The KMS Architecture Design for Service Providing

Slavko Vidovic
University of Zagreb
Faculty of Organization and Informatics, Varaždin
slavko.vidovic@foi.hr

Darko Galinec
Ministry of Defence, Republic of Croatia
Information and Communications Technology Service, Zagreb
darko.galinec@morh.hr

Abstract: *The globalization process is driven by rapid changes in technology, market and culture resulted in global knowledge economy and information society. New challenges and requirements are done; questions are: How to do knowledge management in organizations? How to develop organizational knowledge in companies? Key success factor in implementation business systems is knowledge about business processes. Today, staff is organized around goals and knowledge in new organizational forms (like: competence centres, front offices, back offices, help desks...) and supported by IC networks. In daily operating procedures everyone in company has to know his/her roles to mission-vision-strategy implementation i.e. values done by him/her. One of the most often business system type is Service Providing driven by knowledge and driven by ICT. Business process models are the key knowledge components in company where many drivers are "connected": people and organization, IC devices and networks, content and documents, concepts and model shapes. The Service Providing was our field of research. In this context: we designed the architecture for KM application development to Service Providing companies. One example of implementation is designed.*

"The basic economic resource is no longer capital, nor natural resources, nor labour. It is and will be knowledge." Peter Drucker (1959.)

Keywords: *knowledge management, learning mechanisms, service management*

1. KNOWLEDGE MANAGEMENT SYSTEMS AND BUSINESS INTELLIGENCE: FROM TOP MANAGEMENT TO EVERY EMPLOYEE

1.1 *KMS and Business Process Models aligned to Strategy*

The highest goal of organisation design is to produce synergy. The companies capitalised on capabilities and assets (tangible and intangible) that existed already within organisation. The implementation of strategy requires the active contributions of everyone in the organisation. Executives use the Balanced Scorecard to help communicate and educate the organisation about the new strategy. People value added and employee satisfaction become one of most important theme. Carrier management supported through "whole life education" is the first question for knowledge-based enterprise. The goal of knowledge management is a systematic approach to find, understand, share and use knowledge to create value.

What is KMS in relation to Business processes?

Organisations are traditionally designed around functional specialties (finance, manufacturing, marketing, sales and purchasing) with own body of knowledge, language and culture ("functional silos"). The most of these organisations have great difficulty communicating and coordinating across specialty functions.

In Kaplan & Norton [KAP 01] solution of functional silos problem did not find out in the process orientation, although "strategy linkage diagrams" contain certain basis for business process

development. The solution for that problem is "process-centred enterprise" evolved by Michael Hammer in [HAM96]. Hammer & Champy [HAM01] introduced "the business system diamond" which consists of: Business Processes, Jobs and Structures, Management and Measurement Systems, Values and Beliefs.
Process approach results in Process Repository i.e. Knowledge Base of whole organisation (motivations, processes, organisation, locations, applications, time, technology) which has to be aligned to strategy. Well-known example of process approach is eTOM of Telemanagement Forum.

To rich universal approach, we combined Kaplan & Norton approach (Balanced Scorecard) and Hammer & Champy approach to design "The Business System Dual Diamond" (Figure 1).

