Knowledge Management: Some Definitions

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> In the end, the location of the New Economy is not in the technology, be it the microchip or the global telecommunications network. It is in the human mind.
>
> (Webber, 1993, p. 27)

It all started in September 1992, during the Non-Aligned Nations Heads of State Meeting held in Jakarta. At the meeting, Ghanaian Prime Minister Paul Victor Obeng asked Singapore Prime Minister Goh Chok Tong if Singapore could help Ghana by providing development advice. Prime Minister Goh agreed, and the Economic Development Board of Singapore set out to work immediately, researching the Ghanaian economy. In the process of their research, the team encountered a startling fact: Although South Korea and Ghana started developing from about the same time (Ghana from 1957, after gaining independence from the British; and South Korea from 1953, after the Korean War), and from about the same starting point (from approximately US$250 GDP per capita), by 1990, the South Korean economy had surpassed the Ghanaian economy by almost eight fold. When asked about this large discrepancy, the World Bank explained that South Korea's ability to acquire and use knowledge was responsible for at least half that difference.[1]

It is clear that some countries are more aware of their need to continually acquire new knowledge to reinvent their economies. Of these countries, some are more adept at doing it, and some, less so. One example of a country that has successfully transformed itself economically is Finland, whose economy in the 1960s was based on forestry and paper production (Powell & Snellman, 2004). By the year 2000, Finland had reached a level of 137.6 high tech patent applications per million inhabitants, the highest number within the European Union (Zoppè, 2002). Finland is now known more for Nokia and its innovations in mobile and wireless communications, rather than for its paper products.

By their policies, countries can choose to acquire and use knowledge more effectively. Singapore, for example, has attracted many of best students in the ASEAN region through the ASEAN Scholarship. Although the scholarship only leads to the award of the Singapore-Cambridge General Certificate of Education 'Advanced' Level certificate (A Levels), many of the scholars stay back in Singapore after the completing their A Levels to pursue their undergraduate education in one of the local universities, after which they continue to work in Singapore and to contribute to its economy. Eventually, some scholars may even decide to sink their roots in Singapore, and take on the Singapore citizenship.

The Nanyang Technological University, where I work, attracts the most promising scholars throughout the world to be members of its academic staff with its Nanyang Assistant Professorship scheme. Nanyang Assistant Professors receive start-up research grants of up to S$1 million and an attractive remuneration package with a salary of up to S$160,000 a year and other benefits including assistance with accommodation. Again, policy is used to attract and retain knowledgeable people with a promising future.

At the national level, the then Acting Minister for Manpower, Dr Ng Eng Hen explained in parliament that the government's "foreign talent policy", a policy that allows companies in Singapore to hire foreign manpower, is a strategic asset as companies can then bring in workers with the specific experience and skills they require[2]. He gave the example of IBM Singapore, which included hired people from 25 countries which had valuable experience and in-depth expertise in esoteric areas. An immigration policy that is open and liberal facilitates the relocation of foreign professional staff. In these ways, the best and brightest from the region, and indeed around the world, is attracted to work in Singapore.

On the other hand, countries can also choose to reject knowledge through their policies. The best example of the conscious and active rejection of knowledge is the actions of Hitler. In the early decades of the 20th century, Germany was probably the foremost scientific nation in the world. When Hitler came into power in 1933, he single-handedly destroyed the tradition of scholarship in Germany and dismantled her institutes of higher learning by dismissing approximately two thousand academics and scholars of non-Aryan descent (Marks, 1983). This move was followed by the public burning of books that were "un-German" on May 10, 1933 to purify the German language. Among those who left were twenty professors who were either Nobel laureates, or would be Nobel laureates.

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[1] Story adapted from Chan's (2002) Heart Work (p. 240–241).
[2] Source: http://www.mom.gov.sg/publish/momportal/en/press_room/mom_speeches/2004/20040319-attractingforeigntalenttoworkpasssystem.html

Germany's brain drain was Britain and the United States's brain gain[3]. The exodus of scientists from Germany enabled the Allied forces Powers to defeat Germany. It also enabled the United States to surpass Germany as the world's leading scientific nation after World War II.

