

A MARKET-ORIENTED METHODOLOGY FOR KNOWLEDGE MANAGEMENT

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ABSTRACT

In this paper, a market-oriented knowledge management methodology (KP³ methodology) is developed. The methodology is based on the idea that various knowledge management activities need to be linked to the market performance through product and process. As the speed of technological development gets faster and the accumulated knowledge becomes ever larger, the need for knowledge management would grow. The KP³ methodology for knowledge management would satisfy the need, and provide the lasting competitive advantage for the company.

KEYWORDS

Knowledge management; KP³ methodology; Market-oriented approach

1. Introduction

Recently, knowledge management has been recognized as an important new management principle in the 21st century. Whether it is a fad or fundamental paradigm shift for the new management principle, it deal with important aspect of management resource; intellectual asset.

With the technological advances and changes in the regulatory conditions, the world becomes globalized in a fast way. It becomes almost impossible to imagine doing business without considering a global market. To be successful in the global market, intellectual asset is becoming the corporate America's most valuable asset [12]. Intellectual asset are knowledge of employees, customer and supplier relationships, brand royalty, market positions. Because intellectual assets are considered as an important core competency to be successful in the global economy, they should be nurtured and leveraged. Knowledge management will serve that purpose. It would extract intellectual asset, and share them for improving corporate core competencies [9].

The word *knowledge management* was first coined by Karl Wiig, a management consultant at a 1986 Swiss conference sponsored by UN International Labor Organization. He defines knowledge management as the systematic, explicit, and deliberate building, renewal, and application of knowledge to maximize an enterprise's knowledge-related effectiveness and returns from its knowledge assets [14]. Hibbard [5] defines knowledge management as the process of capturing a company's collective expertise wherever it resides - in databases, on paper, or in people's heads - and distributing it to wherever it can help produce the biggest payoff. Others view knowledge management in different viewpoints [1,13], but it is clear that knowledge management is related to improving corporate performance by utilizing knowledge assets.

Need for a research

Even though the ultimate mission of the knowledge management is related to the improvement of the corporate performance, the efforts to understand the relationships and link the knowledge management activities to the financial performance has been less clear. Despite the recognition of the importance of the tie between knowledge management activities and corporate performance, few if any companies have thus far been able to establish a causal link between knowledge management activities and their business performance, regardless of how it is measured [4].

The effort of understanding the relationship between financial performance and knowledge management activities is very essential considering the fact that business performance needs to be measured and improvement has to be demonstrated before the knowledge management approach is adopted and diffused in the regular business activities. In this paper, we develop a methodology which would address the issue of understanding the relationships between knowledge management activities and market performance. Specifically, we address the following three issues.

- 1) Develop a methodology that would link knowledge management activities and market performance by introducing product and process as linkage function.
- 2) Measure the level of knowledge and control them to increase the financial performance of a company.
- 3) Demonstrate the actual applications of knowledge management activities to the management activities such as human resource development and management, promotion and incentive system, project team building, etc.

Principle for this approach

From many literatures and experiences regarding KM system implementation, several implications can be derived for its successful implementation. First, knowledge management is implemented based on the efficient *knowledge network* which can be accessed remotely and contain information about employees, work experiences, project report, training courses, expert profiles, unstructured knowledge [KPMG, SDS, HP, AT&T cases]. Second, to successfully implement a knowledge management system, knowledge-sharing activities need to be strongly emphasized and encouraged [KPMG, HP cases]. Third, for the successful implementation of knowledge management practices, conventional compensation system has to be changed to encourage the knowledge management activities, and organizational structure has to be flexible for the new job functions [Zeta, SDS, HP cases].

With those implications, a methodology for implementing knowledge management activities to the business activities is developed and named as *KP³ methodology*. *K* means *Knowledge* and *P³* means *Product, Process, and Performance*. It is developed with the following principles. First, the methodology for implementing knowledge management system needs to be market oriented. That is, the methodology has to be useful to link the knowledge management activities to the contribution to the company. Second, the methodology has to be easy to link the knowledge management activities and market performance. Because the direct link is hard in terms of practical implementation, *two-step* approach would make it possible by using *Product* and *Process* as intermediaries.

