



## The model of managerial knowledge of a Higher Education Institution within network environment

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### The model of managerial knowledge of a Higher Education Institution within network environment

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#### ABSTRACT

This article provides a conceptual model for creating knowledge management systems in Higher Education Institutions. The article provides strategic understanding of the role of higher education institution network environment in knowledge management and in developing administrative innovation. The result of the study is a conceptual model of knowledge for managerial decision making in the higher education institution network environment that provides strategic, tactical and operational management of gaining competitive advantages for educational services. The paper presents conceptual judgments and recommendations, to a great extent. Therefore, in future, researchers may perform a more detailed empirical design based on a conceptual model of higher education institution knowledge for managerial decision making and information complex of the higher education institution corporate information system. The paper contains a theoretical conceptual approach to the organization of the higher education institution knowledge for managerial decision making in a network environment which is beneficial to enhance the competitive advantage of educational services. The approach is based on Russian empirical elements.

**Keywords:** knowledge for managerial decision making, network environment, corporate information systems, educational service, competitive advantages.



## **1. INTRODUCTION**

Knowledge and knowledge management are extremely important resources for improving competitiveness. Organisations manage their knowledge to integrate knowledge into goods and services [Grant, R. M. 1993; Drucker, P. F. 1992; Nonaka, I., Takeuchi, H. 1995]. It should be noted that knowledge for managerial decision making determines the nature of coordination within a higher education institution (HEI), organizational structure, the allocation of decision-making rights, determinants of HEI boundaries, it also forms dynamic capabilities in the market, sustainable competitive advantages, promotes innovation development and establishment of HEI consortiums and alliances with businesses [Grant, R. M. 1993]. Along with it, the use of information technology facilitates significantly knowledge accessibility, as well as efficiency of knowledge accumulation and sharing [Choo C. W., 2010]. Despite intensive researches, at present there is no agreement as to aims, main principles of knowledge management of a higher education institution, knowledge types, methods and tools [Metcalf, A. 2006.; Petrides, L., Nguyen, L. 2006; Benítez, D., Pérez, D., Questier, F., Zhu, C. 2011]. In the practice of administrative innovations, Russian higher education is facing two obvious trends. Firstly, it is a fast development of the networked environment and the use of information and analytical systems. Secondly, it is an accumulation of organizational knowledge, expansion of knowledge sharing, transparency of higher education institutions and their interaction with end-users. Therefore, the article discusses theoretically research problem of strengthening the competitive advantages of HEI based on knowledge system for managerial decision making. To do this, the structure of the article highlights features of HEI knowledge for managerial decision making and strategic directions to improve the networked environment. Along with the abovementioned, the conceptual model of HEI knowledge system for managerial decision making that is proposed in the article stresses the need for and the theoretical value of the article.

## **2. METHODS**

The paper used an interdisciplinary approach to the research. Scientific papers on knowledge management, management of a higher education institution are generalized theoretically and analysis of national standards for computerization is carried out. Theoretical analysis was complemented by key problems of creating knowledge for



managerial decision making according to data from the Russian universities websites, journal articles and personal experience of the author.

### **3. RESULTS**

Defining knowledge as “meta-resource” emphasizes its importance for sustaining competitive advantage [Berg, H.A. 2008]. Knowledge is involved in practical activities and decision making; integrating information resources, ideas and experience of personnel as well as initiating social interaction. These functions of knowledge define it as a key resource in management. Therefore, managers are interested in the continuous creation, sharing and use of managing knowledge to take more advantages from knowledge resources and to improve efficiency of the organizations [Schiuma, G. 2012]. Knowledge research in terms of management formed different approaches to knowledge typology [Nonaka, I., Takeuchi, H. 1995; Boisot, M.H. 1995; Quinn, J. B., Anderson, P., Finkelstein, S. 1996; Garvin, D. 1997; De Eck, K. 1998; De Long, D. W., Fahey, L. 2000; Bounken R.B. 2004; Dresvyannikov V.A. 2010]. Types of knowledge are presented in Table 1.

**Table I. Some approaches to knowledge typology**

Types of knowledge	Description
<i>Epistemological dimension– Polanyi, 1966, Nonaka, Takeuchi, 1995</i>	
Explicit	Objective, it can be articulated in formal language, expressed and recorded as numbers, mathematical and scientific formulae, and general principles.
Tacit	It is subjective and is based on personal experience, is associated with an individual and individual situation
<i>Ontological dimension – Nonaka, Takeuchi, 1995</i>	
Individual	This is a starting element of all other groups of knowledge, acquired through formal education, learning and social interaction of people in the society.
Collective	Organizational knowledge is formed through the interaction of individuals; this is an ability of the company as an entirety to create



