

Research Paper

Knowledge Management and Knowledge-based Marketing

Yoosuf Cader^{*#}

* Dr. Yoosuf Cader, Associate Professor, College of Business Sciences, Zayed University, P.O.Box 4783, Abu Dhabi, UAE, Telephone: +9712 4079762 (Direct), Fax: +9712 4434847, Yoosuf.cader@zu.ac.ae

Abstract: Two separate qualitative research studies are designed to gain an insight into the practice of knowledge management and marketing in the engineering and biotechnology industries. The findings show that the engineering industry is practicing knowledge management to varying degrees. The biotechnology industry clearly differentiates between data, information and knowledge. With the new knowledge gained, the biotechnology industry (a rapidly growing knowledge-intensive industry, according to Donn Szaro) is able to innovate and market new products and services.

A Knowledge Management System (KMS) model has been used to show how the various components within the KMS are coordinated and integrated to best achieve organizational objectives in the engineering and biotechnology industries. The KMS model is also used to show how customer-focused organizations use knowledge to market innovative products and services.

Introduction

Most organizations are now more customer-focused and use knowledge-based strategies to reach out to their customers. This is particularly so in knowledge-intensive industries such as the biotechnology and the engineering industries. The biotechnology industry is growing at a rapid pace and is now considered as one of the fastest growing industries in almost all industrialized countries[1]. Knowledge management's overall goal is to build an organization that can 'see' the customer (customer-focused), for it is the customer that drives any business. Peter Drucker [2], the well known marketing guru, views marketing as a philosophy or way of doing business and in its importance in focusing on the customer:

"It is a customer who determines what a business is. It is the customer alone whose willingness to pay for a good or service converts economic resources into wealth and things into goods. What a business thinks it produces is not of first importance, especially not to the future of the business and to its success. What the customer thinks he is buying, what he considers value, is decisive - it determines what a business is, what it produces, and whether it will prosper. And what the customer buys and considers value is never a product. It is always utility, meaning what a product or service does for him. The customer is the foundation of a business and keeps it in existence"

Unless the customer's needs and wants are more than satisfied and their expectations are met, the customer is likely to defect to a competitor. Even satisfied customers are defecting to competitors because the competitor has differentiated and is providing a better service, or quality, or something else better that matters to the customer. Jones and Sasser [3] performed a study to find out why customers defected. They investigated more than 30 companies, in five different industries, with different competitive environments and different types of customer relationships. Their findings on reasons for a shift in customer loyalty were that customers were reasonable but they want to be completely satisfied. If they are not and have a choice, they can be lured away easily. Therefore to be competitive, it is imperative that organizations must be customer-focused. Therefore, knowledge

management's overall goal is to build an organization that can 'see' the customer (customer-focused). This article presents the results of two separate qualitative studies, one in the engineering industry and the other in the biotechnology industry, both taking customer-focused approaches to achieve their organizational goals.

Literature review

In addition to being customer-focused, organizations must also practice knowledge-based marketing strategies. However, prior to practicing knowledge-based marketing strategies, organizations need to know what kind of 'marketing knowledge' is needed. There are different interpretations of what constitutes 'marketing knowledge'. Some scholars such as Huber, Morman, and Miner have defined it as 'market information', meaning this information has to progress through knowledge acquisition, information distribution, information interpretation, and organizational memory [4, 5, 6]. However, other marketing scholars such as Jaworski and Khol, Slater and Narver have defined it as "market orientation" depicting the generation and dissemination of market information [7, 8]. Srinivasta et al. [9] defined it as a phenomenon that involves three different core marketing processes: Product Development Management (PDM), Supply Chain Management (SCM), and Customer Relationship Management (CRM). However, according to knowledge management protagonists Davenport et al. [10], customer relationships are built by customizing the needs of each of their customers and serving them profitably and to do this 'customer knowledge' needs to be managed. Knowledge management however, involves managing customer knowledge and all other available knowledge within an organization to achieve the common goal of increasing organizational productivity.

What then are knowledge-based marketing practices? These are marketing strategies that have been based on the greater understanding gained from the existing marketing knowledge. It is this understanding that is critical in gaining competitive advantage. In other words, for example two marketing managers (human capital) could be looking at the same marketing knowledge but

could arrive at different levels of understanding (managerial judgment or cognitive capacity) based on their own intuition and experience. The organization with the marketing manager who has the greater understanding of the marketing knowledge will gain the competitive advantage, assuming other activities being equal. Similarly the organization that has the appropriate systems in place and has the relevant and updated knowledge embedded in databases also gains the competitive advantage. More importantly, if the three (human capital, systems, and databases) are integrated in an organization, then that provides this organization with the best opportunity to gain competitive advantage.