2. A market-oriented KP³ methodology

Approach

Figure 1 shows the approach for the KP³ Methodology. It demonstrates how the knowledge management activities have to be linked to the corporate performance through product and process.

Specifically, product knowledge is linked to product by Knowledge-Product matrix and further linked to market performance by Product-Performance matrix. On the other hand, process knowledge is linked to process by Knowledge-Process matrix and further linked to organizational performance by Process-Performance matrix. Process and organizational performance are indirectly linked to the product and market performance.

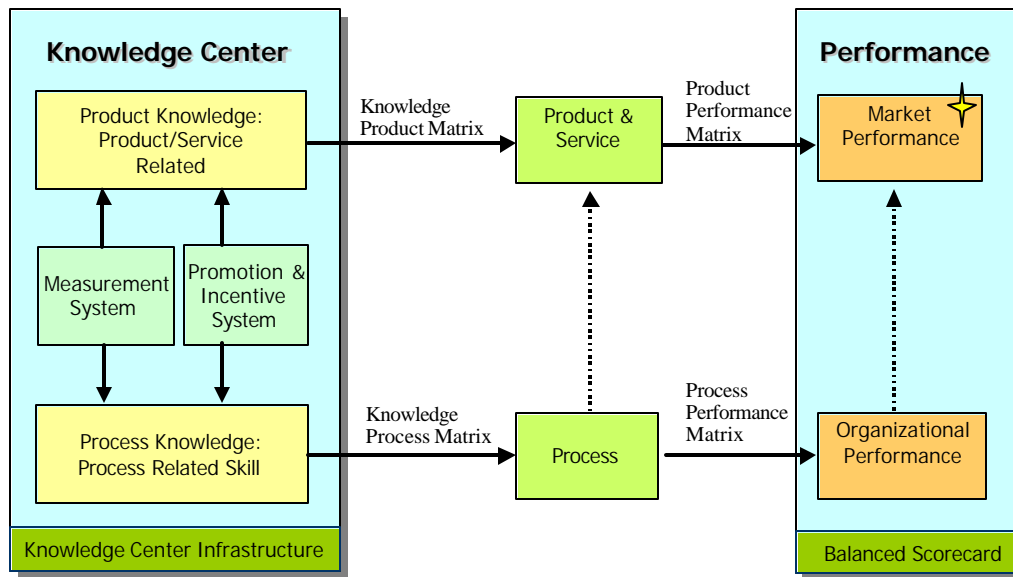


Figure 1: Approach for the KP3 Methodology

Components of the KP³ methodology

The basic building blocks of the KP³ methodology consist of four components: Knowledge, Process, Product, and Performance.

Knowledge

Knowledge can be viewed in many types. Nonaka [8] suggested two types of knowledge: tacit knowledge and explicit knowledge. Collins [1997] related knowledge types to their accessibility: symbol-type knowledge, embodied knowledge, embrained knowledge, and encultured knowledge. There are other views on the knowledge type, such as Spek and Spijkervet [13], Quinn[11].

In this paper, we propose to use dichotomy to classify knowledge: *Product knowledge* and *Process knowledge*. The classification was proposed because the dichotomy adequately links the knowledge to the performance measure by product and process.

Product knowledge is knowledge related to the specific product or service with which a company serves. Specifically, product knowledge can be classified as 1) General management related, 2) Technology related, 3) Business/economic environment related, 4) Market related, and 5) Competitive information related. The knowledge would take specific forms if they were to be applied to a specific industry.

Process knowledge is the knowledge required in each activity of a value chain to successfully provide products or services. The process knowledge would contribute to achieve objectives in each value chain activity. It is closely related to the individual's capabilities and can be further classified into six groups: *General capability (G)*, *Operational capability (O)*, *Strategic and planning capability (S)*, *Problem-solving capability (P)*, and *Interpersonal capability (IP)*.

