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Enterprise knowledge management model (EKMM) in strategic enterprise resource management (SERM)

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Abstract

Creating knowledge intensive systems seems to be inevitable in modern enterprises. More autonomous systems would be dominating nearly all aspects of the organization from management to production, from marketing to supplier management. Since required autonomy can only be assured through effective automated knowledge management systems including agent based approaches, it is advisable to employ integrated information systems such as SERM (Strategic Enterprise Resource Management) together with active knowledge management models such as EKMM (Enterprise Knowledge Management Model) as well respective supporting systems in order to be intelligent enough in own operations. This study will highlight possible benefits and advantageous in creating SERM supported by EKMM in an integrated manner. SERM is capable of handling corporate level strategic planning, traditional ERP systems, technology management, CRM as well as performance monitoring. EKMM on the other hand is designed to handle the corporate knowledge in a systematic ways in order to assure that the right knowledge becomes available to the right person at the right time.

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1. Introduction

Interactions within an enterprise for the exchange and the creation of knowledge have become a key concern for management. This requires clearly defined Knowledge Management (KM) processes as well as respective methodologies.

Knowledge management is the creation and subsequent management of an environment which encourages knowledge to be created, shared, learnt, enhanced, and organized for the benefit of the organization and its customers (Kebede, 2010).

Note that the knowledge is not only limited to intellectual capacity. It also consists of interdepartmental activities, information about the customer satisfaction, products produced and services

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provided etc. This clearly indicates the importance of knowledge management approaches and indicates the need for an enterprise-wide model.

In order to be able to respond to the fast-changing business environment of the markets, enterprises need to integrate business functions into a single system. So called Enterprise Resource Planning (ERP) systems which efficiently utilize information technology, and enable the internal sharing of information as well as communication with the vendors and customers. ERP systems focus on the integration of business functions throughout the entire enterprise by facilitating the flow of information across the line of the business processes as they cross the departmental boundaries (Vandaie, 2008).

Knowledge management achieves would not create successful business results unless an integrated Enterprise Information Network is set up and fed by resource management system such as SERM. This paper presents a general framework for integrating both Resource Management (SERM) and Knowledge Management (EKMM) models aligned with each other for the sake of business goals.

2. Knowledge Management

Knowledge management encompasses the spectrum of management concerns from knowledge creation or codification to knowledge diffusion and exploitation. Some earlier literatures attempted to focus primarily on the knowledge creation or codification processes in organizations (Chen, Huang, 2007). There have been several advantages for formal knowledge management activities within an organization. Arslankaya (2007) listed those as such that the knowledge management;

- Provides facilities to keep critical expertise in organization,
- Increases in the adaptation and flexibility,
- Provides higher return on investment,
- Increases the competitive advantage
- Protects intellectual property right
- Helps developing customer focused organization.

There has been several knowledge management models implemented [for example Lee and Kim (2001), Malhatro (2004), Lin et al (2007), Kanapeckiene et al., (2010), Lee and Lan Y(2011)]. When these models are studied in detail, it can be realized that each model focuses on one or two aspects of knowledge management. Some of them take only two criteria such as technology utilization and knowledge generation as the main focus while others concentrate on other criteria including knowledge processes, knowledge culture and leadership etc. (Dincmen and Aksoy, 2003). An Enterprise Knowledge Management Model (EKM) is a hierarchical network of rules that enables an agent to explain, anticipate and predict events and interaction patterns: (a) in the enterprise's Knowledge (Kn) Processes, or Knowledge Management (KM) Processes; and (b) in the enterprise's environment. An EKM model represents or models the Natural Knowledge Management System (NKMS) of an enterprise (Firestone, 1999).

Enterprise knowledge comprises of every kind of knowledge that has been produced either in or out of the enterprise no matter it is recorded or unrecorded. As noted above, it is difficult to find out a model that covers the overall enterprise and related activities as a whole.

EKMM as proposed by Arslankaya (2007) aims to fill this gap and provide enterprise – wide Knowledge Management practices.

EKMM is designed on the facts following;

- An effective knowledge infrastructure is not enough for just handling of all of knowledge management processes (Knowledge Infrastructure). A successful knowledge management clearly requires some processes such as searching for knowledge, producing the knowledge and updating it etc. (Knowledge Management Process).
- It is also necessary to create knowledge representation schemes so that the knowledge is understood by all in the same way (Knowledge Representation).

