Journal of International Scientific Publication:
Materials, Methods & Technologies, Volume 4, Part 2

THE MULTIDIMENSIONAL MODEL OF KNOWLEDGE MANAGEMENT IN THE COMPETITIVE ENTERPRISE

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Abstract

Nowadays a successful flexible enterprise has an organization knowledge-based. In an era characterized by changes, globalization and competition, knowledge is without doubt the most important asset for a company to gain a competitive advantage. In the enterprise, there is an huge amount of information especially in textual documents. For obtaining specific goals it is necessary an intelligent and efficient management of enterprise knowledge. In this paper a multidimensional model of Knowledge Management, in the competitive enterprise, is analysed.

Keywords: *knowledge management, knowledge classification, unstructured information, information system, performance indicators.*

1. INTRODUCTION

The environment in which companies operate is complex and turbulent: instability of markets, global market, consumers increasingly demanding, more sophisticated products, dynamic and aggressive competition, dynamic costs and prices, technological innovation. Who wants to be successful must continually compete with its competitors, meet customer demand and gather, before the others, useful information for market opportunities. The information becomes obsolete quickly in conditions of dynamic market. An intelligent management of information is a prerequisite for effectively and efficiently reach certain business goals and success. This is important for the realization of a more creative and innovative environment for customer satisfaction.

The approach to KM requires that the company systematically collect, organize, formalize the knowledge created by people and promote collaboration among employees (Lee and Choi, 2003). An objective of KM is to make explicit and accessible the tacit knowledge of any enterprise resource in order to reach competitive advantage (Yang et al., 2008). The KM enables the company not only to produce goods services but also to create a sense of participation and a value for customers, employees and all stakeholders.

The KM focuses on improvement of efficiency, effectiveness, quality and innovation of business processes (Sunassee and Sewry, 2002) (Smuts et al., 2009).

2. THE MULTI-DIMENSIONAL KNOWLEDGE MANAGEMENT MODEL

In this paper a multi-dimensional Knowledge Management model (Figure 1) is analysed. Single dimensions of the figure will be descripted in next chapters.

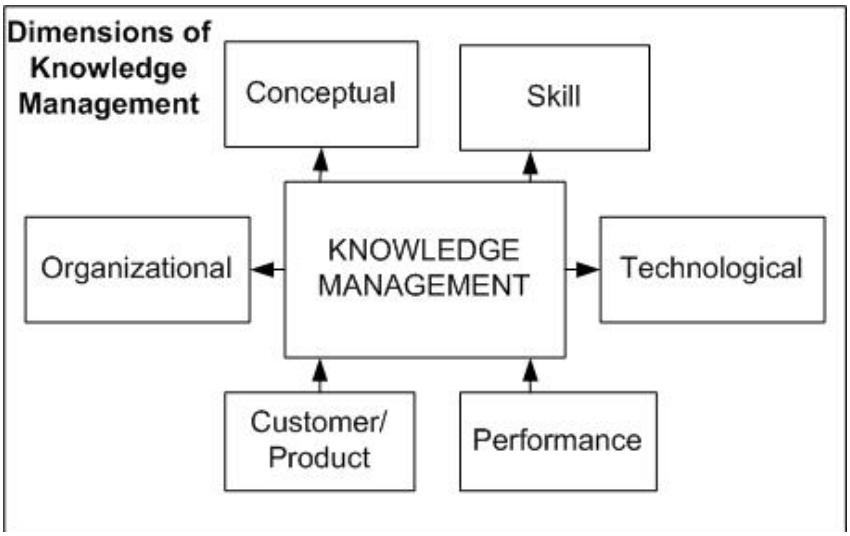


Figure 1. Different dimensions of Knowledge Management

The KM is a management framework to support the business strategy (Abou-Zeid, 2003) and the building of a common knowledge inside the organization.

Inside enterprises must implement knowledge management strategies to acquire, process and distribute useful information (Gupta et al.,2005). The main objective of a KM system is to provide the right information to the right person at the right time. This leads to a reorganization of business processes supported by new information technologies.

3. CONCEPTUAL DIMENSION

Nowadays the information is a strategic resource of the same importance of the classic human resources, financial and economic. The information must be relevant, timely and complete.

The enterprise processes different types of information relating to customers, suppliers, competitors, employees, production. The exchange value of information is linked to the form, space and time. This value increases and becomes a factor of success when satisfies the form (text, image, audio, video ...), the requirements demanded by user and when it is available everywhere (place) at any time.

The information reduces the uncertainty, costs and enriches products. More the information is exclusive and higher is its value.

Knowledge derive from a continuous process of learning based on the acquisition of experiences and concepts (Spender, 1996). Knowledge is the remedy to overcome the uncertainty and to find the problem solution.