Table 1: Process knowledge

Process Knowledge	Category
Motivation	G
Verbal Communications Skill	IP
Ambition	G
Personal Fit	G
Decision Making	S
Self Discipline	G
Problem Solving	P
Ability to Organize	S
Work in Teams Well	I
Practical Work Experience	G
Leadership	P
Time Management Skills	G
Creativity	P
Quantitative Skills	G
Writing Ability	IP
Selling Skills	IP
New Technology Skills	G
Negotiation Skills	IP
Foreign Language	IP

Source: Marketing Education Vol. 17, No. 3, Summer 1998.

Process

A process of delivering a product or service can be divided into a number of linked activities, each of which produces value for the customer [10]. The value chain is a framework for analyzing the contribution of each activity to the financial performance. Various activities that make up the value chain are important individually, but they are perhaps even more important in combination. Overall value for customer is created not by individual activities but by groups of activities that come together to form what are known as core process [7].

Because the core processes are set of critically important activities that produce products and eventually corporate performance, they need to be well managed. Process knowledge would make core process the most efficient and productive process contributing to the product and corporate performance. We identified five core processes in this paper. They are 1) Corporate development, 2) Product and service innovation, 3) Technology management, 4) Operations management, and 5) Customer care.

Product

Products are source of revenue. If the industry we are considering were a service industry, product would mean a service in that context.

Performance

It consists of market performance and financial performances. Market performance is directly influenced by how the product or service performance. They could be measured by revenue, market share, profit, ROI, EVA, customer satisfaction in the market, or other financial benefits.

Organizational performance could be measured by efficiency and quality which would be unique for each process.

Linking knowledge, process, product and performance

The four components of the KP³ methodology need to be linked properly. The proper linkage would enable to monitor the status of the performance, and take necessary actions to improve the market performance through knowledge management activities. The four components are linked through four matrices: *Product-Performance matrix*, *Process-Performance matrix*, *Knowledge-Product matrix*, and *Knowledge-Process matrix*.

Product-Performance matrix

This matrix shows how each product contributes to the performance, specifically market performance. For each cell, the target performance is decided and the actual performance will be monitored and necessary measures are taken.

Table 2: Product-Performance matrix example (Actual vs. target ratio)

Performance Product	EVA	Market share	ROI	Revenue/ person	Customer satisfaction	Weight	Weighted sum
Product 1	1.3	1.2	1.4	1.1	1.0	0.3	1.26
Product 2	0.8	1.1	0.85	0.8	0.9	0.3	0.89
Product 3	1.5	1.4	1.1	1.3	1.3	0.2	1.32
Product 4	1.1	0.6	1.1	1.2	0.9	0.1	0.99
Product 5	1.1	1.2	1.0	1.1	1.2	0.1	1.10
Weight	0.3	0.2	0.3	0.1	0.1		
Weighted sum	1.15	1.15	1.11	1.06	1.04		

Process-Performance matrix

This matrix shows how each process in business activities contributes to performance, specifically organizational performance. Because performances related to the process can not defined clearly like financial measures in Product-Performance matrix, organizational performance measures need to be developed depending on the management needs. The examples are shown in the Table 3.

Table 3: Process-Performance matrix example

Performance Process	Efficiency	Quality
Corporate Development	# of new ideas per person	# of accepted proposal
Product/service Innovation	Time to market	# of new product or service
Technology Management	# of network failures per year	Reliability of network management
Operations Management	Service provisioning time	# of network failure per year
Customer Care	Complaint process time	Customer satisfaction index

Knowledge-Product matrix

The knowledge in the Knowledge-Product matrix means product related knowledge. Table 4 shows the structure of the Knowledge-Product matrix. This matrix can be assessed for each individual and they can be summarized for each team and larger business unit.