- Similarly, it is important to define the systems making the right knowledge to be at the right place at the right time to guarantee that. Using and planning knowledge are also the most important parts of knowledge management model proposed (Knowledge Planning).
- In addition to this, knowledge management strategies and related organizational structure also need to be taken into account in achieving a good management of knowledge (Knowledge Management Strategies).
- This will assure that the knowledge management activities are considered at an enterprise level (Knowledge Organization).
- Knowledge management activities should be considered as way of life in a successful enterprise. This clearly indicates the need for a knowledge culture to be developed (Knowledge Culture).
- This in turn increases the knowledge sharing capabilities in such a way that one increases the other's knowledge. This is called as "knowledge leverage" (Knowledge Leverage)
- Above all of these, the knowledge management activities should be assessed and periodical evaluated in order to make sure that activities required properly carried out. The problems that are identified in this assessment could be sorted out and necessary improvement could be realized (Assessment of knowledge management).

The proposed model is also called "knowledge tower" as the elements of the model is interrelated in a tower shape manner. The elements of the proposed EKMM are given in Fig 1. Details of each element are given in Oztemel and Arslankaya (2011).



Fig 1: Elements of EKMM-Knowledge Tower (Oztemel and Arslankaya, 2011)

3. Strategic Enterprise Resource Management (SERM)

As indicated in fig 2 SERM is an approach for corporate level resource management.

As seen in fig 2, SERM consists of basic MRP and MRP II as well as ERP capabilities. In addition to ERP, SERM provides a way to handle Strategic Management (SM), Customer Focused Activities (CFA), Technology Management (TM) and Performance Monitoring (PM). Similar to EKMM, definition of these components is also provided in Oztemel and KorkusuzPolat (2007).

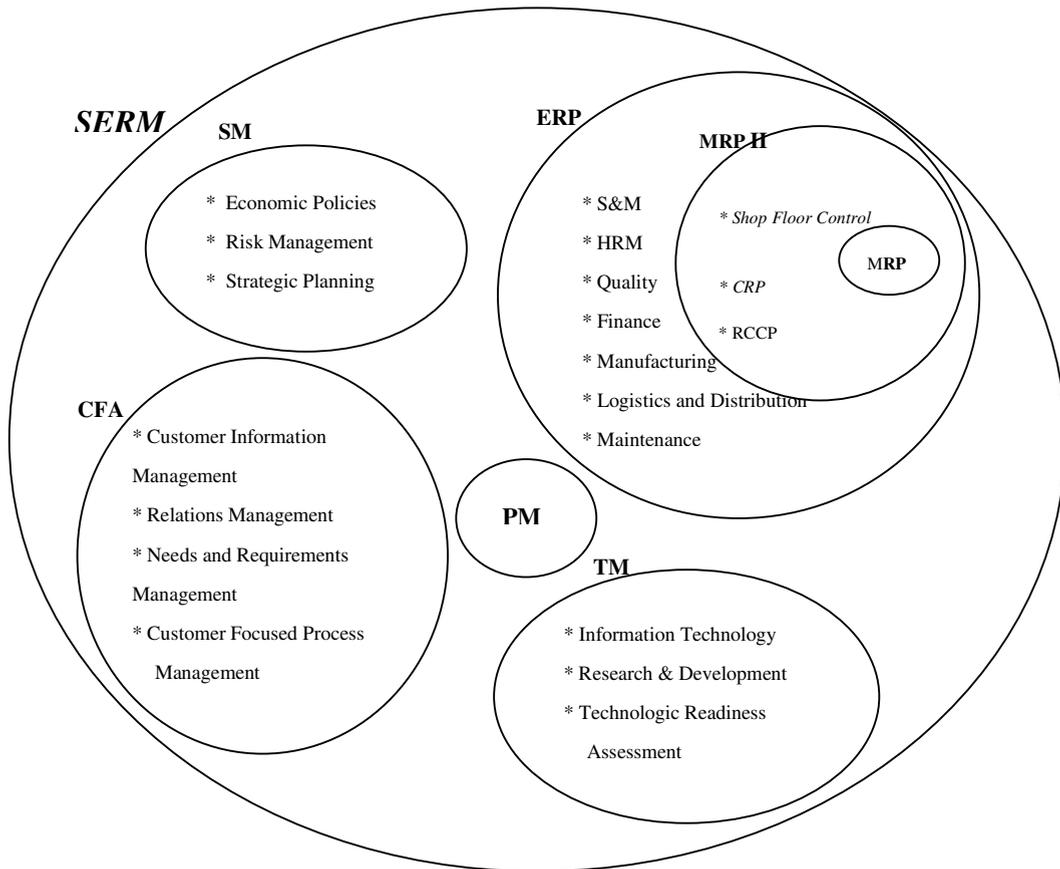


Fig 2: Components of SERM (Oztemel and KorkusuzPolat, 2007)