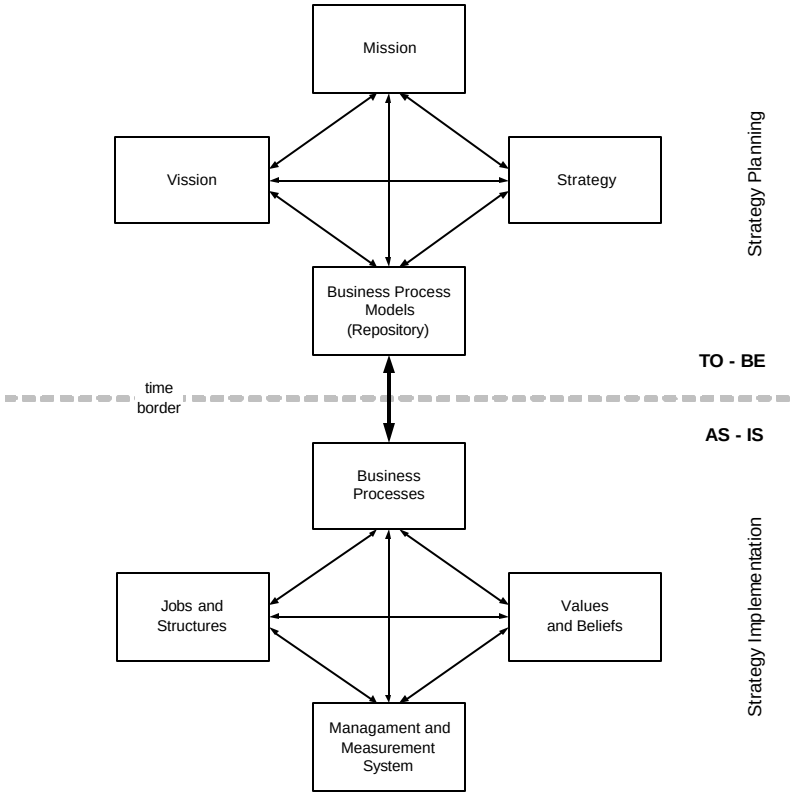


Figure 1: The Business System Double Diamond

The First Diamond surface represents Planned Values, at strategic level, and puts the question "Are business processes models aligned to Mission-Vision-Strategy goals/motivations?"
The Second Diamond surface represents Delivered Values for customers and stakeholders, at operational level, and puts question: "Are customers satisfy with delivered values?"

The conclusion of the above analysis is: *Process Knowledge is the key strategic resource in the context of Strategic Planning and Strategy Implementation.*

1.2 *Employee positioning: KM and BI requirements*

In all research and literature the common basis for Knowledge Management, Business Intelligence and Performance Management is the same: an employee (KAP01, HAM96, NIV02…). Behaviour and results of employee activities are function of three dimensions-vectors (Figure 2.):

- Knowledge management axe: knowledge, skills and learning;
- Business management: motivations, culture, performance management;
- Business intelligence: business intelligence, "climate for action" participation, distributed decision-making.

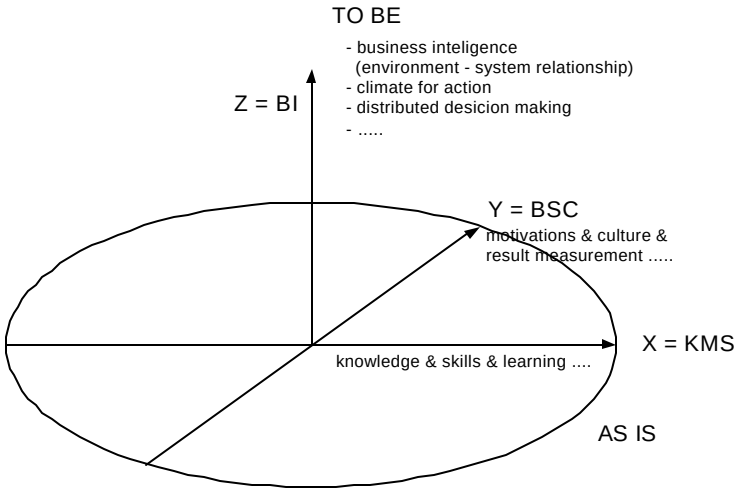


Figure 2: Employee: The basis of KMS, BI and BSC

Key problem is to align employee activity with strategy: through knowledge, organization and technology.

In this context, we research problem of architecture design for knowledge management system development. The key requirement is to establish KMS as business infrastructure for synergy making in an organization. That's why, process knowledge is in focus of our research and seen as strategic resource for strategy implementation.

Business process models are the strongest conceptual resource to store and share knowledge in company. For example, the Zachman Framework is basis for Business process repository development [RUR03].

In general, business infrastructure contains: employees, organization units, technology resources and knowledge (content). All these resources have to be aligned to strategy. From KMS development view, learning processes are generating processes: team learning (organization driven) and e-learning (technology driven).

The employee has key position in learning processes. He/her is supported through organization and technology aligned to strategy (Figure 3.).