In new organizations, the new password is sharing and collaboration. Virtual collaboration systems have expanded the space / time of work group and improved the processes of problem solving and decision making.

In the digital society, the enterprise is seen as a device based on knowledge. The company must produce knowledge and use appropriate information systems for sharing, transfer and distribution. Knowledge is a fundamental asset for competitive success of companies (Davenport and Prusak, 2000). Major keys of success of a company is make available, reuse and renew enterprise knowledge.

Shared and organized knowledge generates new knowledge to acquire competitive advantages.

The enterprise knowledge can be internal or external (Figure 2).

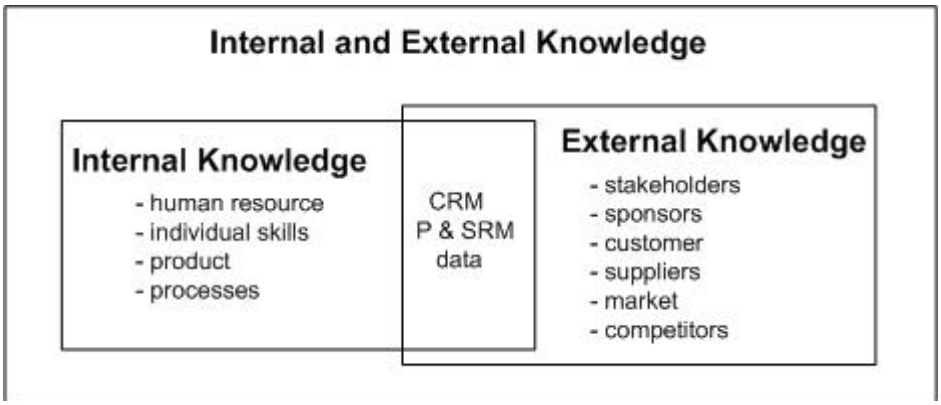


Figure 2. Internal and external knowledge

External knowledge is relative to enterprise stakeholders (sponsors, customers, suppliers,…). The shared part of the two subsets is the part of external knowledge known from enterprise dependents, such as employees of Customer Relationship Management (CRM) or Call Center. Nowadays, a critical success factor is the integration of all useful knowledge, internal and external, for the management of enterprise activities.

4. SKILL DIMENSION

The competitive advantage of an enterprise is to understand the customer demand and continually innovate the product offer before the competitors.

Since the motor of the innovation is the competence and creativeness of the people, inside companies, the human resources become the driver of the innovation (Zirra et al., 2009).

Then it is necessary to create environments and processes to transform design abilities and individual creativeness in a business asset.

Therefore in an enterprise the skills, abilities, the knowledge of individuals are a very strategic resource.

The most important study on the individual knowledge was conducted in a philosophical dimension from M. Polanyi (1967), who distinguished two kinds of knowledge: tacit and explicit.

Tacit knowledge is subjective, personal and therefore difficult to formalize; for example when people learning to drive a bicycle.

When an individual knows tacitly he acts without a clear awareness, use his mind and has great difficulty for explaining the process, where he is involved, with words, rules and algorithms. The tacit knowledge is a key determinant in decision-making processes for the resolution of technical problems.

The tacit knowledge is the most important information asset for the company: 42% of a company knowledge resides in the minds of internal people, 26% on paper, 20% on digital documents and 12%

on electronic media shared by all (Sorge, 1999).

Tacit knowledge can be explicit through exchange of information in virtual communities.

Explicit knowledge is codified in documents and communicated through a formal and systematic language. This knowledge, formalized, can be expressed in form of numbers, words, graphics and can be contained in documents, messages, disseminated inside the company.

The explicit knowledge is derived from the tacit and then we can say that all knowledge is tacit or finds its roots in it. Polanyi (1967) says that "we know more of what we say".

Some authors consider also implicit knowledge that concerns the procedural knowledge, business processes that represent the collective experience of enterprise activities in the organization. It is partially formalized in procedures, workflows, and best practices.

The internal enterprise knowledge can be summarized in the Table 1, where also the technological tools of support are shown:

Table 1. Knowledge taxonomy

Type	Description	Technological support
Explicit	Text contained in documents and web sites	Document Management Content Management Information Retrieval and semantic web
Tacit	Knowledge related to individual skills and experience	Team collaboration support Community of Practice Skills map
Implicit	Procedural knowledge	Business Modelling Workflow Management

Spender (1996) in his taxonomy consider different types of knowledge:

- Conscious knowledge: what we know to know
- Automatic knowledge: what we do unconsciously
- Objective knowledge: explicit and codified knowledge of an organization
- Collective knowledge: rules not written but that the all member of organization share between themselves

To make explicit the knowledge, Nonaka and Takeuci (1995) have formalized the 'Socialization Externalization Combination Internalization (SECI)' model of Figure 3.

