategies, and thus to achieve the growth of KM. According to [20], knowledge is referred, thought and conscious bout the human talent that is involved in the process of the organization; according to him, there are four stages for the acquisition of KM, which are: Stage 1 Identification of the sources from knowledge, Stage 2 Extraction of knowledge, Stage 3 knowledge elicitation requirements and Stage 4 Knowledge acquisition analysis. On the other hand, the globalization as a change factor has propitiated the alliance and expansion of companies at a local level in order to face the global competition. All of it has led to the usage of technology as a vital constituent in these days and the role of it in KM. Reference [17] explains the importance of KM and Technological Knowledge Management (TKM) as the important parts that they are within an organization. The former appears as a facilitator element in the improvement of the whole organization, whereas, the first one involves the decisions making process. It is also notable to say, that without the complement of technology, no organization could be able to compete today, nor to subside.

Reference [1] indicates that knowledge that is built on the daily practice of the individual, at the same time responds to needs, interests and attitudes, in the historical, and economic social context in which it develops. Fur the more, it can be used in the step between the tacit and explicit knowledge. Accordingly, [19]-[24], in his publication ¨The Tacit Dimension¨ (1967), he mentions that personal knowledge depends on the skill each one is to perceive; this is to think and to act in to correct way. Also, it expresses that the knowledge is reducible to a proportional one, since there exists knowledge skills that are not possible to transmit verbally. Reference [14] clarifies that the capacity of adjustment to the change is essential for the survival of the organizations, as well as the knowledge which is a key element needed to manage the organizations learning that demands integration models which go beyond providing information to the people, for example learning also serves them as aim for lasting throughout time and in order to innovate. Additionally, [16] proposes a conversion of the tacit and explicit knowledge integrated by four types of knowledge conversion:

1. From tacit to tacit, or socialization: they are shared experiences; i.e., to share the experiences with the group and to form an alone criterion or a process.
2. From tacit to explicit, or externalization: to share knowledge by means of the writing and the images, metaphors analogies or both. Metaphors are a tool of

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communication that can help to reconcile discrepancies of meaning, since they are thoughts of different things, and depend on the intuition and the holistic imagination. Similarly, the analogy depends on the rational thought and centers on similarities structural/functional between two things.

3. From explicit to explicit, or combination: it is given in the formal education by means of a systematizing concept process.
4. From explicit to tacit, or internalization: it is related to the term ¨learn doing¨ that is the know-how, following processes before they are stipulated and one that has a conclusion.

The creation of organizational knowledge is a constant interaction between tacit and explicit knowledge. According to [3] in order to achieve organizational knowledge, a factorial exploratory analysis has to be carried out, where from three principal blocks are extracted from the intellectual capital: the human capital (where experiences, skills, commitments or professional development from the employees is approached), the structural capital (includes the intangible assets of the company that form part of the structural design), and the relational capital (intangible assets that the company obtains when it supports relationships with its context agents such as their clients, suppliers or allies).

The process of KM is a decisive production factor that manages to be very important in the automotive enterprises that make efforts to be more efficient and competitive [23]. Decision-making in the companies is part of KM that will have an impact in the organization resulting in improvements in the operative part and in good economic performances according to [23]. KM implies that the capacity to manage knowledge in the wisdom in relation to the clients, and directors increases the financial results.

KM turns into a type of instrument used for the integration of the parts that have common interest and that participate in that cooperation, which yields into tangible results that normally vary in nature, and others that are constructed into intangibles ones, known as "added value". According to [1], the KM models have a jointly factor, the human capital, which is the intellectual development and the motivation that interferes with the processes of the company in order to make great value. This is the reason why people that are part of the organization have to be guarded.

Reference [2] declares that KM is defined as a strategy that turns the intellectual values of organizations' human capital into higher productivity, added value, and as a higher means of competitiveness. [18] From perspectives of many authors' can be observed different proposition on KM, where they converge on the indispensable it is, and on the benefit organizations have as "added value" and competitive advantage. Reference [21] enhances the issue that conditions the sector and needs to maintain strategies in KM.

A. TKM

TKM is the action inside KM, and at the same time, inside an automotive enterprise, which means that, a new knowledge can be generated inside a new technology. Technology management and technological management knowledge concepts can be confused; this indicates that one leads to the other.

TKM refers to the administration of technological resources inside a company to make the work more efficient inside it.