The weight for the knowledge and product shows the relative importance representing the changes in the technology and market environments. The weighted average for each product or service knowledge shows very important implications. Depending on the strategic importance for the corporate, the strong area can be utilized and weak area should be either outsourced or developed further. The concept and assessment issues will be explained in Section 3 in more details.

Table 4: Knowledge-Product matrix example

Product Knowledge	Product 1	Product 2	Product 3	Product 4	Weight for knowledge	Weighted average	Simple sum
Corporate Development	0.5	0.4	0.5		0.2	0.37	1.6
Product/service Innovation	0.1	0.1			0.1	0.06	0.3
Technology Management	0.3				0.2	0.09	0.5
Operations Management		0.2	0.4	0.2	0.3	0.18	1.1
Customer Care	0.4	0.1			0.2	0.15	0.7
Weight for product	0.3	0.3	0.2	0.2			
Weighted average	0.25	0.17	0.22	0.06			
Simple sum	1.3	0.8	0.9	0.2			

Knowledge-Process matrix

The knowledge in the Knowledge-Process matrix means process related individual capability. Table 5 shows the structure of the Knowledge-Process matrix. This matrix can be assessed as an individual performance rating and they can be summarized for each team and larger business unit. Its assessment is made in a relative scale by their supervisors or peers.

Table 5: Knowledge-Process matrix example

Process Knowledge	Corp. Dev.	Product/S innovation	Tech. magt	Operations magt	Customer Care	Weight for knowledge	Weighted average	Simple sum
General Capability	0.6				0.2	0.2	0.19	0.8
Operational Capability		0.1	0.5	0.7	0.1	0.1	0.21	1.4
Strategic and planning capability		0.4			0.2	0.3	0.14	0.6
Problem-solving Capability	0.4	0.2	0.4	0.2	0.1	0.1	0.29	1.3
Interpersonal Capability	0.4	0.4			0.2	0.1	0.26	1.0
Weight for process	0.3	0.3	0.2	0.1	0.1			
Weighted average	0.20	0.19	0.09	0.09	0.14			
Simple sum	1.4	1.1	0.9	0.9	1.0			

3. Implementation Issues

In this section, issues related to the implementation of the KP³ methodology would be addressed.

Measurement

There are four main components in the KP³ methodology: Knowledge, Process, Product, and Performance. Performance measuring perspective, there are many already widely accepted criteria for measuring performance, such as EVA, Earning per share, NPV, etc. However, the greatest challenge comes when we want to understand and measure what kind of knowledge we have and what are the levels for them.

Whether the knowledge is related to the product or process, we can define scales and use them for the measurement and future improvement purposes. For example, 7-scale rating could be used to assess the individual capability.

Level 1: Very poor and few hope for improvement.

Level 2: Poor and needs significant development.

Level 3: OK with constant guidance, and it could be a satisfactory level with more experiences

Level 4: Satisfactory (Can perform a job requiring the skill satisfactorily with some support from the colleagues having some experience).

Level 5: Good and can do any job requiring the knowledge successfully and independently.

Level 6: Very good and can do any job related to the knowledge successfully, and can do the job not only independently but also can be a leader helping other people who need support.

Level 7: Excellent and expert level which can be a mentor or role model for that knowledge.

Once the knowledge is measured, they should be managed and used properly. The knowledge level should be aggregated over the lower level business units to upper level business units. The aggregated knowledge level for each business units can be used to understand the problems and devise solutions for them. With the understanding, new employee can be hired to complement the current knowledge problems, or employees with redundant knowledge can be transferred to other departments or business units to better utilize their expertise. Also, they can be used to organize project teams.

Incentive system

Knowledge needs to be extracted and shared among people. Because the extracting and knowledge sharing activities are not a natural human behavior, they should be encouraged and they should be given proper incentives.

Knowledge center

Knowledge center will perform several functions to implement knowledge management.