Product Development Management (PDM), SCM (Supply Chain Management), Customer Relationship Management (CRM), and Marketing Information Systems (MkIS) are useful core marketing processes and each on its own will produce the intended outcomes. However, what is needed is a system that can coordinate and integrate the outcomes of each of these disparate processes to generate the best and most up-to-date marketing knowledge. Such a system is called a Knowledge Management System (KMS) which will help in developing knowledge-based strategies to gain sustainable competitive advantage. Described below is a model (Figure 1) of a KMS which was designed by the author and can be applied to any industry [11]. In this model, the knowledge creating organization integrates the various components responsible for the productivity in an organization. The knowledge creating organization

has four important components: Organizational mission; Knowledge inputs (marketing and other); Organizational outputs or objectives; Information Systems, Computing and Telecommunication Technology.

In the KMS data are gathered from *independent* and *dependent* variables from the marketing environment. The independent variables include data from the marketing mix variables (product or service, promotion, price and place – the 4Ps) and the macro- and micro-environmental factors, i.e. marketplace knowledge (Figure 1). The dependent variables include data from customer behavioral responses and expected performance measures. The behavioral responses include awareness, knowledge, liking, preference, intent-to-buy, and purchase. Performance measures (organizational objectives) include both financial (cost, profit, revenues, ROI, cash flow, earnings per share, sales value, brand value, etc.) and non-financial metrics (sales volume, market share, competitive advantage, customer satisfaction, new patents, and brand image).

The type of data that are gathered from the **micro-environment**, are product or service knowledge, knowledge of competitors, value chain knowledge, and knowledge of customers; such as knowledge of their purchasing power, income distribution, and availability of credit, debt and savings potential. An important resource of the organization is human intellectual capital. This includes marketing personnel who interpret the marketing information.

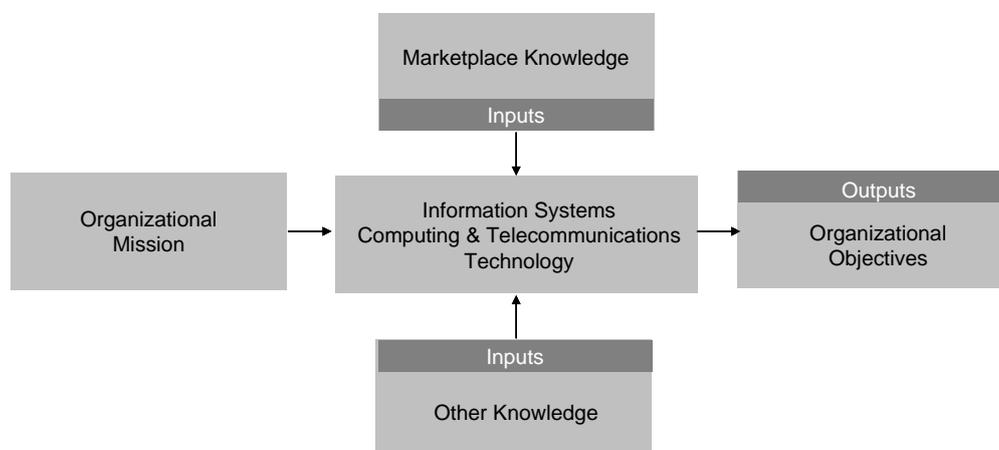


Figure 1: The flow of Knowledge Management in Organizations

In the larger **macro-environment**, the marketing functional unit must continuously monitor and update its knowledge of the changing trends such as social, legal, economic, political, cultural, technological, and demographic factors that impact on the marketing functional unit's ability to implement its marketing strategies. These and other marketplace data lie embedded inside databases within the organization's Marketing Information System (MkIS). These databases must be mined for information using data mining procedures. This enables the organization to effectively implement knowledge-based marketing strategies. Interpreting the output (information) as a result of the transformation of the micro- and macro-environment data in the databases within the Marketing Information System (which is a part of the Knowledge Management System) helps in developing knowledge-based marketing strategies.

In summary, the data from the independent and dependent variables are fed into the databases in the Marketing Information System (MkIS), which is an integral part of the Knowledge Management System (KMS). When marketing managers (human capital) interpret the outputs generated by the systems and if all three - the databases, systems and human capital - are integrated, then this provides the organization to focus on knowledge-based strategies with the best opportunity to gain competitive advantage.

Hypothesis development in the marketing unit of a biotechnology organization

Using this model many hypotheses can be developed for the marketing unit of a biotechnology organization where the 'Marketplace Knowledge Inputs' are the independent variable and the marketing objectives (or outputs) are the dependent variables. Listed below are some hypotheses:

1. Marketplace knowledge inputs lead to an increase in market share
2. Marketplace knowledge inputs lead to an increase in sales
3. Marketplace knowledge inputs lead to an increase in customer satisfaction

4. Marketplace knowledge inputs lead to an increase in profits
5. Marketplace knowledge inputs lead to an increase in brand awareness

These hypotheses can be tested for a biotechnology organization by designing experiments to study the influence of any of the marketplace variables and measuring marketing objectives such as market share, brand awareness, sales, and customer satisfaction.