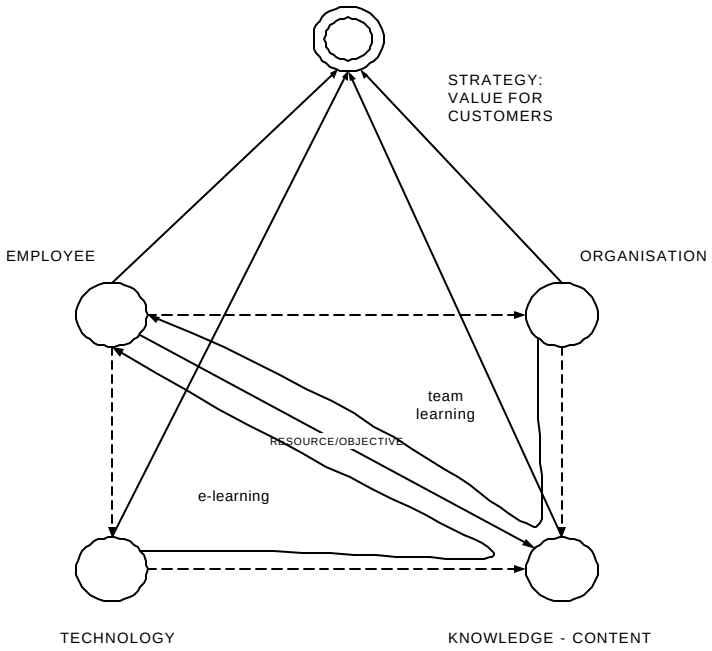


Figure 3: Knowledge, organization and technology aligned - to strategy

2. THE LEARNING AND GROWTH STRATEGY FOR KMS FRAMEWORK

2.1. Business and Technology Trends

The globalisation process is driven by rapid changes in technology, market and culture and its results are knowledge economy and information society. Enterprises are moving toward a more sophisticated, distributed way of decision-making.

Gartner predicts next business trends:

Sourcing: By 2005, 70 percent of leading enterprises will adopt strategic sourcing as a core discipline (0.7 probability). Strategic sourcing, where enterprises seek partnerships for non-core activities while concentrating on their core competencies, has become an important issue when enterprises talk about how to organize themselves more effectively.

Competency centres: By 2005, knowledge workers focusing on innovation will represent between 30 percent and 35 percent of the workforce in developed nations, up from between 10 percent and 15 percent in 2000 (0.6 probability). Knowledge workers already have a more networked way of working and consulting peers - inside and outside the enterprise - in their decision-making processes. Typically, knowledge-intensive enterprises organize their business activities in competency centres.

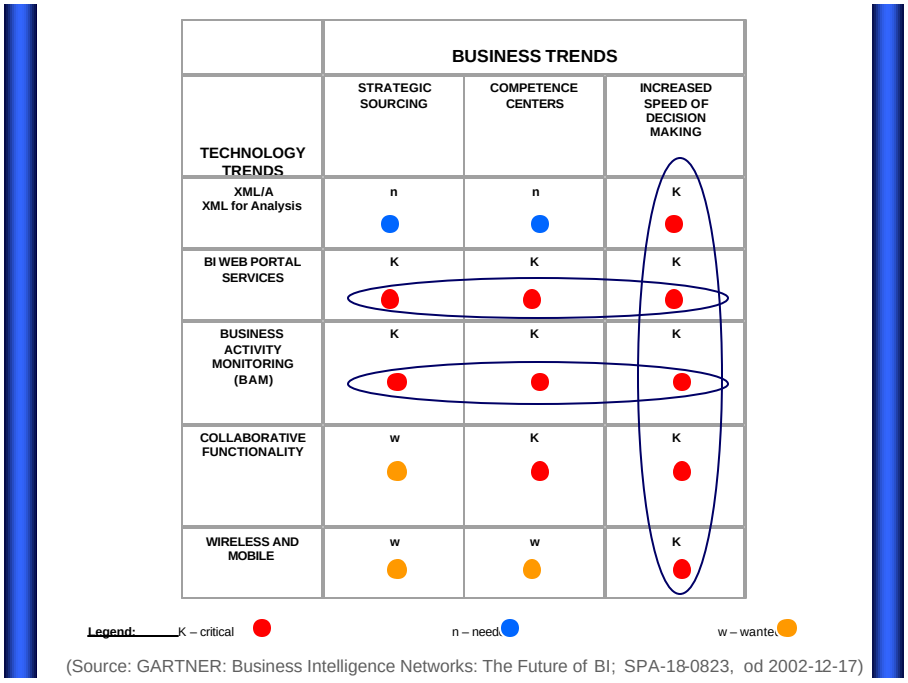
Increased speed of decision making: The concept of the real-time enterprise (RTE) - which competes by using up-to-date information to progressively remove delays in managing and executing its critical business processes - is becoming more widely recognized. By 2005, more than half of the Global 2000 will have set very demanding goals for delay reduction (0.6 probability). In the RTE, speed is a competitive differentiator. This includes the speed of decision-making: regulators are demanding that enterprises speed up the closing of their books; competition needs to be addressed by