The process for expliciting knoweledge is a spiral path where the phases of Socialization, Externalization, Combination and Internalization are continually repeated.

In the socialization and interaction of people, the organizational and social context facilitates the process of creation and sharing of knowledge. The transversal collaboration improves the collective performance and the creation of new knowledge.

Content Management Systems (CMS) are technological tools for producing documents like software of office automation or web authority solutions.

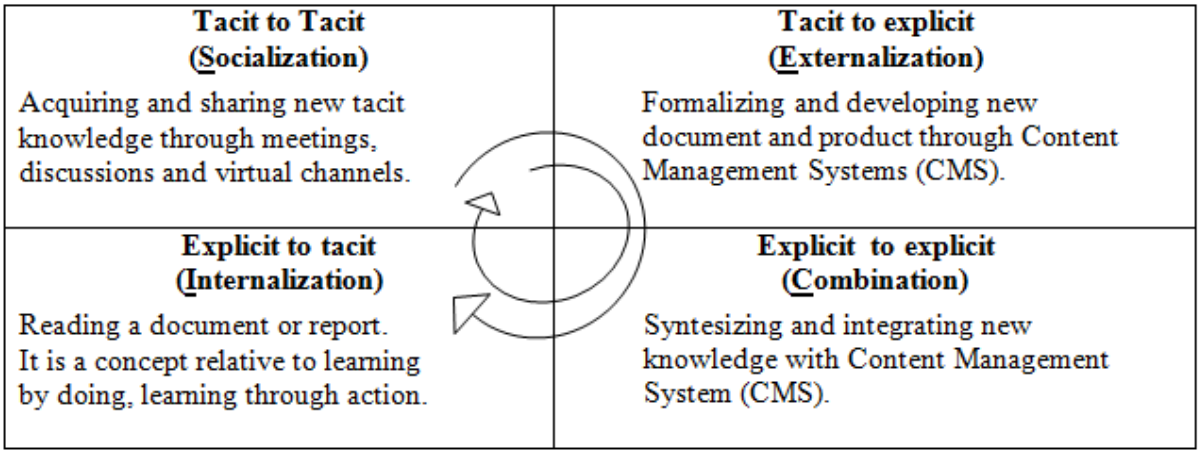


Figure 3. SECI model of Nonaka-Tacheuchi (adapted by author)

5. ORGANIZATIONAL DIMENSION

The advent of digital technology and the diffusion of Internet have changed the paradigms of value creation and organizational models. The "new economy", which differs from the "old economy" has the primacy of intangible assets on material goods and a rate of exponential growth favored by the use of technology. In the economy there is a continuous process of "dematerialization" characterized by the primacy of the know-how capital which has two main consequences: a reduction of costs with prosperity of the society and a market globalization with a circulation of information.

To optimize the management of informative flow, techniques of Knowledge Management are used. The system of knowledge management must be integrated with the culture and business strategy (Abou-Zeid, 2003) and in particular with the Business Process.

The information, accurate, timely and updated, detected from the companies must be adapted to business models (Choi, Lee, 2002).

The information inside the enterprise, must be properly managed (Knowledge Management) in the context of enterprise strategy business (Business Intelligence). In the company, in recent years, there was a change from a functional structure with low degrees of integration to a functional structure with a high degree of integration in the processes (Business Process Reengineering).

In the Knowledge Management strategy, the stages of knowledge and specific tools to process them are the following (Figure 4):

- Knowledge discovery/classification (acquire and classify useful information)
- Knowledge creation/storage (save knowledge into database and generate new knowledge by Content Management tools and Computer Aided technology)
- Knowledge diffusion/sharing (share and diffuse knowledge by web sites and collaborative tools)

- Knowledge use/application (use of knowledge in specific applications like ERP, Business Intelligence)

Discovery/Classification	Creation/Storage	Diffusion/Sharing	Use/Application
Data Mining	Content Management	Web site	ERP
Text Mining	Computer Aided tech.	Virtual communities	Business Intelligence
Neural network	Database	Collaborative tools	Desktop Application
Expert System			

Figure 4. Stages of knowledge process

4.1 Discovery/classification of acquired knowledge

For discovering and classifying the knowledge we can use intelligent algorithms. The classification can be based on predefined classes or taxonomy: pre-buiding schema that, in a logical manner, classify documents into categories and subcategories. We may also obtain a taxonomy automatically generated from the contents (clustering).