Knowledge-based marketing

What is knowledge-based marketing? It is marketing which makes use of the macro- and micro-environmental knowledge that is available to the marketing functional unit in an organization. It is not a case of "knowing what you know" but "what you need to know" in a changing micro- and macro-environment.

When marketing theory such as the importance of continuously scanning the environment and looking for trends is not put into practice it can result in product failures. Tupperware's failure to continuously scan and monitor the demographic trends resulted in loss of market share. Tupperware markets air-tight, easy-to-use plastic food storage containers using the party concept method of distribution according to Grossmann. In the 1960s and 1970s company sales were doubling every five years. However, the environment started changing in the 1980s when the incidence of divorce and women entering the work force increased. As a consequence the North American sales started declining from 60% to 40% of the market. At the same time a competitor's (Rubbermaid) sales shot up from 5% to 40% of the market [12]. Rubbermaid adapted to the changes in the environment and used the new knowledge to market similar products in grocery and discount stores, while Tupperware did not respond to these environmental changes. Tupperware markets household consumer products (not engineering or biotechnology products). However, this example has been mentioned to stress the importance of scanning any marketplace environment rather than restrict it to the biotechnology or engineering environment.

Many organizations, large or small are practicing knowledge-based marketing. Kotler and Keller have described the practices in a knowledge-based organization. Procter and Gamble (P&G), one of the largest global consumer organizations has a marketing research unit called Consumer and Market Knowledge (CMK) [13]. Its goals are to gain knowledge of consumers, sustain long-term brand equity, to use local market expertise and establish retail partnership. It also has a Corporate CMK group whose functions are to manage a proprietary research methods department, to use expert application of and acquire cross-business learning from core research competencies, share services and infrastructure, leveraging traditional research basics e.g. brand tracking; experiential consumer contacts; proprietary modeling methods; and scenario planning or knowledge synthesis events. On the other hand, a small organization such as Okmulgee Plumbing (Oklahoma) practices knowledge-based marketing in a less sophisticated but yet effective way. They make a deliberate attempt to capture and maintain knowledge about every customer they serve. They do this with knowledge exchanges with their target market. This involves analyzing customer databases, listening to customers, conducting market research including surveys and studying the micro- and macro-environmental trends which includes the competitors. A Knowledge Management System is vital in any organization that intends to practice knowledge-based marketing and the model of the Knowledge Management System (KMS) described above can be applied to any industry including the engineering and biotechnology industries.

Knowledge management system (KMS)

Knowledge management is a way of doing business just like marketing or Six Sigma is. However, the understanding of the concept of knowledge management by different individuals within the same organization may be incoherent. This very much depends on the functional unit to which the individual is attached in the organization. For example, information technologists would consider the information technology infrastructure of the organization as the most critical knowledge asset, whereas operations managers would consider continuous

improvement and operational techniques as its most critical knowledge asset, while marketing professionals consider knowledge-based marketing as its most critical asset, and so on. In the KMS designed by the author (described above) the model represents how the effectiveness of the 'whole' is greater than the effectiveness of the 'disparate parts' in terms of organizations becoming more productive by leveraging all of its knowledge assets in an integrated and coordinated manner.

In the KMS model, the knowledge creating organization brings together the various components responsible for the productivity in an organization including the innovation of new products or services (see figure 1). As mentioned earlier, the knowledge creating organization has four important components: Organizational mission; Organizational outputs or objectives; Knowledge inputs (marketing and other); and Information systems, computing and telecommunication technology.

According to this model, the organizational mission of the knowledge creating organization must have a clear purpose which should be carefully crafted and successfully implemented. More importantly the organization must be faithful to the mission in every sense of the word. This is why organizations as diverse as British Petroleum and SENCO (a US-based nails manufacturer) consider themselves as being in the knowledge management business. As a consequence they are effectively leveraging knowledge to create wealth for their organization and value for their stakeholders. They are doing this more effectively than their competitors.

Anything that an organization does is focused on achieving its outputs or objectives. Organizational objectives such as market share, knowledge-based innovative products or services, customer and stakeholder delight, knowledge that benefits human welfare, and profits, to name a few, are derived from the carefully crafted mission statement.

In the KMS model various marketplace knowledge inputs are required before the strategies are developed. As mentioned earlier these include macro- and micro-environmental knowledge, product or service knowledge, knowledge of

competitors, knowledge of customers, and value chain knowledge, etc. Other non-marketplace knowledge includes research and development knowledge, knowledge of automation, knowledge of operational techniques, and contribution by knowledge workers, etc. (see figure 1). In the KMS model the core of any organization today is its information systems, computing and telecommunication technology resources. These technologies enable the organization to capture, create and share knowledge. No organization will survive without this critical resource that would enable it to deal with a rapidly changing environment. All these knowledge components within an organization should be integrated and coordinated in order to achieve its overall objectives.

Customization and personalization

Mass customization involves obtaining market knowledge and dynamically organizing resources leading to customization. This process enhancement creates a quality product and a body of **architectural knowledge** (human, technological and processes). Burger King practices the concept of mass customization by giving the customer the option to choose the ingredients in a hamburger. To make customers aware of this concept they advertised the now famous slogan "Have it your way".