achieving a shorter time-to-market; and customers demand more-timely responses. But simply speeding up established processes cannot speed things up significantly and usually only results in time reductions of 10 percent to 20 percent. The only way to significantly speed up processes is to delegate decision-making power to a lower level in the organization and to give people the same insight into the value chain, as higher management has.

Based on Gartner's predictions, we have designed the evaluation table where the importance of technology for business trends is shown.

Results of this analysis and evaluation are:

1. "Increased speed of decision making" is in focus of technology services, and, it is most difficult task/field of business transformation.
2. "BI/web portal services" and "Business activity monitoring (BAM)" are the most useful technology trends.



(Source: GARTNER: Business Intelligence Networks: The Future of BI; SPA-18-0823, od 2002-12-17)

Figure 4: Business Trends supported by Technology Trends

These business trends have strong impacts and complex requirements for business system development and transformation. In the future global development, KMS will be a key business infrastructure.

2.2. KMS Strategies

Kaplan & Norton's "The learning and growth strategy" defines the intangible assets needed to enable organizational activities and customer relationships to be performed at ever-higher levels of performance. There are three principal categories for this perspective (defined by Kaplan & Norton in [KAP01]):

1. Strategic competencies: The strategic skills and knowledge required by the workforce to support the strategy.
2. Strategic technologies: The information systems, databases, tools, and network required to support the strategy.
3. Climate for action: The cultural shifts needed to motivate, empower, and align the workforce behind the strategy.

By treating the learning and growth strategy after the three other perspectives have been defined, executives can align their human resources, information technology, and corporate climate objectives with the requirements from the strategic business processes and customer differentiation strategy. The human resources strategy (as part of HRM) also required significant training for the staff, complemented by ongoing evaluation programs. The employee satisfaction measure on the scorecard recognized the employee had to be a true partner with the strategy.

The work of Carla O'Dell and C.J. Grayson on knowledge management [DEL99] has built a complementary framework for thinking about learning and growth strategies (designed by Kaplan & Norton). They describe the goal of knowledge management as «a systematic approach to find, understand, share and use knowledge to create value». The greatest value comes when knowledge management is linked to the strategy and value proposition of the organization.

Different product/service providers have different value propositions and consequently: require different **Knowledge Management Strategies**. From that point of view, there are three types of providers:

- Customer intimacy companies,
- Product innovators,
- Operational excellence companies.

Customer intimacy companies require employees to understand their customers, so that they can build long-term relations with them. Contact-centres and multilevel customer support units are new types of organizational and technological resources.
KMS strategies for Customer intimacy providers are:

- Capture knowledge about customers
- Understand customer needs
- Empower front-line employees with information they need
- Ensure that everyone knows the customer
- Make company knowledge available to customers.

Product innovators must accelerate the time to develop and commercialize new products. Such companies use knowledge management approaches to manage patents, development cycles, and customer requirements.
KMS strategies for product innovators are:

- Reduce time to market
- Commercialize new products faster
- Ensure that ideas flow (e.g., from customer service to R&D)
- Reuse what other parts of the company have already learned.

Operational excellence companies, in their quests to lower cost and improve quality, use best-practice sharing approaches to move winning approaches «from the best to the rest». Such companies use knowledge management to improve safety, reduce energy costs, and shorten construction cycles.
KMS strategies for Operational excellence companies are:

- Reduce cost
- Improve quality
- Move know-how from top-performing units to others.

Our interest is research of Service Providing Companies, which are customer intimacy companies. The ability to improve business processes, consistent with a customer value proposition, depends on the ability of individuals to change behaviour and focus their knowledge on the strategy.