TKM departs from the acquired technology and generates a new one, which breaks with the established paradigms in which it innovates, and that burst inside the established technologies up to the moment. TKM must be visualized towards a change of paradigm, that is capable of making it look as a process which helps the company acquire knowledge that is transferred from tacit knowledge to the explicit one; and not as a process to achieve the best acquisition of software machinery or the implementation of administrative strategies or models. Contrary to this, [8] establishes that technological management integrates concepts of quality management, monitoring, risk factor management, and the analysis of different factors such as financial, economical, technological, productive, organizational and social. With a systemic vision rested upon the usage of expert system tools in order to provide an integrated vision of these factors in the process of technological management.

Sumanth and Sumanth mentioned in [15], define technological management as the process in which an organization notices a need for technology by means in which the organization is insufficient without it, which is then acquired and adapted to fulfill the company's needs. As a result, it obtains advances from it, and then abandons it to find another one that best satisfies its needs to increase or to maintain its productivity. This process is described as a constant cycle that can be applied at any level such as: product, service, function, center of work, division plant, corporation and national or international industry.

For [22], the technological management has turned into an essential activity for the business world, since it helps to handle companies' operations, as well as the strategic development of capacities that facilitate them to compete on the market. In addition, thanks to the suitable technological management, a company is prepared for the future, having reduced the uncertainty associated with the change and the risks in the market, increasing the flexibility and the rapidity to respond earlier to the new challenges. According to [10], technological management is the administration process of research and development activities of all the stages such as: the project conception, the negotiation, the formation of work teams, follow-up of the project, evaluation of the results, and technology transfer towards the productive automotive sector.

Inside knowledge technology management, IT are found, which are considered as a fundamental base in the automotive companies' process. For these companies to be communicated in real time it is a priority since the decision making process depends on the communication and the information that they count on.

B. IT

In KM, organization and the technological management are

found; in this context the role that IT plays is fundamental, and lies in the ability to promote communication, collaboration, search, and the generation of information and knowledge. It is necessary to remember never the less that when KM is discussed the collaborative environment provided with a constant vocation for learning. It is a matter of achieving a job environment in which the workers can realize all kinds of learning activities, and share the acquired knowledge with their colleagues and clients. According to [7] strategic KM allows the creation of structures and processes that promote knowledge, for knowledge professional. Then, operative KM takes part in information and communication technologies (ICT), as a support to organize, classify and distribute the knowledge from and towards the collaborators of the organization previously mentioned. The systems of KM are based on the concept of information system. Whereas IT is a generic term for computer, programs, and telecommunications; fundamentally, information systems are a wider concept, which refers to how information flows are designed inside the organization so that they satisfy the company needs of information, [12]. Similarly, [5], [8] mention that in order to be successful in a new economy, a conceptual frame is needed, referring to knowledge model as a central asset in the organizations, and not as an expense, which does not justify the investments in IT as a factor of success being part of a wider strategy that it includes social and cultural dimensions.

Information and communication technologies are found within the organization and help the automotive industry with productive customers and suppliers for real time deliveries and it helps the decision making process for the benefit of the company.

IT as a strategic factor inside the organization, is related to the definition offered by [4], [11], which says that it is the study, the design of the development, the promotion, the maintenance, and the administration of the information by means of IT systems that not only includes computers, the most versatile IT tools, but also mobiles.

The usefulness of these IT, is to transform the way of doing business, integrating processes, to improve the productivity and the relations between the collaborator companies.

II. Perspectives of the Study

The raised perspective leads us to conceiving the following questions of investigation: *what challenges does this one raise the technological management of the knowledge (TMK)?, and innovation in our cultural context?, how to take advantage of the potential that offers the technological management knowledge?, how does one present the processes the technological management of the knowledge in IT?, the management of the knowledge do they develop or propitiate learning in the organizations?.*

General Purpose: "To determine the basis of IT process through the TKM", whose aspiration is to develop a methodology that support the automotive organizations.

Specific objectives:

- To check the different KM processes
- To identify the characteristics that IT technological management presents
- To analyze the technological management in our cultural context
- To identify the potential advantages of TKM
- To develop the IT processes of the company across the KM theory.

III. Methodology

The investigation that originates the present article is from a pilot test that an automotive company Queretana develops where they produce power steering gear the Ford and Chrysler brands. The main topic is *"The use of KM and Technology Information Management (TI) in the competitive strategy of an automotive industry*".

This investigation is an exploratory descriptive case study where the objective reality will be analyzed *"To determine the basis of IT processes through the TKM"*, whose pretension is to develop a methodology to support the automotive organizations.