In his *Competitive Advantage of Nations*, Porter (1990) argues that many of the competitive advantage of individual organizations lie outside the organization itself. He suggests that the business environment plays a critical part, and so does a nation's institutions, e.g., educational (schools, polytechnics, universities), cultural (e.g., museums, libraries), standard setting agencies, professional societies, and judicial system.

Things are largely similar at the organisational level – companies differ in their ability to acquire and use knowledge. Those that are able to, innovate and thrive; those that are not able to, wither and perish. Many industries are faced with an uncertain and rapidly changing environment. Industry deregulation, new and disruptive technologies, and changing cultural trends, demographics and economic realities are posing tremendous challenges for many organizations. Listed below are some examples:

- In many countries deregulation of the aviation sector has caused 'legacy carriers' (airlines founded before the deregulation) to face stiff competition from the newly formed 'low-cost' or 'budget' carriers. Travellers now have a choice, and many of them choose budget carriers for shorter distances. Business travel has also been affected. Due to the economic downturn, many organizations have introduced austerity measures and as a result, on the short haul routes, their employees have to take budget carriers! The 'budget' carrier model is so successful that it is being adapted for long distances. AirAsia X, e.g., has started daily flights from Kuala Lumpur to London. Besides offering lower ticket prices, budget carriers are also innovative, in addition to its Internet ticketing service, AirAsia launched the world's first SMS ticket reservation service in 2003 in order to reach to 10 million mobile phone users in Malaysia. Full-service airlines have to reinvent themselves to compete with budget carriers.

- Internet applications like Google Apps are eating into the market share of traditional software companies. Universities, for example, have realized that maintaining their own email services can be very expensive as it entails, at the minimal level, the purchase of servers, the periodic upgrading of these servers, and the hiring of personnel to maintain the servers. Shrinking budgets have caused some universities (e.g., the University of Notre Dame) to switch to Google Apps. The Singapore Ministry of Education has also adopted Google Apps for its 30,000 teachers and staff in over 350 schools in Singapore by end 2009. This has resulted in the lowering of its IT operating costs for the Ministry but a nightmare for Microsoft. Traditional software companies have to reinvent themselves to address the challenges of cloud computing.

- Voice over IP telecommunications providers like Skype[4], TokBox[5], VZOchat[6] and Google Voice[7] and Talk[8] offer free unlimited worldwide PC-to-PC calls and PC-to-PC video chat is having a major impact on telecommunications companies, whose profitability is likely to be hit significantly and permanently due to reduced fixed line and mobile revenues, especially revenue from long distance calls. At the CeBIT Technology Industry Summit in 2005, Niklas Zennström, CEO and co-founder of Skype Technologies SA, announced that people should not be charged for making phone calls. Skype users use their computers to call any other Skype users free anywhere in the world regardless of distance or service provider. Suddenly, geography is rendered meaningless, and this is significant because traditional phone companies have based their charges loosely on the distance a call travels. In 2005, Skype was sold to Ebay for $2.6 billion. Traditional telecommunications companies have to offer value-added services to maintain their existing subscribers.

- Ebooks represent the fastest growing segment of the book publishing industry. While traditional publishers are still coming to grips on how best to alter their business model to take advantage of ebooks, new publishers like Smashwords[9] have already started authors a free service that helps them publish, promote, distribute and sell their books as a multi-format ebook, ready for immediate sale online at a price they determine. The traditional publishing model is encumbered by intermediaries, e.g., literary agents, editors, publishers, printers, distributors and bookstores, that stand between the author and their prospective reader. Smashwords' social publishing model removes the middlemen and allow readers to decide what's worth reading, and vote for it with their purchase. (http://blogs.zdnet.com/feeds/?p=286)

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[3] The two thousand included four categories of people: (1) those who were Jews, which formed the majority; (2) those whose wife was a Jew; (3) those who left to protest the way in which their colleagues were being treated; and (4) those who disagreed with the National Socialist attitude to science and scientific objectivity (Marks, 1983, p. 372).
[4] http://www.skype.com/
[5] http://www.tokbox.com/
[6] http://www.vzochat.com/
[7] http://www.google.com/googlevoice/about.html
[8] http://www.google.com/talk/
[9] http://www.smashwords.com/

- Hospitals in the United States face challenges of a different kind. Increased ease of travel have enabled patients from these countries to travel to foreign lands to have their surgery performed. These arrangements are made more attractive because patients typically enjoy a two- to three-week vacation in luxury accommodations following their procedure (http://www.mis-asia.com/magazines/mis-asia/volume-4-2009/the-mecca-of-medical-tourism)

- The music and film industries are in turmoil because of technologies like MP3 that makes encoding of music and movies easy. File-sharing sites like Kazaa make distributing the files easy, and this increases piracy.