3. KMS ALLIGNEMENT TO STRATEGY IN SERVICE PROVIDING

3.1. Strategy issues in Service Providing Companies

Knowledge-based organizations are typical Service Providing Companies (SPC). Yogesh Malhotra states [MAL02] that based on the compilation of the latest knowledge, research and practices being defined by world-leading scholars, practitioners and researchers, Knowledge Management and Service Providing is the first work that synthesizes the latest thinking in Knowledge Management with the design of information technology and Internet-enabled new organization forms. The major emphasis of this is on Knowledge Management, Service Providing and success factors for both terms. The contributions represent the first attempt to address the issues of applying Knowledge Management for enabling "anytime, anywhere, anyhow" Service Providing companies. These issues will be of relevance to all researchers, scholars, managers, executives and entrepreneurs interested in understanding how information technologies and Knowledge Management can enable effective design and emergence of Service Providing companies.

The last few years have seen rapid increase in the speed in all business processes. Speed of innovation has become increasingly important, while competitive advantage from innovation last less and less time. In order for an organization to satisfy this need for speed, all people in the organization have to be aligned and working together. Everybody must know what the organization stands for, where it is going and what their own role is.

Managing and using knowledge has become a vital competitive tool. The value of an organization is no longer determined only in terms of tangible assets but also in intangible assets and in the quality of its workforce.

Much has been written in recent year about knowledge management strategies and systems within organizations, and many school of thoughts exist. One common trait of all such systems may be the desire to make the implicit knowledge held within the minds of workforce explicit and open for discussion and learning. There may be no grater challenge facing an organization today then codifying and acting on that knowledge.

Furthermore, it is well known that recent scientific and expert's theories and paradigms, included "best practices", show that best performance companies with sustainable business could be only strategy focused companies.

Corporate strategy must be translated into tangible objectives for all organizational levels so that everyone knows what the organizations is aiming for. If there is a top-level, corporate strategy, there must be sub-strategies that make the strategy actionable at lower levels. To be effective overall, strategy at all levels must be aligned.

An organization is working smart when everyone is doing what they need to do in order to implement the strategy – there is synergy between the actions of different individuals, teams, departments and business units.

To develop or evaluate a company' strategy based on mission, values and vision statements two main sources of information have to be captured. The first one is company itself, and the second is company's environment. Information-gathering and detailed analyses (financial, marketing, technical, political, etc.,) are very important and could be very complex and demanded.

Many approaches and names exist in today's practice for BI treatment and analysis of internal and external data and information.

In the Service Providing "industry", business environment, as well as market scene, have technology leaders and consultancy companies as key "players". In context of opportunities and threats, service providing company has to choose lines of business and decide, "how is partner and how is competition". For this decision: key question is mapping market needs (market segment) and company values for that service market segment.

SPC are type of "customer intimacy companies" as described in 2.2., and therefore knowledge management strategy is required as a part of business strategy.

3.2 Education requirements for KM strategy

The company's knowledge management system has to support comparably two facets of its employees knowledge – knowledge focused on core and general business and knowledge focused on human potential and creativity. Contemporary schools of management and leadership just give evidence of that. However, that approach has to be applied on all employees. The consequences of the today's business/market requirements are that everyone must think and behave like an owner. There are no too much difference among small and large companies.

The holistic perspective is now required of every single employee.

One of the most important emerging theme in the business today is broad-based business education and understanding. If everyone is to think and act like an owner, every one has to have an owner's perspective on the business. They must understand the SPC as whole not just one small part of it. They must appreciate the factors driving the industry. Companies are finding that this requires a major commitment to business education for workforce.

Such knowledge is not of theoretical value. Understanding shapes attitudes and attitudes shape behaviour - and change in behaviour is ultimately what process centring is all about.
Furthermore, business fields like KMS, then strategy implementation with Performance Management (BSC), BI, and many others have to use understanding on necessity of balance, Euripidus told about so long ago. SPC's implementation of KM strategy requires continuous business education and training.

4. THE APPROACH: SERVICE AND RESOURCE MANAGEMENT ARCHITECTURE DRIVEN BY KNOWLEDGE

Performance Management, Business Process Reengineering, Business Intelligence and Knowledge Management, focus on their cores business processes, strategy and employee; yet rely on an employee whose initiative knowledge of those both ensures strength to the system.