(MRP: Material Requirements Planning; CRP: Capacity Requirements Planning; RCCP: Rough-Cut Capacity Requirements Planning; MRP II: Manufacturing Resources Planning; S&M: Sales and Marketing; HRM: Human Resources Management; ERP: Enterprise Resources Planning; PM: Performance Monitoring; TM: Technology Management; SM: Strategic Management; CFA: Customer Focused Activities; SERM: Strategic Enterprise Resources Management)

4. Proposed Approach for Integrating EKMM & SERM

EKMM & SERM can be integrated in various ways. The integration could be done in two folds. Either EKMM is taken as a baseline and SERM components can be tailored to those in EKMM for satisfying business goals or vice versa. In this study SERM is taken as a baseline.

4.1. Knowledge Infrastructure in SERM

EKMM provides a systematic knowledge infrastructure which can be utilized by SERM modules as indicated in figure 3.

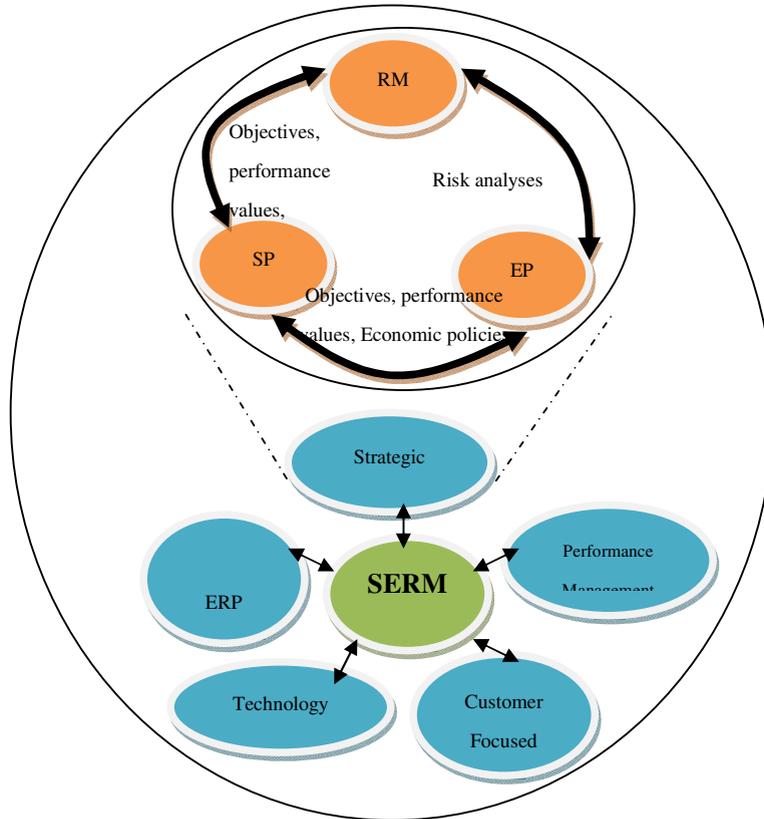


Fig 3: General knowledge infrastructure of EKMM in SERM

4.2. Knowledge Management Process in SERM

Knowledge process may involve operational aspect of the knowledge management. This indicates that in each enterprise the following processes specifically set up for handling the available knowledge. Processes such as searching, producing, updating, sharing, storing and transferring the knowledge etc. between SERM modules. In the SERM, the strategies prepared by the sub-module of strategic planning; the risks, risk action plans and risk precaution plans determined by the sub-module of risk management; the criteria required for evaluating technology in the sub-module of technology management; and

information like the customer information and customer needs/requirements in customer-focused activities should be stored; the strategies prepared by the sub-module of strategic planning and the risks prepared by risk management should be shared with the relevant units; and customer/product/supplier information should be updated. The realization of these activities in the SERM can be done by means of the information management processes of the EKMM model.