The enterprise knowledge (internal and external) can be structured or unstructured. The information that circulates, inside a company, in most cases, are unstructured information (free text): textual documents, news from newspapers, magazines off line and on- line, data from e-mail, interventions on forum, blogs, text files, sounds, video.

In the Table 2 we make a comparison between structured and unstructured information.

Table 2. Comparison structured – unstructured information

	Automation process	Management cost	Usability	Scalability	Process integration
Structured information	↑	↓	↑	↑	↑
Unstructured Information	↓	↑	↓	↓	↓

At the moment, how it is possible to see from Table 4, the processing of unstructured information presents only disadvantage and in particular an high cost of management.

From the annual survey Teradata (2006), on a sample of about 1200 managers from 23 countries (56% from the Americas, 23% from Asia-Pacific and 21% from Europe, Middle East and Africa –EMEA-), 70% of interviewees who work in America and Asia-Pacific and 36% of interviewees of EMEA said that the use of unstructured data, can be an high competitive advantage to support decision and enterprise business.

Enterprise Information System (EIS) currently processes only structured information that correspond

to 20% of the information that circulate in the company; the remaining 80% is unstructured information (Tan, 1999).

For enterprise, it is necessary to have a module of Enterprise Information System (EIS) that process this unstructured information to extract useful knowledge for strategic business planning.

Therefore it is important to have a platform that can uniquely extract information from structured and unstructured sources.

The processing of integrated knowledge (Consoli, 2009a) can be respresented from the following framework (Figure 5).

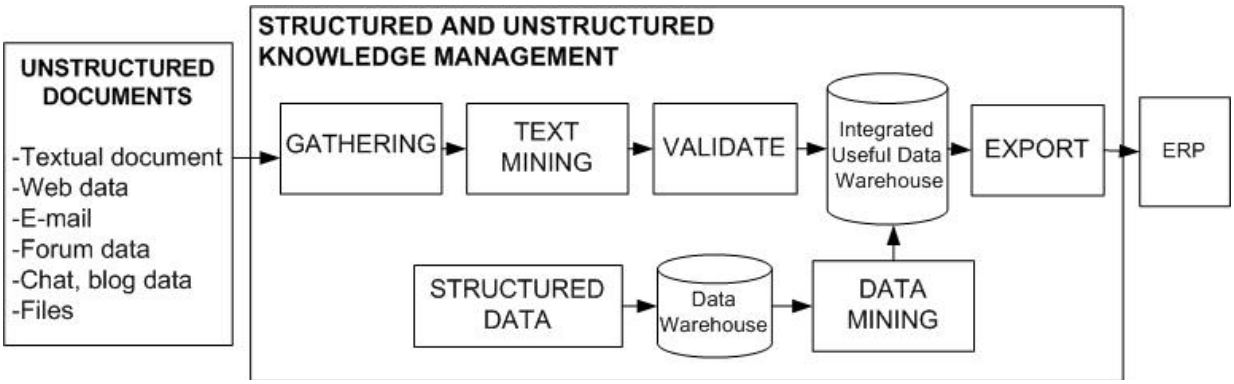


Figure 5. Structured and Unstructured Knowledge Management

To support the processing of unstuctured information it possible to use Text Mining (TM) technology that, recently, has grown after the explosion of social media.

With the techniques of Text Mining, we can transform a large amount of textual documents into structured knowledge. Since opinions are written in Natural Language, we need specific pre-processing techniques: elimination of stop-words (articles, conjunctions, prepositions), division of the phrases into single words, identification of different parts of speech POS (nouns, verbs, adjectives), lemmatization, and numerical representation of text data (Berry and Castellanos, 2007). In the pre-processing phase it is important the use of the lexical ontology (e.g. WordNet). The ontology contains a set of explicit assumptions that concern the meaning of the words.

From data apparently isolated and without meaning we can extract all the most relevant information and quickly identify significant correlations between specific entities. We can identify relationships between documents, independently of the format.

Therefore TM techniques recover dispersed knowledge within an organization, to improve the level of understanding the needs and preferences of customers and translate this knowledge in marketing strategy.

The Text Mining procedure is used by many companies. For example, the company Honda integrating structured data deriving from production and from technical assistance with the customer complaints (unstructured information) has developed a system of "Early Warning" to quickly resolve problems and reliability of its products for customer satisfaction and for understanding the weaknesses and required improvements.

To extract knowledge from unstructured information (Bolasco et al., 2005), the procedure is more complex. We must transform different documents in a matrix that presents documents in rows and the

words of individual documents in columns. This matrix is compressed by SVD techniques and converted into numbers. Then these numbers that representing documents are used to discover the rules and for creating model of analysis. After with a model it is possible to predict other values.