Our research emphasizes importance of methodologies as the key knowledge in processes management. An essential description of methodology positioning is from Zachman's Enterprise Architecture: "In general, any type of methodology helps provide a structure. Structure helps provide discipline. Discipline helps provide rigor. Rigor helps provide standards. Standards help provide units of measure. Units of measure help provide metrics. Metrics help provide statistics. Statistics help demonstrate results. Results can be used to drive methods."[RUR03].

At the KM tool level, researchers and entrepreneurs are racing to create the next generation of effective KM applications and infrastructure, including communication, storage, gathering, dissemination, and synthesis [MAL00].

In the context of implementation, KM system's requirements are grouped in the following components (Figure 5.):

- Business Process Models (Repository) aligned with strategy
- Company certification for service providing
- Employee's knowledge certification and support:
  - Current task backlog and efficient reports for each employee
  - Resource usage by individual project, contract types of project and by methodology types and project phases
  - Project phases situation
  - Drill-down to detailed issues of work
  - Reports: details down to level of minutes per day
  - Service “production trade”
- Performance measurement and monitoring
- Customer support (Contact Centre / Help desk).

SRMA features

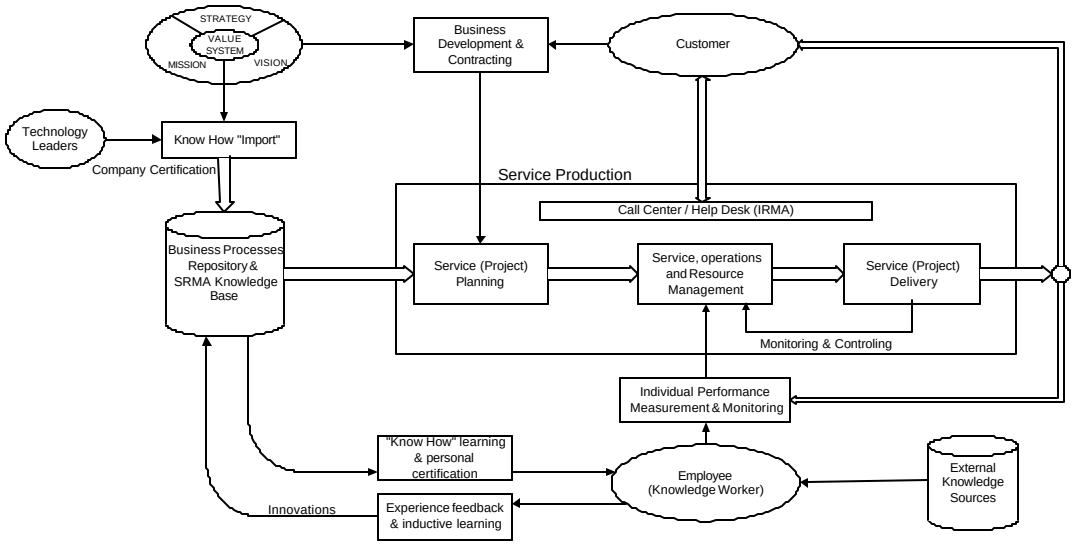


Figure 5: *â SRMA is trademark of InfoDom, Zagreb, Croatia*

We find out key issues for service providing:

1. Process knowledge (driven by “packaged methodologies” (Figure 7.)) as key business infrastructure; and
2. “Company certification” by knowledge source authority (technology leaders or consultancy leaders) as measure of business capability.

The key internal mechanism for system development is «learning and innovation mechanisms» (Figure 6.).

Knowledge and service activities (driven by methodology) are organized in three levels:

- Project level,
- Project phase level,
- Workflow/work order level.

Service delivery “production” has three basic functions:

- Planning and standardization,
- Service and controlling,
- Learning and innovation.