4.3. Knowledge Representation in SERM

Knowledge representation is creating a certain standards for the knowledge in such a way that all understands the same thing from the same context. Providing specific formats (for knowledge filtering, reporting, archiving, file storing etc. in SERM modules). In the SERM, the strategies/objectives prepared by the strategic planning module are sent to the other modules of the SERMs. The units send the activities they have performed regarding the objectives as a report back to the unit of strategic planning. Likewise, to determine the corporate risks, the module of risk management asks the other SERM modules to determine the risks. The important parts of the EKMM model include the comprehension of knowledge in the same way by everybody and the development of joint knowledge displaying methods for the availability and comprehension of the right knowledge in the right places and at the right time. Again, there should be a standard for the forms to move among the units so that everybody can understand the same things from the same content. It can use the knowledge displaying module of the EKMM model also to determine which reports should the SERM model produce among its modules, at which levels these produced reports will be produced and in which format it will produce. Just like the standard format, in which knowledge is displayed in the SERM, a standard might be provided in their filing, too. Thanks to this standard, knowledge may be accessed more quickly. The example of knowledge movement card used in the EKMM is shown in Table 1.

Table 1: Knowledge movement card

Name of firm / unit	XXX		
Knowledge	Risk determination analysis	Knowledge Code	
		Date	
Place where the knowledge is formed	All units	Importance of knowledge: Provision of the knowledge required for determining the risks	
Its place of use	Risk management unit		
Producer of the Knowledge	All units		
Production Time	January/June	Content of knowledge: Risks, risk sizes, risk precautions and risk actions	
Unit/person using it	Risk management unit		
Its time of use	February/July		
Its destination			
Objective of knowledge			

4.4. Knowledge Planning in SERM

Knowledge planning is about creating knowledge plans in such a way that the right knowledge can be utilized at the right time by the right person. Knowledge planning defines the knowledge routes should support computer networks and traditional management information systems. It defines what knowledge is to be produced when and where.

Table 2: Examples for knowledge flows between Strategic Planning sub-module and other SERM's modules

Strategic Planning	KNOWLEDGE SHARING		HOW WILL IT INFLUENCE STRATEGIC PLANNING?
	...From	...to	
Customer Focused Activities	A feedback report showing the positive and negative impacts of a firm's customer strategies on the firm Objectives and activities of the unit	Strategies concerning customer-focused activities Objectives of the unit (approved)	Knowing the customer feedbacks helps in arranging/renewing the institutional policies and strategies in line with the positive and negative reactions by customers.
Risk Management	A case report on risks of the whole institution Objectives and activities of the unit	Strategies for risk prevention and monitoring Objectives of the unit (approved)	It is important in determining the strategies about risk.
Research and Development	A case report on Research & Development Objectives and activities of the unit	Objectives of the unit (approved) Strategies for Research & Development Ideas about new products	It is important in determining the Research & Development strategies and in decision making about investments in Research & Development.
Knowledge and Information Management	A case report on Information and Informatics Management Objectives and activities of the unit	Strategies for Information and Informatics Management Objectives of the unit (approved)	It is important in determining the information and informatics strategies and in decision making about investments in information and informatics.

4.5. Knowledge Management Strategies in SERM

Knowledge strategies define enterprise level policies and strategies regarding knowledge management. It affects the enterprise behavior. Following strategies could be good examples. However, the enterprises can develop their own business specific strategies as well.

- Strategic Management of SERM
- Priority assignment (critical success factors)
- SERM based SMART Goal development
- (Specific, Measurable, Attainable, Realistic and Time-based)
- Resource allocation
- Action planning and implementation
- Performance monitoring
- There should be a guideline for producing of the knowledge. This may ensure the rightness of the true knowledge
- The knowledge should be kept in the right place and accessible for those who are eligible to access
- Right knowledge should be transferred only upon request of the authorized person.
- The knowledge received upon request should definitely be analyzed, used or disregarded in the right ways. Possible feedbacks should be generated
- Keeping knowledge within the enterprise and do not disclosure any information outside the enterprise without proper authorization

4.6. Knowledge Organization in SERM

Knowledge organization defines organizational units and functions as well as activities. It determines the following.

- Organizational units such as information technology departments
- Departmental or process responsible (knowledge workers)
- Tasks and responsibilities,
- Working regulations
- Required human resources
- Tool and methods (Required Hardware and software)

Responsibilities for SERM related processes and issues should be defined and respective institutional structures are established. (Chief Knowledge Officer, Knowledge Worker, DBMS Administrator, IT Staff etc.)