First, it provides knowledge infrastructure for the implementation of the knowledge management. It will be intranet/extranet/ internet-based information system and application software that help to support technical functions for the knowledge management activities. Second, it will collect information from internal and external sources, process them, and classify them as a useful knowledge depending on the predefined codes. Of course, it should administer how to update and register new knowledge as they become available. In addition, the knowledge needs to be audited by the expert in that area before it is stored and shared through the data warehouse. Third, it should develop programs encouraging knowledge acquisition and development. The programs need to be linked to the incentive and performance appraisal systems so that knowledge activities; extraction, shoring, sharing would be properly encouraged and compensated.

4. Conclusions

Knowledge management activities are not the natural act for human individual. They should be encouraged and compensated depending on the corporate mission and strategy. In this paper, a market-oriented knowledge management methodology (KP³ methodology) was developed. The approach is based on the idea that various knowledge management activities need to be linked to the market performance through product and process.

KP³ methodology developed in this paper is a general approach and it can easily applied to any industry with relevant domain knowledge. The possible applications area would be in the following.

- 1) **Evaluation, Compensation and Promotion of employees:** It can be used for evaluation, compensation and promotion of employees.
- 2) **Knowledge acquisition and administration:** Using the predefined knowledge code, knowledge can be systematically classified and administered. The knowledge can be represented by the knowledge map, and it can be used to build project team depending on the required knowledge and their levels.
- 3) **Human resource management and development:** It can help to develop knowledge for the current employees. Also, it can find outside resources which are needed to achieve corporate objectives.

As the speed of technological development gets faster and the accumulated knowledge becomes ever larger, the need for knowledge management would grow. The KP³ methodology developed in this paper is a very doable and practical approach. We believe that this methodology will provide the lasting competitive advantage for the company.

REFERENCES

1. Beckman, Thomas J. (1997). *A methodology for knowledge management*, International association of science and technology for development (IASTED) AI and Soft Computing Conference, Banff, Canada.
2. Beckman, Thomas J. (1999). *The current state of knowledge management*, Chapter 1, in the Knowledge Management Handbook, edited by Jay Liebowitz, CRC Press.
3. Collins, H., Human, (1997). Machines, and the Structure of Knowledge, Ruggles R., ed., *Knowledge Management Tolls*, Butterworth-Heinemann.
4. Davenport, Thomas J. (1999). *Knowledge management and the broader firm: Strategy, Advantage, and Performance*, Chapter 2, in the Knowledge Management Handbook, edited by Jay Liebowitz, CRC Press.
5. Hibbard. J. (1997). Knowing what you know, Information Week, October 20.

6. IEC (1999). Knowledge Management for the Telecommunications Industry: Strategic Analysis Report.
7. Miller, Alex, and Dess, Gregory G. (1996). Strategic Management, 2nd Ed., McGraw-Hill companies.
8. Nonaka, I. and Takeuchi, H. (1995). The Knowledge Creating Company: How Japanese Companies Create the Dynamics of Innovation, Oxford University Press.
9. Peteraf, M. A. (1993). The Cornerstone of Competitive Advantage: A Resource-Based View, Strategic Management Journal, Vol. 14, pp. 179-191.
10. Porter, Michael (1985). Competitive Advantage: Creating and Sustaining Superior Performance, Chap. 2, New York, The Free Press.
11. Quinn, J. B., Anderson, P. and Finkelstein, S. (1996). Managing Professional Intellect: Making the Most out of the Best, *Harvard Business Review*, March-April, pp. 71-80.
12. Roos, G., and Roos, J. (1997), Measuring Your Company's Intellectual Performance, Long Range Planning, Vol. 30, No. 3, pp. 413-426.
13. van der Spek, R., and Spijkervet A. (1997). Knowledge management : Dealing Intelligently with Knowledge, Knowledge management and its Integrative Elements, Liebowitz & Wilcox, Eds., CRC Press.
14. Wigg, K. (1997). Knowledge management: Where did it come from and where it will go?", Expert Systems with Applications, Vol. 14, Fall.