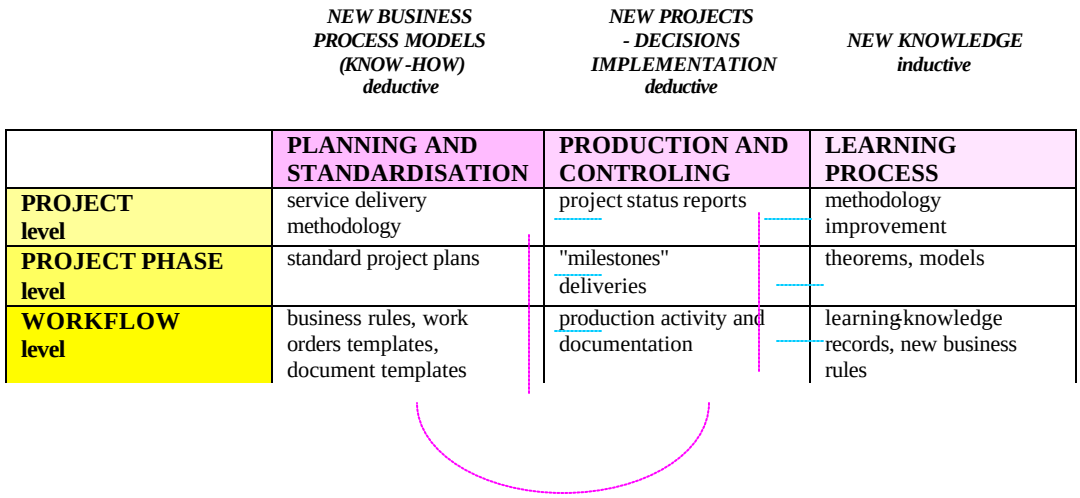


Figure 6: Learning and innovation mechanisms

Architecture composition defines SRMA as three main rows of knowledge and operations, which are as follows:

1. Knowledge on service development and deployment methodology implemented by business system and knowledge of resource configuration as a base for servicing
2. Models and standard forms of various project types led by specific technologies
3. Knowledge Management Project for problem solving, requests and initiatives.

Based on this architecture, application system SRMA is developed by InfoDom - Zagreb, and then implemented through several business projects.

The SRMA product functions are evaluated through components of Gartner’s structure of intellectual assets (Figure 7.). Identified functions of the evaluation are underscored, while basis knowledge is fully supported.

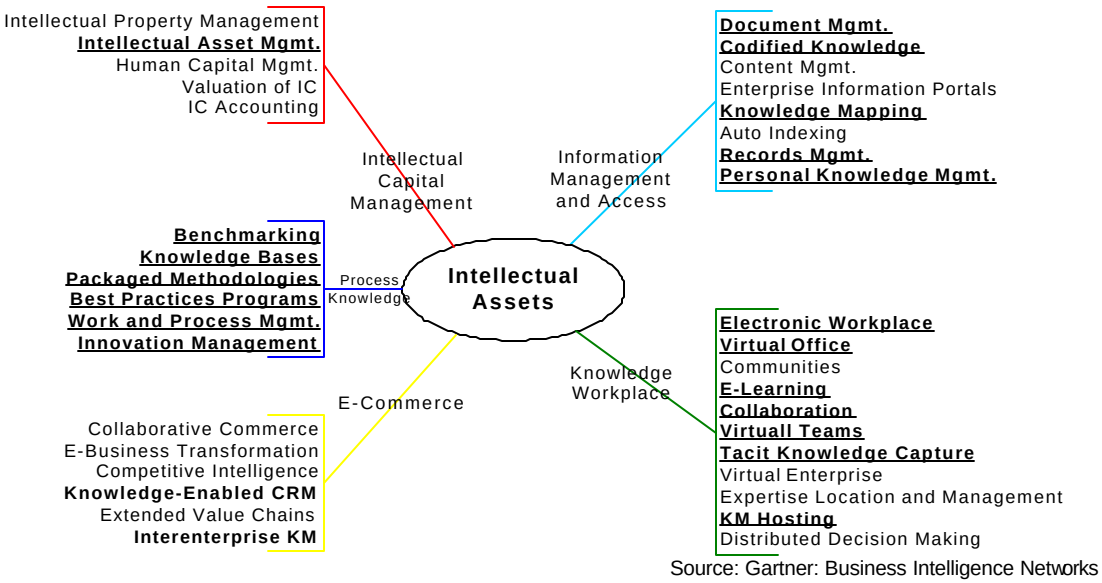


Figure 7: Lenses of Knowledge Management

Based on predefined and packaged methodologies for service providing, the SRMA system offers automatisms in creating work orders for employees and controls their completion and efficiency (driven by methodology discipline and phases).
For the management purpose the system offers:

- Group of statistics, trends, analysis and parameter reports,
- Monitoring of project realization of services,
- Monitoring of costs of services/projects by cost centres (both with KPI),
- Efficiency of Organizational Units and dynamic teams,
- Monitoring work force and resources by service types and project types for all organizational units (linked to QMS),
- Annual, mid-term, monthly, weekly and daily reports and finally,
- Engagement of HR by projects,
- Subscription - publishing mechanisms are to be linked to DMS.