Regarding the jobs performed by each of five main modules of the SERM, it has its own Chief Knowledge Officer and Knowledge Workers. For instance, the CKO of the main module of strategic management performs activities concerning the development of corporate culture and the enhancement of the infrastructure of corporate affairs and its information resources. For their innovations, he provides specialized knowledge, information, competitive advantage and support. He carries out these activities in agreement with the general operating of the module of strategic management. Knowledge workers, on the other hand, have the ability to rapidly acquire theoretical and empirical information and transfer it to practice. They are individuals with a high level of education. In addition, they have a skill of continuous learning. For instance, the knowledge workers of the main module of customer-focused activities have the skill of rapidly acquiring theoretical and applied information about customers and of using them for the sake of the corporation. They continuously learn about customer needs/requirements and reflect new knowledge on products/services/processes.

4.7. Knowledge Culture in SERM

Knowledge culture is a kind of concept about building of an active, confidential and safe, productive understanding of knowledge management by providing all the personnel to predicate all their behaviors to the true knowledge. It may include creating highly motivated knowledge society within the enterprise. The culture itself should be equipped with believe that knowledge is the only source of power and share the experience is the active implementation of it. Enriching the enterprise knowledge through continuous monitoring and updating is another cultural motto of the knowledge management. Active motivation and flexibility of knowledge use, focusing on productivity as well as effectiveness, putting interest on reliability, authorization and secrecy in implementing.

4.8. Knowledge Leverage in SERM

Knowledge leverage can be defined as helping others to improve his or her self knowledge. This may ensure that the level of knowledge and its utilization can be synchronized within the enterprise. This may obviously prevents delays in decision making and increase the level of contributions to decision making. As all people will be understanding each other and using the same knowledge language this will also increase the effectiveness as well as efficiency in defining or locating the right knowledge. In order to prevent lack of knowledge and avoid possible gaps in joint decision making, a set of activities should be carried out to establish an equal knowledge background of all stakeholders. (External and internal leverage)- (brain storming, focus groups, proper communication channels, sustainable knowledge transferring and sharing environment, problem solving teams etc.). In the SERM, the module of strategic planning informs all other sub-modules about the strategies/objectives it has specified. When necessary, it provides other units with the required support regarding the subjects such as the specification of objectives, the realization of objectives, the realization of activities, and the measurement of objective performances. To eliminate the lack of knowledge in any of its modules within it, the SERM uses the knowledge leverage activities in the EKMM model. By organizing in-service training activities and brain

storming sessions, by specifying focus groups and suitable communication channels, by creating the environment, to which knowledge can be transferred, and with similar methods, leverage can be achieved. By means of leverage, the knowledge level of each module of the SERM can be maintained at the same level.

4.9. Assessment of knowledge management in SERM

To assess the capability of implementing

- MRP and ERP systems
- Strategic Management (Strategic planning, Risk management, Economic Policies)
- Technology Management (R&D, Information Technology, Technology Readiness Assessment)
- Customer Focused Activities
- Performance Management etc.

To control whether the right knowledge works in the right place, in the right person and at the right time in SERM, some 585 sub-criteria affiliated to 22 criteria in the EKMM model are used.

5. Conclusion

Strategic Enterprise Resource Management provides systematic way of handling of rationale activities within an enterprise with specific focus on strategic thinking. SERM requires first corporate level strategies to be defined based on mission of the organization as well as customer needs and requirements. The strategies should be compatible with the economic development of the market and should be reviewed through detailed situational analysis, technological analysis and R&D results. Enterprise Knowledge Management Model provides methods and methodologies to sustain better knowledge management within the enterprises. Enterprise level objectives and strategies are dominant and guides the knowledge related activities starting from knowledge planning and establishing suitable infrastructure. The proposed model enforces the practitioners to implement specific knowledge representation schemes in order to create a well defined and understood knowledge utilization, implementation and sharing environment. One of the mostly important elements of this model is to handle knowledge and all related activities at the organizational level and propose a highly knowledge motivated culture. In addition to those a set of knowledge leverage support within the enterprise should not be neglected for the sake of success. Integrating SERM and EKMM assures productivity and effectiveness of operations and managerial activities. A set of criteria for the assessment is being built revising the existing sub- criteria.

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