- Higher education has not been spared. In countries where the birthrate has been low, the survival of universities has been threatened because of declining enrolments. In Taiwan, 60 universities (out of about 160) may have to be closed in the next 12 years.
(http://www.taipeitimes.com/News/taiwan/archives/2009/10/16/2003456103)

- Caterpillar is faced with an aging workforce, and a large proportion of their existing workforce will retire in the near future. They are trying to collect the knowledge of their retiring workers and make it available to others to those who need it. Caterpillar is not alone in its predicament. Organizations in countries that have a rapidly ageing demographic profile have to think of how to retain the knowledge of their workforce.

- On June 27, 2008, a new release by the United States Bureau of Labor Statistics on June 27, 2008 showed that the average person born in the later years of the baby boom held 10.8 jobs from age 18 to age 42. This means that in these 24 years, they held on to each job for an average of only 2.22 years[10] (http://www.bls.gov/news.release/nlsoy.nr0.htm)!

- Newspaper companies have to contend the fact that in addition to reading a lot less than before, people obtain news from non-traditional sources, like Facebook and Twitter. To compound the problem, advertising on newspapers have decreased as more companies divert their advertisement dollars to social networking sites.

In the same way, whether or not these companies are able to survive the challenges they face, and whether or not they can adapt to the new rules of the game depend critically on their ability to acquire and use knowledge to innovate or reinvent themselves. Organizations that succeed will be the South Korea or Finland of their industry. Organizations that merely manage to do this will have to be contented to be the Ghana in their industry. Organizations that fail will not exist five years down the road. Other organizations need to have a constant stream of ideas, and the ability to convert these ideas to products and services.

Lastly, for the individual, never before have his skills and knowledge mattered as much in his economic prospects (Resnick, 1995). Some individuals, because of the values they hold, the attitudes they possess, or the habits of mind that they have cultivated, are magnets for knowledge. One such person is Nguyen Thai Vu, a Vietnamese teenager whose attitudes to learning and life is described in John Wood's (2006) *Leaving Microsoft to Change the World*. Wood, the founder of *Room to Read* met Vu in Hue and was impressed by his hunger for knowledge. Vu worked the night shift at the hotel where Wood stayed earning US$23 a month, and learning Microsoft Excel part time at the Computer Academy at a cost of US$15 per month. His hunger for knowledge was such that when a hotel guest left behind the manual for a Casio calculator, Vu read it four times.

Whether at the national or organizational or personal level, the ability to acquire and utilize of knowledge is important and difference in this ability made the difference between success and failure. This has led a desire, especially by companies, to manage what the knowledge they have, and today, many organizations look to effective knowledge management as being critical to their ongoing success. What *is* knowledge management? Universities have started postgraduate programs on knowledge management, publishers have started journals with knowledge management as its focus, professional bodies established with knowledge management practitioners as its main members founded, and conferences organised with knowledge management as its theme. But what *is* knowledge management, really? Many scholars and researchers have defined the term knowledge management, and I will review some of them.

Definition I

Knowledge management deals with the process of creating value from an organization's intangible assets. It's an amalgamation of concepts borrowed from the fields of artificial intelligence/knowledge-based systems, software engineering, business process reengineering, human resource management, and organizational behavior.

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[10] 24 years ÷ 10.8 jobs = 2.22 years per job

Knowledge management deals with the conceptualization, review, consolidation, and action phases of creating, securing, combining, coordinating, and retrieving knowledge.