In Table I and Fig. 1, the hypotheses that were raised in the investigation and the methodological model are presented:

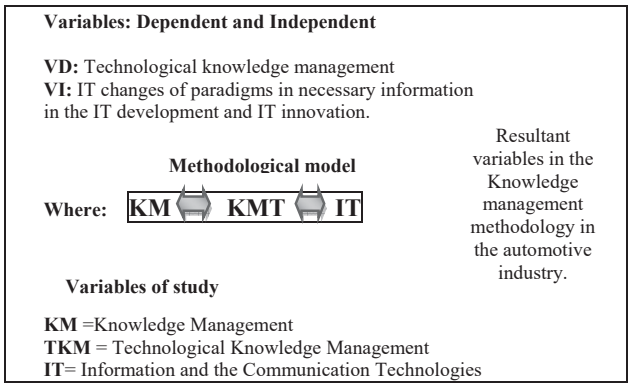

Fig. 1 Variables of KM

For the description of the VI variable changes in necessary information of IT paradigms for the IT development and IT Innovation, in Fig. 1 it is convenient to explain the concept of paradigm change. Reference [9] considers paradigms as universally scientific recognized accomplishments that, during certain time they provide models for problem and solutions linked to a scientific community. IT that giving course for new technologies for example since it would be the case of the mobiles at present.

TABLE I
Hypothesis of the Investigation

Hypothesis	Void Hypothesis
H1 TKM of the paradigm change	**Ho** TKM does not propitiate the paradigm change in IT
H2 TKM determines the necessary information in the development of IT	**Ho** TKM does not determine the necessary information in the development of IT

The Instrument I was designed in four blocks with its respective variables. Table II shows as was made the

instrument by Blocks. The instrument had 53 questions in total. A total of 21 subjects from the manufacturing area were polled (all engineers).

TABLE II
INSTRUMENT MEASUREMENT BLOCKS

Block	Variables	Unit	K/ of Items
Block 1	General information	Personal information	3
Block 2	KM	Attitudes	20
Block 3	TKM	Models	10
Block 4	Information and Communication Technologies	IT	20

The evaluation criteria of the instrument were carried out with a Likert scale where:

1. I put out of tune totally
2. In disagreement
3. Neither in agreement nor in disagreement
4. In agreement
5. In total agreement

Listed in Table II, each of the instrument blocks is described:

- **Description of the variables:** The variables in this study were taken under the following criteria:
- **Personal information**: It refers to the worker's personal information
- **Attitudes**: It refers to the manifested states of mind somehow
  - **Models**: It refers to KM models used in the company
- **Information and the communication Technologies**: It refers to the information and communication technologies that are used in the companies.
- **Validation measurement instrument Test:** The Cronbach's alpha Coefficient

$$\alpha = K/K-1\left[1-\sum S_i^2/S_T^2\right] \quad (1)$$

where: K Items number, S_i^2 Variance sum, S_t^2 variance items, and α is Cronbach's alpha's Coefficient, if α = 0.96 the test pass.

Example to choose of a sample; the vehicle company of manufacture steering device was analyzed

$$n = \sigma^2 Npq/e^2(N-1)+\sigma^2 pq \quad (2)$$

where **N**=1500 (employments), **P**= 0.50 (Probability of occurrence of the event) **Q**=0.50 (Probability of not occurrence of the event, confidence level 95%, **E**= .05, **Z**= 1.96 (Value of Z taking of tables at 95% of confidence level); **the test indicates a sample size of n** = 306 (employments in the study)

IV. RESULT/FINDINGS

Analysis of Results

In this pilot test, descriptive and inferential statistical tests are made to performing a hypothesis test in which the Sigma Plot 12.5 version and SPSS 13.0 were used.

A. Descriptive Statistic Test

Figs. 2-7 present blocks issue from statistical analysis and discussion take account the class indicated in each figure and employments that participate in the study.

a) KM (Block 2)

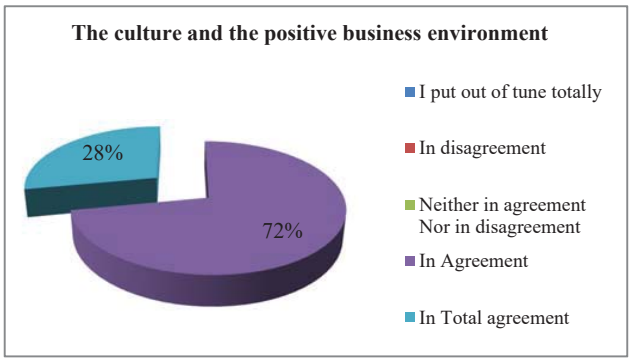

Fig. 2 The culture and the positive business environment

Fig. 2 shows the results regarding the point of view of the employees, 28% were total agreement about technical feature of their work, 72% only agrees. From that perspective, it is possible to assess that the organizational culture and the business's environment is positive, and it seemed to be coherent with this company, though it is not possible to know how that particular culture in the work environment benefits the business.