According to Sasser, Jones, and Klein the Ritz-Carlton Hotel chain uses both its customer and architectural knowledge to offer highly personalised services to its customers in a timely manner [14]. From the time a customer checks in to a Ritz Carlton Hotel, customer intelligence gathering begins in an unobtrusive way by the hotel employees, who store and disseminate the information using the networked knowledge management system. The customer's preferences are captured and recorded in a database. When the customer checks in to a Ritz Carlton the next time, all his/her needs will be met, including the bed size, the number of pillows required, room preferences, and also ensuring the checking-in process is smooth.

Levi's Jeans also practices the concept of mass customization. When a customer enters a store to purchase a pair of jeans, measurements and

specific needs are entered into Levi's knowledge management system. The information is dynamically sent to a central production capability, which produces the customized product for shipment to the customer faster than its competitors as time is also considered an important element of mass customization. Although the above three examples are not from the engineering or biotechnology industry the same principles of knowledge management will apply to these two industries as well.

Knowledge management officers

Apart from technology and processes, the human factor is one of the most important factors involved in implementing knowledge management. These three factors constitute what is called architectural knowledge. If the human factor is missing, then all you have is the information in databases. These databases alone do nothing for an organization unless the information contained within it is analysed and interpreted correctly by a knowledge worker and the knowledge produced is quickly shared within the organization. Unfortunately when organizations started de-layering the organizational structure, many knowledge creating employees left, taking with them the important tacit knowledge which had not been captured by the organization. Organizations should employ knowledge management officers or a 'knowledge champion' to capture this tacit knowledge, integrate and coordinate all the other knowledge assets within the organization and make sure knowledge is shared quickly with the appropriate people.

Capturing and transferring knowledge

It is important to capture the knowledge embedded in organizations. This is because employees not staying long enough in organizations results in a loss of 'knowledge creating employees' [15], the terminology used by Nonaka and Takeuchi. When the 'knowledge creating employees' leave, they take with them what is called 'tacit knowledge', which is knowledge inside the head of an individual. Ninety per cent of the knowledge in an organization is tacit knowledge according to the website Libsuite KM [16]. What is important is to capture this tacit

knowledge by transferring it to 'explicit knowledge', which is organizational knowledge in systems within the organization which can be rapidly communicated to people and processes that are connected to the Internet.

Nonaka and Takeuchi have described a good example of capturing tacit knowledge and successfully transferring this (knowledge transfer) to explicit knowledge and as a consequence leveraging it to make profits for an organization. This can be best demonstrated in Matsushita's marketing of the home bread-making machine [15]. The Matsushita Electric Company is one of the largest corporations in the world and is well known for brand names such as Panasonic, National and Technics. In 1985, the product development team was developing a new home bread-making machine at their headquarters in Osaka. When the machine was developed they found that the outer crust of the bread was overcooked while the inside was still uncooked. After much experimentation including comparing dough mixed by this machine and by professional bakers, they could not identify the problem. A software developer, Ikoko Tanaka, volunteered to observe how the Osaka International Hotel's chief bread maker made the best bread in the region. After about a year's observation of his craft, especially the kneading techniques, and subsequent trials she realized that the hotel's bread maker's skills (tacit knowledge) was in the stretching and kneading of the dough. The bread maker himself could not articulate how he did this. Tanaka introduced special ribs in the machine to imitate the stretching and kneading of the dough. This product called 'twist dough' became a marketing success for Matsushita. Thus tacit knowledge – the baker's skill of special stretching and kneading – was transformed into explicit knowledge by writing product specifications which included the special ribs inside the machine imitating the chief baker's stretching and kneading skills.

According to Lord John Browne (former chairman of British Petroleum) in an interview with Harvard Business Review [17], "the wonderful thing about knowledge is that it is relatively inexpensive to replicate if you can capture it. Most activities or tasks are not one time events. Knowledge should be replicated throughout the company so that each unit is not

learning in isolation and re-inventing the wheel again and again. Our challenge has been getting people to systematically capture the information the company needs, to be able to use both explicit and implicit knowledge repeatedly". BP does this by transferring the knowledge gained in an oilfield in the North Sea to the start-up of a new field and thereby saving substantial costs in drilling at the new field. Another company, Dow Chemical, in an entirely different industry generated over \$125 million in revenues and savings by actively leveraging one of its key knowledge assets, its patent portfolio.

According to Schwartz, Bruce Power, a nuclear power generator company in Canada has a good knowledge capturing system [18]. The power plant was built in the 1970s. It has 3700 employees, most of them engineers. In three years time, one-third of its workforce will retire (as most baby boomers will do) taking with them their tacit knowledge. In order to capture their tacit knowledge before they left, Bruce Power implemented a Knowledge Management System called Kana IQ, which allows engineers to document how they tackled problems. New engineers joining the company can now search Kana IQ using decision trees and case-based reasoning.