Liebowitz, 1999, p. iii–iv

Definition I focuses on an organization's success in creating value out of its intangible assets. Kaplan and Norton (2004) classified intangible assets into three categories:

Human Capital   :   Employees' skills, talent and knowledge
Information Capital   :   Databases, information systems, networks, and technology infrastructure
Organization Capital :   Culture, leadership, employee alignment, teamwork, and commitment

Different people in an organization have attended different schools, have learnt to do different things, have had different work and life experiences, and possess a different knowledge base. How can an organization deploy the knowledge of its workforce to further its goals? How can an organisation use its employee's skills, talent and knowledge to bear on the problems it faces, and the opportunities it encounters?

At 3M, Spencer Silver invented a "failed" (not-sticky-enough) adhesive. Art sang in his church choir during weekends, and used slips of paper to mark the pages of his hymnal. One day, it occurred to him that Silver's "failed" adhesive could be put to use to create a better bookmark. The result is the Post-It notes that can be found today in virtually every office. 3M managed to tap on its human capital (even knowledge related to singing in a choir, an activity completely unrelated to work at 3M!) for innovation.

Some organizations encourage their employees to contribute what they know into knowledge management systems. Some even offer rewards for employees that make the effort to document what they know, but ultimately, knowledge sharing depends on the level of psychological safety in the organisation. An organizational ecology that full of emotional toxicity is not likely to encourage knowledge sharing, while one that embodies organizational care is likely to be more successful in this regard.

Buckman Labs developed a system called K'Netix which which included electronic forum to facilitate the exchange and cross-fertilisation of ideas. The CEO, Robert Buckman took the lead when he announced that "those individuals who have something intelligent to say now have a forum in which to say it". In stating that "management can no longer hold them back", Buckman attempted to remove fear so long as they had "something intelligent" to say. His was deeply involved with the development of K'Netix, and wrote the Code of Ethics that would govern the use of K'Netix. As Buckman Labs was an international company, Buckman ensured that the most important messages were translated into different languages within 48 hours. From the Buckman Labs example, we see that the involvement of the CEO is important. He contributed postings, and prodded people to reply to postings and this sent the signal that knowledge sharing was an important part of the Buckman Labs' "way of doing things".

Daimler Chrysler developed the Engineering Book of Knowledge (EBoK), a knowledge database containing the best practices contributed by its employees. Before its inclusion, a best practice is identified, refined, and verified. Any engineer may proposes a best practice, but Tech Club members responsible for that area of knowledge comment on the knowledge. As the *Book Owner* is ultimately responsible for approving new entries and changes to the EBoK, he joins the discussion. The proposer then considers the inputs given by the Tech Club members and can use them to build a more refined practice. Ultimately the Tech Club decides, and the Book Owner enters the new knowledge into the EBoK.

Definition II

Knowledge management is the [set of] systematic processes by which the knowledge needed for an organization to succeed is created, captured, shared and leveraged.

Knowledge management focuses on how an organization identifies, creates, captures, acquires, shares and leverages knowledge. Systematic processes support these activities, also enabling the replication of successes. All of these are specific actions organizations take to manage their knowledge.

Rumizen, 2002, p. 9

Definition II defines KM as a bunch of activities that are applied to knowledge. Many scholars have taken this approach, and have proposed different processes that make up KM. "Process models" for KM are very common, and they vary according to the granularity of the processes proposed. Davenport and Prusak (1998) proposed a three process model:

- Knowledge Generation
- Knowledge Codification
- Knowledge Transfer

On the other hand, Schwartz (2007) proposed a model with twelve processes:

- Knowledge Creation
- Knowledge Discovery
- Knowledge Acquisition
- Knowledge Classification
- Knowledge Verification and Validation
- Knowledge Codification
- Knowledge Calibration
- Modelling Knowledge
- Knowledge Integration
- Knowledge Sharing
- Knowledge Dissemination
- Knowledge Maintenance

Kucza's (2001) model consists of five processes:

- Knowledge Need Identification
- Knowledge Sharing
- Knowledge Collection and Storage
- Knowledge Creation
- Knowledge Update

From their study of six high-technology firms in China, Lau, Lu, Makino, Chen and Yeh (2002) proposed a three-stage knowledge management model (Figure 1) which may be more suitable for such firms, which is characterised by high-labour mobility. Their model comprises of three stages: (1) acquisition; (2) dissemination; and (3) commercialisation. Three of the firms, namely, Legend Computer Systems, Beijing Kehua, and Zhongke Sanhuan are located in Beijing's Zhongguancun area. They are state-owned enterprises, and were established by the research institutes of the Chinese Academy of Sciences (CAS). The other three firms, namely, Huawei Technologies, Rihai Communication Equipment, and Huayang Industries are located in the Guangdong Province. Of the three, only Huayang Industries is a state-owned enterprise, while the other two are private enterprises.