b) KM (Block 2)

Fig. 3 shows the results participants were asked if the business where they work on has an open communication and involves each and every worker, from that, 13% is in total agreement, 62.33% is in agreement, 20% in disagreement, and 5.1% is in disagreement. The fact that some of the workers do not feel that the communication is open and that it does not involves each and every of the workers, may be to due lack of feeling part of their work team or that the instructions do not obtain in a clear way. From that, they could not understand the questions, or they were not able to answer them as part of a team.

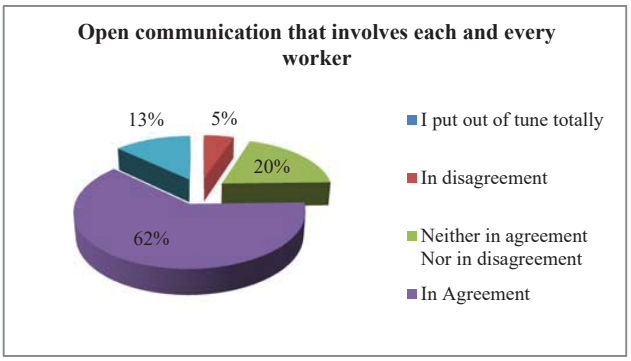

Fig. 3 The communication is opened and involves each and every of the workers

c) TKM (Block 3)

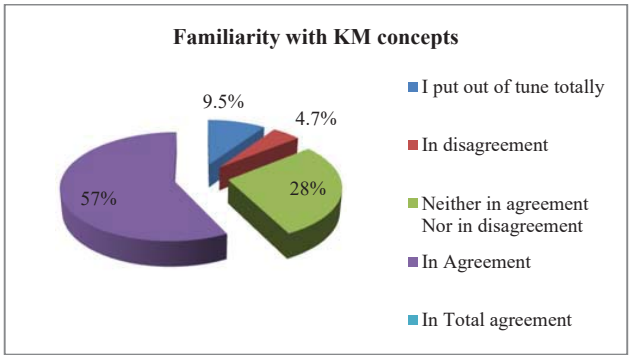

Fig. 4 The Familiarity with KM concepts

Fig. 4 shows the familiarity of the participants with KM concepts, results indicate that 4.7% is in disagreement with it, 9.5% in total agreement, 57% in agreement, and 28% is neither in agreement or in disagreement. The reasons attributed to the 57% are that the TKM model is not identified or that they may be more than one functional model and that creates confusion to identify them.

d) TKM (Block 3)

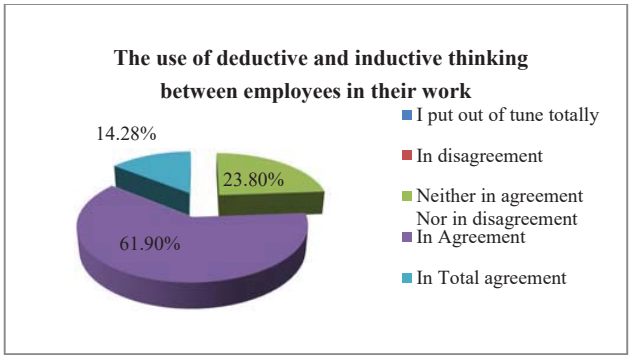

Fig. 5 The use of the deductive and inductive thinking common between the employees in the work

Fig. 5 shows the results for the inquiry about the use of deductive and inductive thinking between employees in their work that is commonly used and that they consider important for the management of machinery that one finds in ideal conditions for the production of a product. In this case, 14.28% correspond to put out of nor totally, 61.90% in agreement, 23.80 % neither in agreement nor in disagreement.

e) IT (Block 4)

Fig. 6 shows the results regards with the IT use in marketing, 46% of the participants are in total agreement, 42% is in agreement, 10.30% neither in agreement or in disagreement, and 2.2% is in disagreement. Probably, those who are in disagreement with the statement is due with not having accessed the web page of the company that presents marketing information.