While there are formal processes developed to capture knowledge there are also informal processes that are quite effective in capturing knowledge. Socialization and story-telling are effective informal processes in organizations which help in capturing and sharing knowledge. Here the socialization and story telling can take place at lunch, or in the corridors in offices or even by the office water cooler. Sales representatives usually meet up with other sales representatives while travelling and usually engage in socializing during meal times. Oftentimes solutions to problems in this informal setting among colleagues can be very quickly resolved. Many have reported the benefits of informal socializing and story telling including Nonaka, Takeuchi [15], Brown, and Duguid [19]. Thus capturing knowledge requires organizations to do a number of things. There should be Knowledge Management Systems with databases, processes, technology and most importantly a culture that encourages employees to use the opportunity to

informally socialize and exchange stories (tacit knowledge) of how they solved difficult problems.

Knowledge cultures

This is the hardest to achieve. You can have the knowledge infrastructure in place, but you may not have the right culture in place. Building the right culture in an organization is quite difficult especially so when employees are still unsure of the nature of the new knowledge asset and what leveraging that means to them. Others such as Carla O'Dell from the American Productivity & Quality Centre [20] have also confirmed that "Fewer than 10% have succeeded in making it (knowledge management) part of their culture". It appears that capturing knowledge is the hardest to achieve in any organization.

Knowledge communities

Knowledge communities help to build a knowledge culture within an organization. A knowledge community is one in which a group of people come together to share knowledge of interest to them. They could be office colleagues, people with similar interests who have formed an informal group and could be boundary less spanning the globe. Many organizations encourage employees to become members of a knowledge community sharing knowledge among them. Even part of World Bank's knowledge strategy is to build knowledge communities.

Knowledge sharing

A good example of an organization sharing knowledge is INTEC, which has revenues of over \$80 million. It is a project management company based in Houston with 500 employees in the global oil and gas industry with expertise in marine pipelines, terminals, and facilities. A group of INTEC engineers formed a 'knowledge community' to capture knowledge and share it among them. They integrated INTEC's web-based software and search engines with a repository that included 75,000 technical documents, staff's existing skills and certification databases, lightweight Directory Access Protocol files of employees' names, titles, locations, e-mail addresses, and photographs. Engineers with

questions can now search for relevant documents or send e-mail queries to company expatriates. The system was designed to incorporate all queries into INTEC's knowledge base. The benefit of this integrated system to INTEC was its speedy resolution to problems (saving three weeks on average), improved sales processes and also offering these benefits to its customers.

McDermott and O'Dell suggested the following strategies can contribute to creating knowledge sharing cultures [21]: Make a visible link between sharing knowledge and business objectives; provide a reward and recognition system; provide adequate resources to encourage human networks of knowledge sharing; link knowledge sharing with widely and deeply held core values; encourage 'boundary-spanning' individuals who can translate knowledge and experiences from one group to another, and support a committed project champion.

Overall research goals

1. To gain an insight into the extent of knowledge management practiced in the engineering industry in the United Arab Emirates (UAE).
2. To gain an insight into the innovative products or services launched by biotechnology organizations.

Methods used

Valuable insights can be obtained from the qualitative studies in both industries. While these qualitative studies alone cannot lead to conclusive findings due to the specific exigencies of the situation, they nevertheless provide some insight. More research needs to be done to arrive at conclusive findings.

Engineering industry

The sample represented engineers, managers, and consultants of global and local engineering firms such as Hyder Consulting Middle East, Al-Futaim Carillion, Etisalat, Anabeeb Hobas Gulf, Wilber Smith Associates, Capita Symonds, ARENCO Environmental Construction and Consultants, Meinhardt Engineering Advisory and

Consulting services, CEGELEC Solutions and Services. The sample size consisted of twenty two respondents from thirteen organizations surveyed. The sample was selected because they had knowledge of the engineering industry in which they worked.

First, an understanding of the various types of knowledge was given during a presentation. They were knowledge transfer, knowledge sharing, knowledge capture, tacit knowledge, explicit knowledge, knowledge creation, knowledge exchanges, knowledge-based marketing, etc. The audience was asked to complete the survey while the presentation was in progress explaining each type of knowledge using examples of knowledge management practiced in the engineering industry in other countries.

Biotechnology industry

In-depth interviews were conducted with ten senior managers employed in ten biotechnology organizations who were attending the XIX International Congress of Genetics held in Melbourne (6-11 July, 2003). Their responses were analyzed to identify the innovative products or services recently marketed and planned for launch in the future to researchers and other users in the biotechnology industry. These managers were selected because of their knowledge of the industry in which they were employed.