Figure 1: Lau, Lu, Makino, Chen and Yeh's (2002) Three-Stage KM Model

State-owned enterprises differed from private enterprises in the way they acquired knowledge. At the beginning, the state-owned enterprises depended mostly on the knowledge base of their major shareholders (the research institutes and laboratories of the CAS), who also provided them with research funding, and ensured that absorptive capacity was developed in the firms. The tight linkage with CAS meant that boundary-spanning individuals played an important role. In the case of Zhongke Sanhuan, this role was played by the CEO himself, who was a Fellow of the CAS. After the transfer of knowledge from the CAS, the firms then focussed on knowledge related to the efficient production and the achievement of economies of scale, and lastly to knowledge related to market needs (for the development of new products). Lastly, firms started to acquire knowledge from foreign firms and to develop new knowledge from their own R&D efforts.

While the private enterprises enjoyed research funding form CAS research institutes, they rely more on knowledge developed internally (e.g., Huawei Technologies designs their integrated circuits in-house), and from knowledge sourced from business partners, customers and suppliers. Customers, for example, are involved in the product design of both the private enterprises. The sales and marketing personnel thus becomes the boundary-spanning individuals. In addition, the acquisition of knowledge becomes for the private enterprises becomres more

global. Huawei Technologies capitalised on their network of branck officers to hire technical personnel from India and Russia who are experts in software and wireless technologies, respectively.

Knowledge dissemination is encouraged by communication and collaboration between different departments. At Huayang Industries, the R&D and engineering departments was dencouraged to collaborate by a senior VP who was in charge of both departments. Huawei Technologies uses a matrix structure to enhance the communication between the marketing and product development teams. Legend Computer Systems emphasises a "technology development" culture, using email to disseminate news and using ad hoc groups to champion new products or ideas. Zhongke Sanhuan's CEO uses his charisma to attract high-calibre researchers to work for the firm. He then provides them with a relaxing atmosphere to cultivate interpersonal relationships and with opportunities to further develop their ideas. The development of social capital is thus an important step toward the dissemination of knowledge and integration of technologies. The two private enterprises are more succesful in integrating technologies into their products.

Knowledge commercialisation refers to the extent to which the product meets the needs of the market. In this respect, Legend Computer Systems is seen to be the have the sharpest market focus. It engages in extensive market studies and product design efforts to ensure that its products meet the needs of the market. Others develop new technologies by working closely with their customers. The social network of the CEOs play an important role in securing customers for thr firm. In the Chinese high-technology firms, this stage is regarded as the most important on as in the past, the products were more targetted for the domestic market, and therefore the latest technologies and market needs did not matter so much. Now, the firms are forced to explore new markets and have to develop successful products to remain viable and competitive.

Listed below are four more definitions of knowledge management. Definitions are important as they provide organisations that plan to implement knowledge management with a framework of thinking about what knowledge management means to them, and what it hopes to achieve by implementing knowledge management. Definitions are important because too many companies start their knowledge management journey without thinking through these important questions. It can be seen from the various definitions here that there are different perspectives to KM, and identifying the type of knowledge management that an organisation wishes to pursue is an important first step. Organisations have to realise that a cookie cutter approach simply does not work with knowledge management. Successful knowledge sharing initiatives in a hospital will look very different from the ones in the military. Thriving communities of practice in a secondary school would have been implemented differently from the ones in a production facility or chemical plant. So here they are:

Definition III

Knowledge management can be defined as doing what is needed to get the most out of knowledge resources. Although knowledge management can be applied to individuals, it has recently attracted the attention of organizations. Knowledge management is viewed as an increasingly important discipline that promotes the creation, sharing and leveraging of the organization's knowledge.