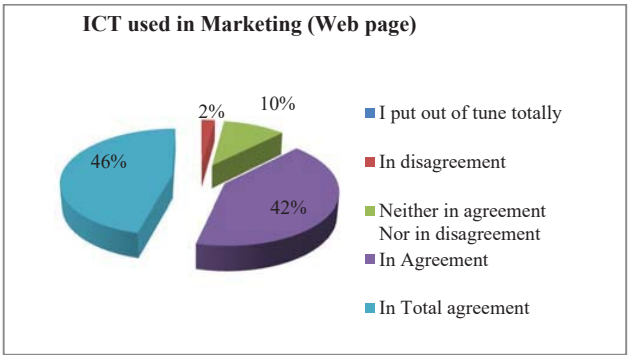

Fig. 6 ICT that are used in marketing of the automotive enterprise (Web Page)

f) IT (Block 4)

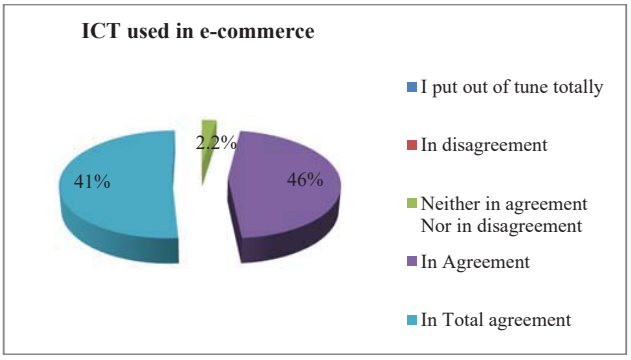

Fig. 7 IT that are in used in e-commerce

Fig. 7 shows the results that 46% is in agreement, 41% is in total agreement, 2.20% Neither in agreement or in disagreement about the statement IT that are used in electronic commerce, applied to the enterprise they work for. Likely 2.20% has not noticed that they can use the technologies of the information and the communication in the electronic commerce.

B. Inferential Statistics

Non-parametric test trough of Sigma Plot software for windows version 12.5, and SPSS software version 13.0, was realized normality regression test.

The results of the normality test were taken as follows: the trend from the model and IT variables according to the responses from the participants fall within the parameter's error limits f 0.05 to 45, as well as within the indicated range.

In Fig. 8 is observed that variables have a parameter error of 0.05 is at 45° inside the model and IT variables range, thus the proposed model was validated in this study.

The dispersion normality test, as shown in Fig. 8 indicates that its error parameter is 0.05 and is at 45° within the allowed range to validate the variable.

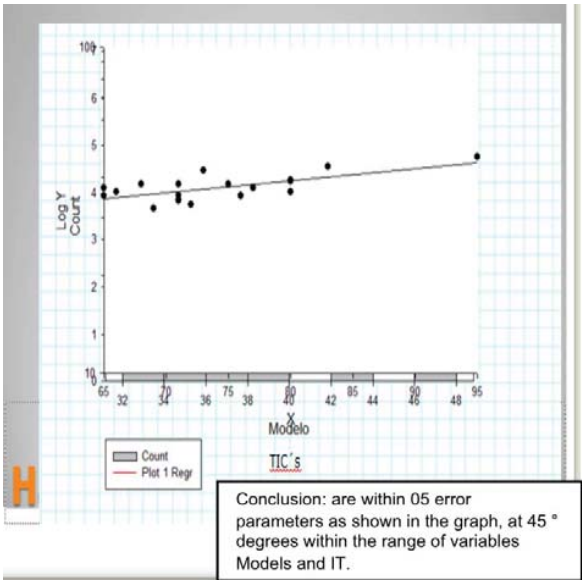

Fig. 8 Dispersion normality model

V. Conclusion

The pilot test analysis provides relevant information for the production of the instrument for the investigation that is in process. In the investigation the following information processing appears: a) descriptive statistics and b) inferential statistics. From the descriptive statistics, it is inferred that the enterprise does not fully take advantage of KM usage in the ideal way, since it does not have a special department for KM, and it manages it across different human resources groups. Similarly, it shows that it does not have a KM model. As a consequence, the transfer of knowledge and the interconnectivity problems between the different work areas may arise. Nevertheless, the company does have a wide platform for real time IT.

Finally, it is concluded that the pilot instrument is of great usefulness to determine if the items achieve the allowed parameters, due that they present certainty and clarity in this investigation. Likewise, the methodology that will be proposed in this research project will have major efficiency inside the an manufacture industry that produces steering gear for Ford and Chrysler brand cars of Hermosillo Sonora, which are companies that constantly seek to be competitive, and that are catalogued as one of the best plants established in México according to [6].

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