Results

Engineering industry results

A Knowledge sharing systems

The results indicate 72% of the organizations have knowledge sharing systems in place (see figure 2). These include web-based systems (internet/intranet), attending best practice seminars, web access to databases, management information systems and knowledge forums. All of these - while helpful in sharing knowledge - are not as effective when compared to the coordinated and integrated efforts of organizations such as INTEC (not a respondent of this survey). INTEC's engineers in the knowledge community were connected with web-based software and

search engines with a repository of organizational information. Engineers with questions can search for relevant documents or send e-mail queries to company expatriates. The system was designed to incorporate all queries into INTEC's knowledge base. What is most important in knowledge sharing is the coordinated and integrated effort of organizations and making a connection between knowledge sharing and practical business goals.

B Knowledge cultures

In the organizations surveyed in this study, 59% have implemented a knowledge culture within their organization. This figure appears to be too high since it is well known that achieving a knowledge culture is a most difficult task. However, most of the respondents found only a minimal level of knowledge capture had been achieved. Interestingly, one organization with its head-office in the UK, has already invested one million pounds sterling this year on a trial basis and funding will continue if it turns out to be a success.

C Knowledge capturing systems

41% of the organizations surveyed had already implemented knowledge capturing systems. However, most respondents did not describe their knowledge capturing systems. One mentioned the use of databases to capture project statistics and experience, another organization mentioned the use of 'Share Points' (preference plane and or application to help share any directory in Mac OS X). It is unclear as to what other systems were used to capture knowledge.

A good reason to capture knowledge is because employees do not stay long enough in organizations, resulting in a loss of 'knowledge creating employees'. When the 'knowledge creating employees' leave, they take with them what is called "tacit knowledge". As mentioned earlier in the literature review, 90% of the knowledge in an organization is tacit knowledge.

Databases, artificial intelligence, neural networks, incentives to employees to produce high quality content, periodical quality reviews of content, encouraging employee socializing, etc. are some of the methods and tools used to capture knowledge.



Engineering organizations use a combination of knowledge management systems, enabling technology, informal socializing, and non-threatening observation of knowledge workers in order to transfer tacit knowledge to explicit knowledge.

D Employment of knowledge management officers (KMOs)

Only 23% employed KMOs. This is a reasonable percentage within this industry and is likely to grow. It is important to support a committed project champion who can enthuse and motivate employees with the knowledge sharing initiative and bring together people in the organization who already share ideas and knowledge. This project champion is one of the key human factors involved in implementing knowledge management in organizations. The

other two factors are technology and processes and all three constitute what is called architectural knowledge.

E Knowledge communities

Only 23% of the respondent organizations are part of a knowledge community. It is important to build knowledge communities similar to that practiced by INTEC, mentioned above. They connected their engineers with web-based software and search engines with a repository of organizational information.

F Knowledge-based marketing

Only 23% of the respondent organizations practice knowledge-based marketing. This is not surprising as many organizations are not customer focused. If an organization cannot “see” the customer (is not customer-focused) then all that

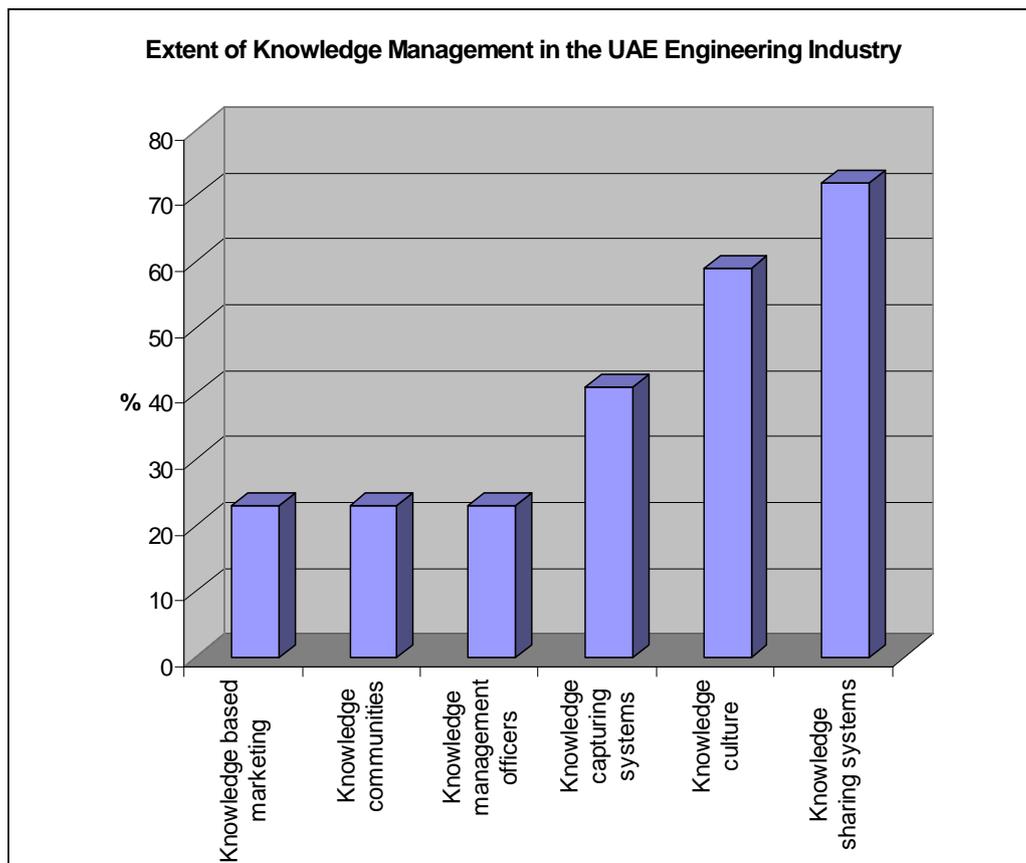


Figure 2: Extent of Knowledge Management Practiced in the UAE Engineering Industry