Unstructured information, after TM processing and a specific validatione are saved into a Text Warehouse integrated with the structured information processed by Data Mining.

Data Mining is an excellent method to discover pattern and sequences on structured data saved in a Datawarehouse.

Finally integrated useful data can be acquired from management software like to Enterprise Resource Planning (ERP).

4.2 Organizational efficiency in knowledge management

For organizations it is essential to learn, quickly and continuously, in order to use the new knowledge acquired as a differential factor.

For managing, with efficiency and effectiveness, the flow of enterprise activities, it is important to use a Workflow Management System (WMS).

A WFM system (Cardoso et al., 2004) is primarily a system of sharing information and documents (Document Management) based on a common data repository, which manage accesses, authorizations and permissions. A process modeling shows the dynamic evolution and transformation of data to obtain desired results.

WFM systems manage the flow of activities during the phases of creation, revision and approval of a document, which often involve more people, offices and branches.

An efficient and effective KM presents the following performances:

- reduction of inefficiency, errors and efforts for each enterprise activities
- reduction of implementation time for new product and solutions/ideas
- more success of the products
- innovation in product/services and more opportunities
- increase of productivity and faster product development
- quickness in the information access
- reduction of time to market
- quality improvements
- increased availability of information and knowledge in real time
- higher cognitive skills of workers and greater involvement in operational decisions
- better knowledge of the weaknesses and critical success factors
- major motivation to work of human resources

6. TECHNOLOGICAL DIMENSION

With an efficient Information System it is possible to improve the circulation and the processing of enterprise knowledge (Tseng, 2008a) and in particular manage all enterprise transactions and activities (Davenport, 2000).

The KM can be considered as a regulator of informative flow; it regulates the flow and makes that this flow arrives at the right time and to right people.

The information flow within the company is represented in Figure 6. An horizontal flow, Enterprise Resource Planning (ERP), crosses all business functions and feeds different specialized vertical software like Customer Relationship Management (CRM), Supply Chain Management (SCM), Product Data Management (PDM), Manufacturing Execution System (MES), Computer Aided technology (CAt), Business Intelligence (BI).

The ERP operates as an adhesive between various functions and enables digital enterprise, by physical and virtual channels, to interact with the production, mechanical devices, employees, customers, suppliers. The main supply of ERP is the Datawarehouse.

The software can be classify in "management software" (CRM, SCM, BI) that controls the management of enterprise and "productive software" (PDM, MES, CAt) that controls operational and productive processes like production, maintenance, distribution.

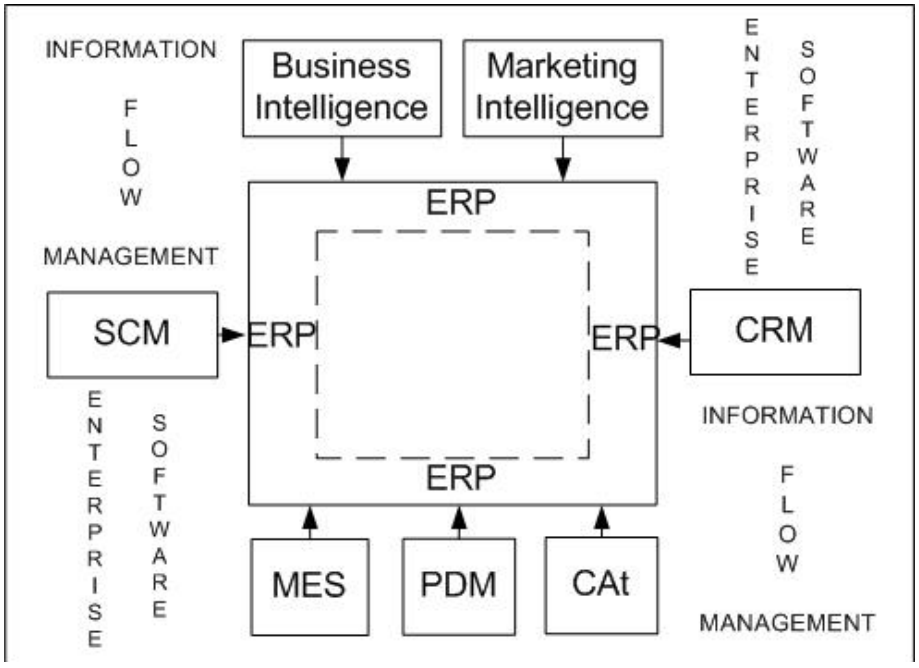


Figure 6. Enterprise information flow

The single units of Figure 6 are the followings:

- Enterprise Resource Planning (ERP). We can divide ERP in 2 parts: the first part for global management of the enterprise (management system) and other part for productive data

management (production system) that manages the data useful to production: order quantity, magazine, materials, etc…

- Supply Chain Management (SCM) to organize and dynamically reconfigure the network of supplies depending on the location, availability, capacity fluctuations in the market demands. In this way it is possible to minimize cost and store management (just in time production).
- Customer Relationship Management (CRM) to manage the relationship with customer.
- Business Intelligence (BI) for analysing data (structured and unstructured) to extract useful knoweledge for strategic decision making.
- Marketing Intelligence (MI) for analysing customer data and the relationship for strategic marketing decisions.
- Computer Aided technologies (Cat). Computer Aided Design (CAD), Computer Aided Engineering (CAE) to design and engineeering management of enterprise products. Computer Aided Manufacturing (CAM) for planning and production control. With these tecnologies it is possible to realize a Computer Integrated Factoring: integration of various devices into a single coordinated system, exchange of information in real time, continuous monitoring of the industrial plant and system scalability.
- Manufacturing Execution System (MES) to connect the management area to productive area and therefore to control electronics-mechanical device (FMS, PLC, Sensor/Actuator, shop floor) of the production (Consoli, 2009b).
- Product Data Management (PDM) (Consoli, 2008) manages product information that is basically an Information System for storing, archiving and managing productive data and related workflows. PDM contains the list of project participants, authorization, reviews and the phases of product development in its business process (bill of materials, version control, traceability).

7. PRODUCT/CUSTOMER DIMENSION

In the knowledge society the focus is shifting from tangible to intangibles resources (brand, logo, reputation,…). Products and services are increasingly information-intensive. Even physical products is dematerializing and incorporating an high informative content. People don't have more interest in the physical phone but in all value-added services that revolve around it (ringtones, logos, wap). The after-sale, online assistance and various updates make more attractive the extended product (Kotler and Scott, 1993). This immaterial content is well integrated with the flow of business information and it is processed, in an intelligent manner, with other information.

In the extended product (Figure 7), the services, customer oriented, include:

- After-sales services
- Support services on-line
- Possibility of online buying
- Customer care service
- Availability of compendium about product features.

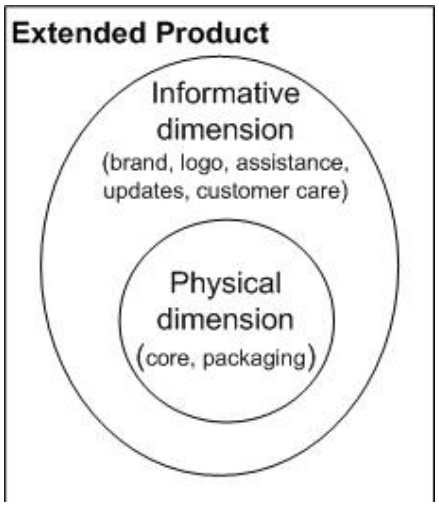


Figure 7. Extended Product

7.1 The informative dimension of product

The dematerialization of production has stimulated the proliferation of technological sources for processing the informative component.

KM technique manages very well the dematerilization of product. For example companies, from the resolution of technical problems by on-line services, create a database to improve new products.

Adding to core some information ("peripheral"), the product can become more refined. The peripherals (value-added information) are able to generate the competitive difference and therefore a rich service to customer. If we add additional information to the product, its value increases; for example when furnishing an apartment by a design software.

Each product/process has a physical and an informative component; the physical component affects the productive factors and the informative component the data processing.

These components are combined together in certain percentages depending on the activities to manage.

The needs of Information Systems (IS) is proportional to product information (IPT) and process information (IPS):

$$IS = f(IPT, IPS)$$

The informative aspect may be relevant in terms of processes and not in term the product in petrochemical, gas and oil refining. In other case the contribution of informative product is higher than the process (leaflet). In home bankink, the contribution of information in product and in process is high

The impact of information tends to involve all stages of the value chain of a company. The role of information technology is high with products that present an high informative content.

It is important to have the support of Information Technology to process informative component for value-added and competitive advantages. The new technology allows to provide physical product with a greater amounts of information.

Currently the market with the development of electronic devices, presents also products that process information when working (information embedded). These products have built-in program like self-diagnostic and reporting failures; for example the warning signal in the dashboard of the car.

The increase of technological content in the products and therefore the adoption of design and production assisted by computer (CAD / CAM / CAE) improves the quality reducing drastically the costs of production.

The design of a product is a complex process that involves interdisciplinary knowledges and generates high knowledge that accumulates in the years. It is important to capture this know how that explicates through rules, constraints, recommendations that derive from experience.