All these capabilities are basis for process knowledge improvement. In order, continuous tasks and KM direction are:

- To create employee knowledge as an objective of a communication process in organization; and
- To establish reward system that set up a linkage between organizational performance and individual rewards.

5. CONCLUSIONS

1. Business intelligence initiatives and strategic management (as Balanced Scorecard) initiatives are parallel to KMS initiatives. "Learning and growth" of a for knowledge economy is fundamental

for business. Business trends, predicted by Gartner - Strategic sourcing, Competency centres, Increased speed of decision-making - are focused on new roles of employees and new IC technology for knowledge workers.

2. The goal of knowledge management is a systematic approach to find, understand, share and use knowledge to create value. KMS and learning mechanism implementation are a "quantum leap" in relation to current business approaches and are critical for every company. New ICT tools and solutions, artificial intelligence tools and techniques, performance measurement tools and QMS procedures are useful.

3. The position of employee and manager are the same: everyone has to learn and to teach (to integrate explicit and tacit knowledge). Knowledge and organisation have to be aligned to business strategy, which is itself based on a company's mission and vision. A certification mechanism with respect to the knowledge and skills of employees/teams is required by standardisation practices (prerequisite for knowledge industry). To align their employees to business strategy, companies need specific activities in the following directions: Employees must learn about and understand the strategy; Creating employee knowledge as an objective of a communications process; Reward systems that set up a linkage between organisational performance and individual rewards.

4. Feedback, learning mechanisms and competence centres have to be systematically planned and established to build a "learning organisation". Through BPR projects we have to correspondingly design a KMS, HRM, QMS, DMS and Performance Management System (based on new IC technology). Business Process Models have huge capacities to store and share knowledge in an organisation. Industrial specific best practice processes are an important source of domain knowledge: to learn and to improve business success.

6. REFERENCES

[1] O'Dell C.; Grayson C. J. (March-April, 1999): *Knowledge Transfer: Discover Your Value Proposition*, Strategy and Leadership

[2] Forman E.; Selly M.A. (1996): *Decision By Objectives*, E. Forman, George Washington University

[3] Hammer M. (1996): *Beyond Reengineering*, HarperCollins Publishers, Inc. New York

[4] Hammer M., Champy J. (2001): *Reengineering the Corporation*, HarperCollins Publishers, Inc. New York, 2001

[5] Infodom d.o.o. (V/2003): *Company Profile*

[6] Kaplan R.S.; Norton D.P. (2001): *The Strategy-Focused Organisation*, Harvard Business School Press

[7] Malhotra Y. (2002): *Knowledge Management, Virtual Organizations and Service Providing*, Idea Group Publishing

[8] Malhotra Y. (2000): *Knowledge Management and Business Model Innovation*, Idea Group Publishing

[9] Malhotra Y. (1999): *Extending the Technology Acceptance Model to Account for Social Influence: Theoretical Bases and Empirical Validation*, Proceedings of the 32nd Hawaii International Conference on System Sciences, IEEE

[10] Niven P.R. (2002): *Balanced Scorecard step by step: maximizing performance and maintaining results*, John Wiley & Sons, Inc., New York

[11] O'Rurke, Fishman N., Selkow W. (2003): *Enterprise Architecture: Using the Zachman Framework*, Thomson Course Technology, Boston, 2003

[12] Vidovic S.; Blumenshein B.; Stimac M. (2002): *e-Enabled Public Administration*, Business Process Conference, Brussels

[13] Vidovic S.; Blumenshein B.; Milic Z.. (200r): *Knowledge Management System and Business Intelligence for Decision Support Systems*, Knowledge Management Conference, Zagreb, CroInfo, 2003

[14] Vidovic S. (2003): *Upravljanje znanjem*, Infotrend, Zagreb