they do is of no use, for without customers, there is no business. They must capture knowledge and use that to become better equipped to bring out innovative and creative products and services that are needed by their customers. Every organization should have a good Knowledge Management System, similar to that described by the author (in the introduction) to capture marketing knowledge and to use that knowledge wisely.

Biotechnology industry results

The results from the interviews demonstrated the conceptualization of the flow of data, information, knowledge and products/services in the biotechnology industry and were identified as shown in figure 3. A summary of the range of new products and services being marketed to meet the biotechnology industry needs are shown below:

- Computerized drug design and innovative drugs;
- Large computer storage systems; software and hardware packages; operating systems; and database management systems;
- Microarray slides, radio-immunoassay kits, and research tools;
- Tools for analysis of genetic sequence data, text mining and natural language tools;
- Bioinformatics and other training courses;
- Organic chemistry products, mass spectrometry, chromatography;
- Cell culture;
- Statistical tools and algorithms.

Results

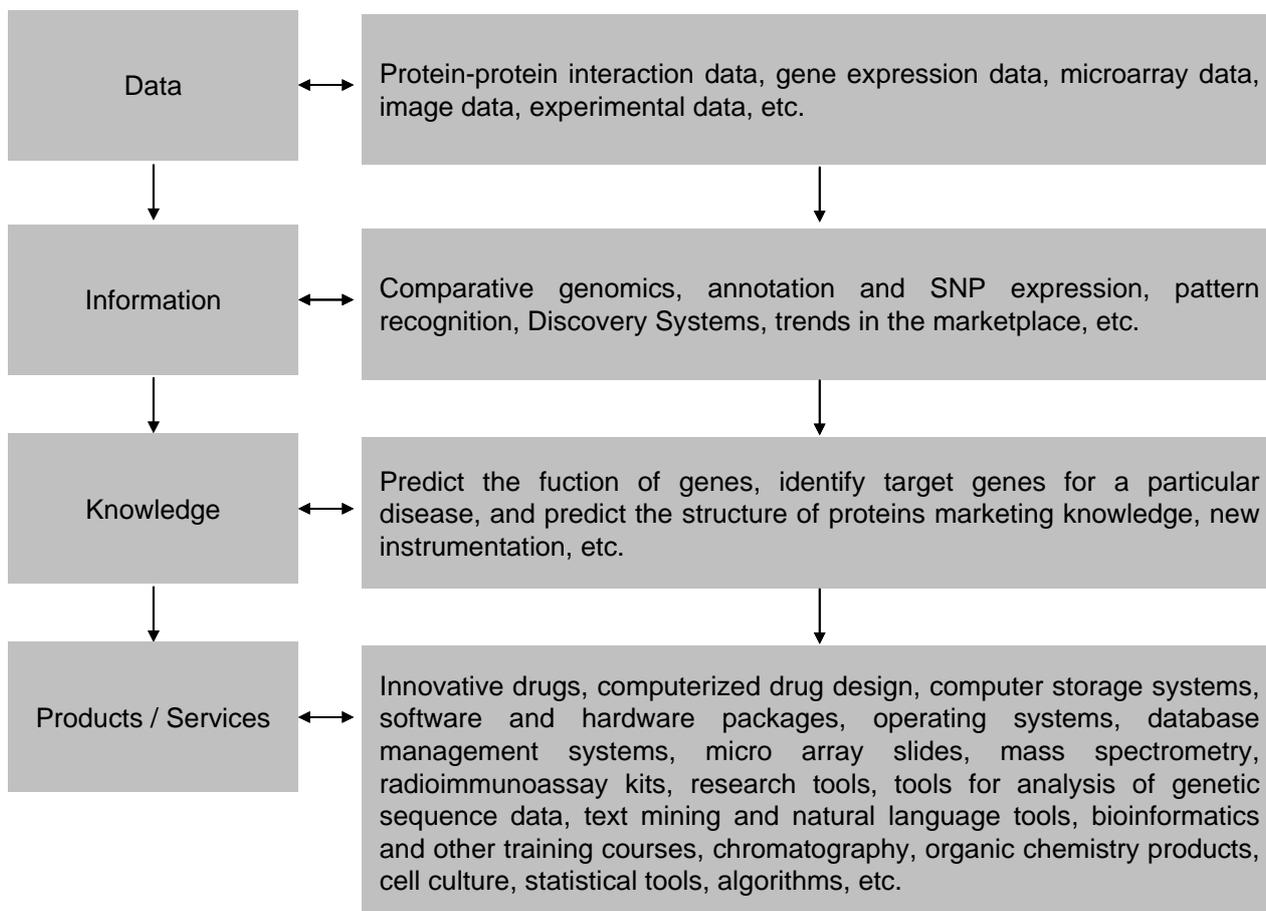


Figure 3: The flow of data, information, knowledge, and products/services

Discussion

Engineering industry

Despite the small sample size, the insights gained from surveying the engineering industry in the UAE is very valuable. The findings show that the engineering industry is implementing the various components of knowledge management to varying degrees. For example, they share knowledge and attempt to implement a knowledge culture. However, most engineering organizations do not have a knowledge Champion (Knowledge Management Officer) nor do they practice knowledge-based marketing. They have not formed knowledge communities. More importantly the various knowledge components are not integrated or coordinated. Knowledge management must be incorporated in all the sub units or functional departments – not an easy task due to interdepartmental conflict – of the organization in to an integrated whole, thereby promoting congruence where the effectiveness of the ‘whole’ is greater than the effectiveness of the ‘disparate’ functional units.

Biotechnology industry

In the biotechnology industry, several new products and services were marketed. The industry is also able to clearly differentiate between data, information, and knowledge. With the new knowledge gained (such as a target gene for a specific disease), the industry is able to come up with innovative new products and services.

References

- [1] Szaro, D. (2006), *Beyond Borders*, The Global Biootechnology Report, Ernst & Young