All data and documents related to projects, saved and managed by PDM (Product Data Management) are useful for improving the effectiveness and efficiency of processes in the design and realization of the product.

7.2 Customer care

Nowadays the companies focus on customer to full satisfy their demands. Consumers develop a more detailed knowledge of the offer and express sophisticated needs.

Hagel and Rayport (1999) say that the ownership of information is now held by the consumer.

The consumer thus acquires a greater power and control. Davenport says how to support the customer, companies use Knowledge Management techniques "Knowledge capture, sharing and reuse." It is important to capture the knowledge about customers, their preferences, purchasing behavior and make this available in the organization.

In these last years the focus shifts from the product to the enterprise market and customer. There was a passage from production-oriented company towards a company marketing oriented, able to listen and understand the market, identify still unsatisfied needs and respond with an appropriate and competitive supply. The marketing is a means to understand, create and communicate.
For the company, the following values become important:

- better understanding of purchasing behavior
- better meeting of needs and requirements of customers
- timely identification of target customers
- consolidation of customers in new market niches
- best rate of success for products/services
- greater comparison with competitors
- greater understanding of the trend through the use of historical memory
- reduction of time to market for products/services
- increased capacity to innovate and develop products required
- holistic vision of the company.

According to Kotler we have changed from "producing and selling" to “listen and respond" from "owning things" to "have things", from the "enterprise governance" to "marketing governance”, from “just-in-time” to “real – time”.

In the passage from product-centered model to customer-centered model all involves around these main points: customer satisfaction, customer relationship, customer loyalt and customer retention.

8. PERFORMANCE DIMENSION

Nowadays, an huge amount of information circulates in the company; this is similar to absence of information or added value. The overload of information exceeds individual processing capacity and slowdowns decision making in enterprise strategies. The chaos of information represents the primary source of enterprise inefficiency. We must transform this mass of information into knowledge and select only the useful information through a Knowledge Managent System (KMS).

To assess a KMS we must consider a Performance Measurement Systems (PMS) that evaluate the enterprise objectives (Tseng, 2008a). This system defines a group of performance indicators that provide information if goals are reached or not and if the operations deriving from strategy are implemented in the correct way.

To assess the performances of Knowledge Management System (KMS) we must take in consideration three processes: strategy of KM, KM planning and its implementation.

Important physical and financial indicators (Lauras et al.,2010) are :

- Management accounting
- Critical Success Factor (CSF)
- Key Performance Indicator (KPI),
- Activity Based Costing (ABC),
- Balanced Score Card (BSC),
- Intangible Assets Monitor (IAM) are used for measuring the performance of enterprise.

9. CONCLUSIONS

In this article, a multidimensional model of KM strategy is discussed. The informative flow in the company needs to be well managed through a technological support (technological dimension) and specific competence of internal human resources (skill dimension). Firstly it is necessary to conceptually understand (conceptual dimension) what is the information useful for strategic goals. This information must be organized and managed in efficient way (organizational dimension). The focus of a company is to satisfy customer with an extended product and value-added services (product dimension). We can measure the efficiency of flow management with opportune indicators (performance dimension).

REFERENCES

1. Abou-Zeid, E. (2003) Developing business aligned knowledge management strategy. In Knowledge Management: Current Issues and Challenges, E. Coakes, Ed. IGI Publishing, Hershey, PA, 156-172.

2. Berry, M. W. and Castellanos, M., editors (2007) Survey of Text Mining II: Clustering, Classification, and Retrieval. Springer

3. Choi B. and Lee H.(2002) Knowledge management strategy and its links to knowledge creation process. Expert Systems With Applications 23(3), pp. 173-87.

4. Bolasco, S., Canzonetti, A., Capo, F. M., della Ratta-Rinaldi, F., and Singh, B. K. (2005) Understanding text mining: A pragmatic approach. In Sirmakessis, S., editor, Knowledge Mining, volume 185 of Studies in Fuzziness and Soft Computing, pages 31–50. Springer Verlag.

5. Cardoso J., Bostrom R. P. & Sheth A. (2004) Workflow Management Systems and ERP Systems: Differences, Commonalities, and Applications. Information Technology and Management 5, Kluwer Academic Publishers, 3-4 (Jul. 2004), pp. 319-338.

6. Consoli D. (2008) The Product Lifecycle Management in the Enterprise 2.0. In 1th International Conference on Management and Marketing Sciences, Athens, Greece, May 23-25.

7. Consoli D. (2009a) Text mining technology to support enterprise knowledge management. In Proceedings of the 4th International Conference on Knowledge Management: Projects, Systems and Technologies, Bucharest, November 6-7, pp. 139-142.