Becerra-Fernandez, Gonzalez & Sabherwal, 2004, p. 2

Definition III highlights the fact that KM can be applied at different levels. Indeed, although knowledge management in organizations have taken centre stage, it can be equally applied to individuals, organisations, and society as a whole. Indeed, the eCitizen[11] and EnterpriseOne[12] initiatives in Singapore can be seen as society-wide knowledge management initiatives.

Definition IV

Knowledge management is the strategic management of people and their knowledge, and of an organization's content, using technology and processes, with the aim of optimizing knowledge sharing and utilization by transferring knowledge between people directly face-to-face or indirectly through IT systems, to benefit the organization.

Suresh & Mahesh, 2006, p. 14

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[11] http://www.ecitizen.gov.sg/

[12] http://www.business.gov.sg/

Definition IV highlights two modes in which the utilization and transfer of knowledge can be achieved – directly face-to-face or indirectly through IT systems. Even if an organisation were to decide to use mainly IT for knowledge sharing (perhaps because of its size and geographical spread), it needs to realise that communication media differ in their capacity to facilitate understanding. As "rich" media have a higher capacity, they are able to facilitate the acquisition of insight and rapid understanding. Daft, Lengel and Trevino (1987) state that what determines the richness or poorness of a medium is the blend of four criteria: (1) the ability to provide instant feedback; (2) the availability of an array of cues, e.g., voice inflection, gestures, etc.; (3) the variety of language signals that can be used; and (4) the infusion of feelings and emotions. From these four criteria, they constructed a hierarchy of four levels of media richness (Fig. 2), in which, face-to-face interaction was the richest form.
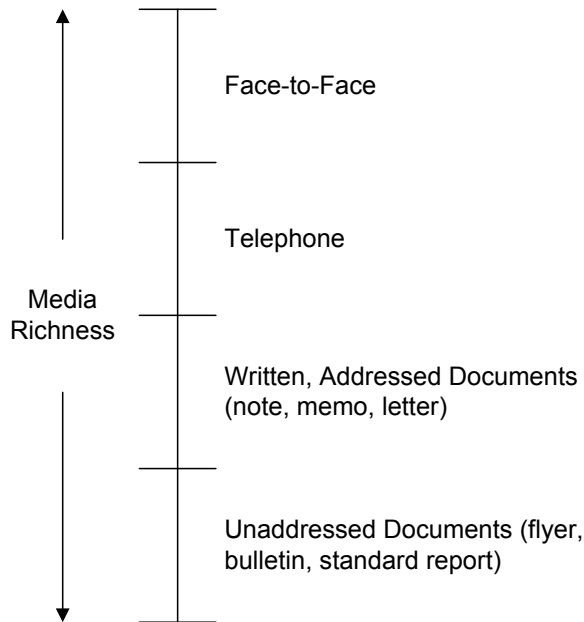
Media
Richness

Face-to-Face

Telephone

Written, Addressed Documents
(note, memo, letter)

Unaddressed Documents (flyer,
bulletin, standard report)

Figure 2 Daft, Lengel and Trevino's (1987) Model of Media Richness

Definition V

Managing knowledge is a multidimensional process. It requires the effective concurrent management of four domains: content, culture, process and infrastructure.

Chait, 1999, p. 24

Definition VI

Knowledge management is a hybrid discipline, neither art nor science; functionally, it can be straddle the fields of learning and organizational development, human resources and IT.

Collison and Parcell, 2004, p. 19–20

Definitions V and VI touches on the parts or domains of KM. Schwartz (2007) has lamented that KM is a "fragmented field" (p. 18), and proper implementation of KM has to recognize that all the component parts have to be addressed. Not just people (e.g., offering rewards for knowledge sharing) or IT (e.g., "rolling out" the latest version of Microsoft SharePoint to the entire organization). Here, organizations need to decide on the "blend" that they want for their knowledge management initiative. The proportion of learning, IT, tweaking of HR policies is unique to each organisation, and so requires careful deliberation by management.

Conclusions

In this article, the necessity of knowledge management at different levels has been presented, and six definitions of knowledge management that focus on different perspectives were also discussed. The importance of definitions in clarifying knowledge management implementations was stressed.

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