- [2] Drucker, P. (1993), *Management: Tasks, Responsibilities, and Practices*, Harper & Row
- [3] Jones, T.O. and Sasser Jr. W.E. (1995), *Why satisfied customers defect*, Harvard Business Review. Nov/Dec 95, Vol. 73 (6), p88-91.
- [4] Huber, G.P. (1991), *Organizational learning: the contributing processes and the literatures*, Organizational Science, Vol. 2, Feb. pp. 88-115
- [5] Morman, C. and Miner, A.S. (1997), *The impact on organizational theory on new product performance and creativity*, Journal of Marketing Research. Vol. 34. No.1, pp91-106.
- [6] Morman, C. and Miner, A.S. (1998), *Organizational improvisation and organizational memory*, Academy of Management Review. Vol. 23 No.4, pp 693-723.
- [7] Jaworski, B.J. and Khol, A.K. (1993), *"Market Orientation": antecedents and consequences*, Journal of Marketing, Vol. 57, July, pp.53-70.
- [8] Slater, S.F. and Narver, J.C. (1995), *Market orientation and the learning organization*, Journal of Marketing, vol. 59, July, pp. 63-74
- [9] Srinivasta, R.K., Shervani, T.A. and Fahey, L. (1999), *Marketing, business processes, and shareholder value: an organizationally embedded view of marketing activities and discipline of marketing*, Journal of Marketing, Vol. 63, Special Issue, pp. 168-79
- [10] Davenport, T.H., Harris, J.G., Kohli, A.K. (2001), *How do they know their customers so well?*, MIT Sloan Management Review, Vol.42 No2. pp 63-73
- [11] Cader, Y. (2006), *The Nexus between Knowledge Management, Biotechnology Industry, and Marketing*, International Journal of Knowledge, Culture, and Change Management. Volume 5, 2005/2006
- [12] Grossman, L.M. (1992), *Families have changed but Tupperware keeps holding its parties*, Wall Street Journal, July 21 pA1-A13
- [13] Kotler, P. and Keller, K. (2006), *Marketing Management*, Procter and Gamble, Chapter 3. page 102
- [14] Sasser Jr, W. E., Jones, T.O., Klein, N. (1994), *Ritz-Carlton: Using Information Systems to Better Serve Customer, Case 9-395-064*. 94, Boston Harvard Business School.
- [15] Nonaka, I. and Takeuchi, H. (1995), *The Knowledge Creating Company: How Japanese Companies Create the Dynamics of Innovation*, New York. Oxford University Press, 1995
- [16] Libsuite KM: Retrieved from: http://www.libsuite.com/know_management.htm on 8 April 2007
- [17] Browne, J. (1997), *Unleashing the Power of Learning: An Interview with British Petroleum's John Browne by Steven Prokesh*, Harvard Business Review (Sept-Oct 1997)
- [18] Schwartz, E. (2006), *Filling the void left by baby-boomer techies*, Infoworld, (IDG Communications)
- [19] Brown, J.S. and Duguid, P. (2000), *Balancing Act: How to Capture Knowledge Without Killing It*, Harvard Business Review May-June
- [20] O'Dell, C. (2000), American Productivity and Quality Centre.
- [21] McDermott, R. and O'Dell, C. (2001), *Overcoming cultural barriers to sharing knowledge*. Journal of Knowledge Management, (51), 76-85