8. Consoli D. (2009b) The Collaborative Product Development in the Computer Integrated Factory. In Proceeding of 11th International Symposium MM & T, Sunny Beach, Bourgas, Bulgaria, Journal of International Scientic Pubblication: Materials, Method & Technologies, Vol. 3, P. 1, pp. 94-107.

9. Davenport, T. H. (2000) The Future of Enterprise System-Enabled Organizations. In Information Systems Frontiers 2, 2 (Aug. 2000), 163-180

10. Davenport, Thomas H., and Prusak Laurence (2000) Working knowledge: how organizations manage what they know. Boston: Harvard Business School Press.

11. Gupta, S. K., Bhatnagar, V., and Wasan, S. K. (2005) Architecture for knowledge discovery and knowledge management. Knowl. Inf. Syst. 7, 3 (Mar. 2005), 310-336

12. Hagel, J. I. and Rayport, J. F. (1999) Creating value in the network economy, chapter: The coming battle for customer information. The Harvard Business Review Book Series. Harvard Business School Press, Boston, MA, USA, pp. 159–171.

13. Kotler P., Scott W.G. (1993) Marketing Management. Prentice Hall International.

14. Lauras, M., Marques, G., and Gourc, D. (2010) Towards a multi-dimensional project Performance Measurement System. In *Decis. Support Syst.* 48, 2 (Jan. 2010), pp. 342-353

15. Lee, H. and Choi, B. (2003) Knowledge Management Enablers, Processes, and Organizational Performance: An Integrative View and Empirical Examination. In Manage. Inf. Syst. 20, 1 (Jul. 2003), pp. 179-228.

16. Nonaka I., Takeuci H., (1995) The Knowledge Creating Company: How Japanese Companies Create the Dynamics of Innovation. Oxford University Press, New York

17. Polanyi M. (1967) The Tacit Dimension in Knowledge in Organizations, L. Prusak, Ed.

Boston, MA: Buttreworth-Heinemann, 1997, pp. 135-146,

18. Smuts, H., van der Merwe, A., Loock, M., and Kotzé, P. (2009) A framework and methodology for knowledge management system implementation. In Proceedings of the 2009 Annual Research Conference of the South African institute of Computer Scientists and information Technologists (Vanderbijlpark, Emfuleni, South Africa, October 12 - 14, 2009). SAICSIT '09. ACM, New York, NY, pp. 70-79.

19. Sorge C. (1999) Gestire la conoscenza. Espansione, Sperling & Kupfer Editori n.5, p. 79

20. Spender, J-C. (1996) Organisational knowledge, learning and memory: three concepts in search of a theory. In Journal of Organisational Change and Management, Vol. 9, No. 1, pp. 63-78.

21. Sunassee, N. N. and Sewry, D. A. (2002) A theoretical framework for knowledge management implementation. In Proceedings of the 2002 Annual Research Conference of the South African institute of Computer Scientists and information Technologists on Enablement Through Technology (Port Elizabeth, South Africa, September 16 - 18, 2002). ACM International Conference Proceeding Series, vol. 30. South African Institute for Computer Scientists and Information Technologists, 235-245.

22. Tan, A-H. (1999) Text mining: The state of the art and the challenges. In Proc of the Pacific Asia Conf on Knowledge Discovery and Data Mining PAKDD'99 workshop on Knowledge Discovery from Advanced Databases, pp. 65-70.

23. Teradata (2006) Insights from the Fifth Annual Teradata Survey Validate a Global Phenomenon. Enterprise Decision-Making survey, 2006 Report, Teradata

24. Tseng, S. (2008a). The effects of information technology on knowledge management systems. Expert Syst. Appl. 35, 1-2 (Jul. 2008), 150-160.

25. Tseng, S. (2008b) Knowledge management system performance measure index. Expert Syst. Appl. 34, 1 (Jan. 2008), 734-745.

26. Yang, J., Sun, Y., and Wu, X. (2008) Research of the Tacit Knowledge Management on the Knowledge Intensity Enterprise. In Proceedings of the 2008 international Seminar on Future information Technology and Management Engineering (November 20 - 20, 2008). FITME. IEEE Computer Society, Washington, DC, 2008, 512-515.

27. Zirra, D., Voicu, V., and Cruceru, A. (2009) Using K-management to improve HR performances. In Proceedings of the 10th WSEAS international Conference on Mathematics and Computers in Business and Economics (Prague, Czech Republic, March 23 - 25, 2009). N. E. Mastorakis, A. Croitoru, V. E. Balas, E. Son, and V. Mladenov, Eds. Recent Advances In Computer Engineering. World Scientific and Engineering Academy and Society (WSEAS), Stevens Point, Wisconsin, pp. 225-230.