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	new knowledge, to distribute it among the members of the organization and to embody it in the products, services and systems.
<i>Fundamental processes (labour, education, organization) – De Eck,1998</i>	
Postfigurative	It is in the explicit form, acquired through academic programs (syllabi), and induces efficient training.
Configurative	It is acquired when solving problems as an experience, ideas, discoveries, mainly in tacit form, induces innovative training.
Prefigurative	It is unidentified, tacit knowledge in the form of presentiment, intuition, guesses. It facilitates creative training, creation of new reality, and it has a subcultural nature
<i>Purpose – B.Z.Milner, 2003, R.B.Bounken, 2004</i>	
Strategic	A long-term knowledge about the purpose of the activity.
Theoretical	Knowledge for the sake of knowledge, it creates a general, integral reflection of the world in a person’s mind. Academic knowledge of systems, schemes, techniques.
Practical	It provides ideas for person’s behavior, aimed at forming skills and activity in the world, it is used for routine work and it is an ability to make decisions.
<i>Content – Garvin, 1997, V.A.Dresvyannikov, 2010</i>	
Administrative	The knowledge used in conjunction with the support operations in an organization such as administering benefits or troubleshooting problem accounts
Manufacturing (production)	It includes production and technical (engineering and technological) knowledge, business (in finance, marketing) knowledge, as well as social and psychological knowledge and knowledge of culture which is acquired at inner personal and interpersonal relations level.
Management	It plays a coordinating and integrating role exploiting other groups of knowledge.

Generalization of knowledge types enabled us to specify the category of “knowledge for managerial decision making” as explicit and tacit theoretical, practical, strategic individual and organizational knowledge used for making decisions. Consequently,

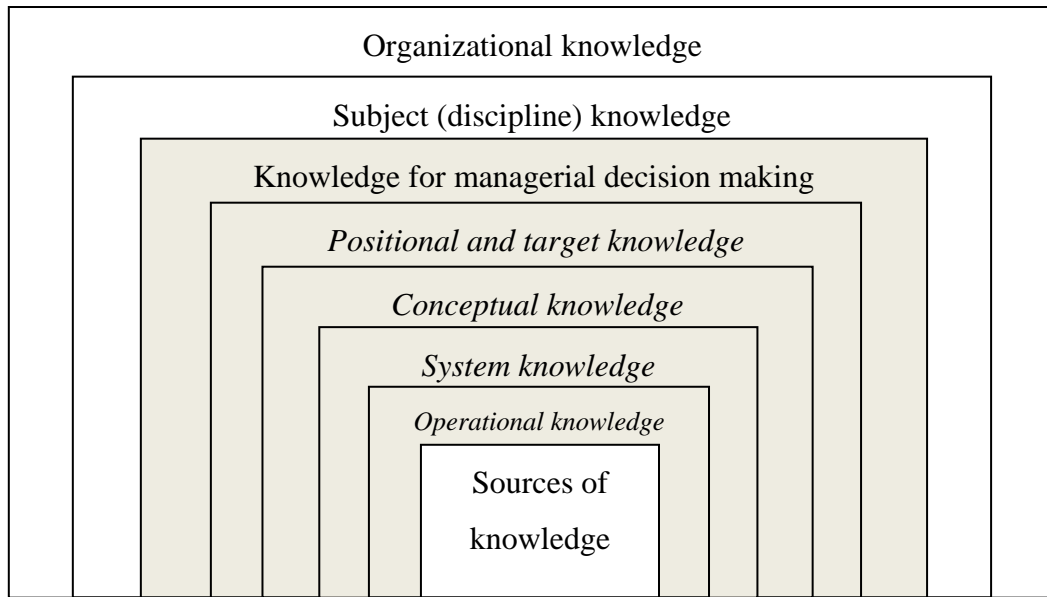


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knowledge for managerial decision making combines operational (or administrative) knowledge and managing knowledge.

Efficiency and sustainable competitive advantages are determined by knowledge that is created within organization. Knowledge is built into three main elements of an organization: employees, tools, tasks, as well as into different subnetworks which are formed as a result of combinations and cross-links of the elements [Argote, L., Ingram, P. 2000]. At the moment there is no unanimous understanding of the term “knowledge employee” [Mladkova, L.2012]. We assume that employees at all management levels are knowledge employees and holders of explicit and tacit knowledge for managerial decision making. Therefore, employees need coordination and opportunities to develop and use knowledge. Along with it a key determinant is the distribution of resources [Argote, L., Ingram, P. 2000; 19]. Knowledge transfer in the subnetwork “employee – task – tool” [Argote, L., Ingram, P. 2000; Barney, J.B. 1986] assures carrying out of operation, integration of employees’ ideas and experience, initiating social interaction. Knowledge transfer is linked with its transformation at the stages of socialization, externalization, combination and internationalization [Nonaka, I., Takeuchi, H. 1995]. Synthesis of the cognitive processes and types of knowledge [Dresvyannikov V.A. 2010] enabled us to determine the place of knowledge for managerial decision making in the organizational knowledge, which is system shown in Figure 1. The leading role of knowledge for managerial decision making emphasizes the need to research it more in the context of educational services competitive advantage.



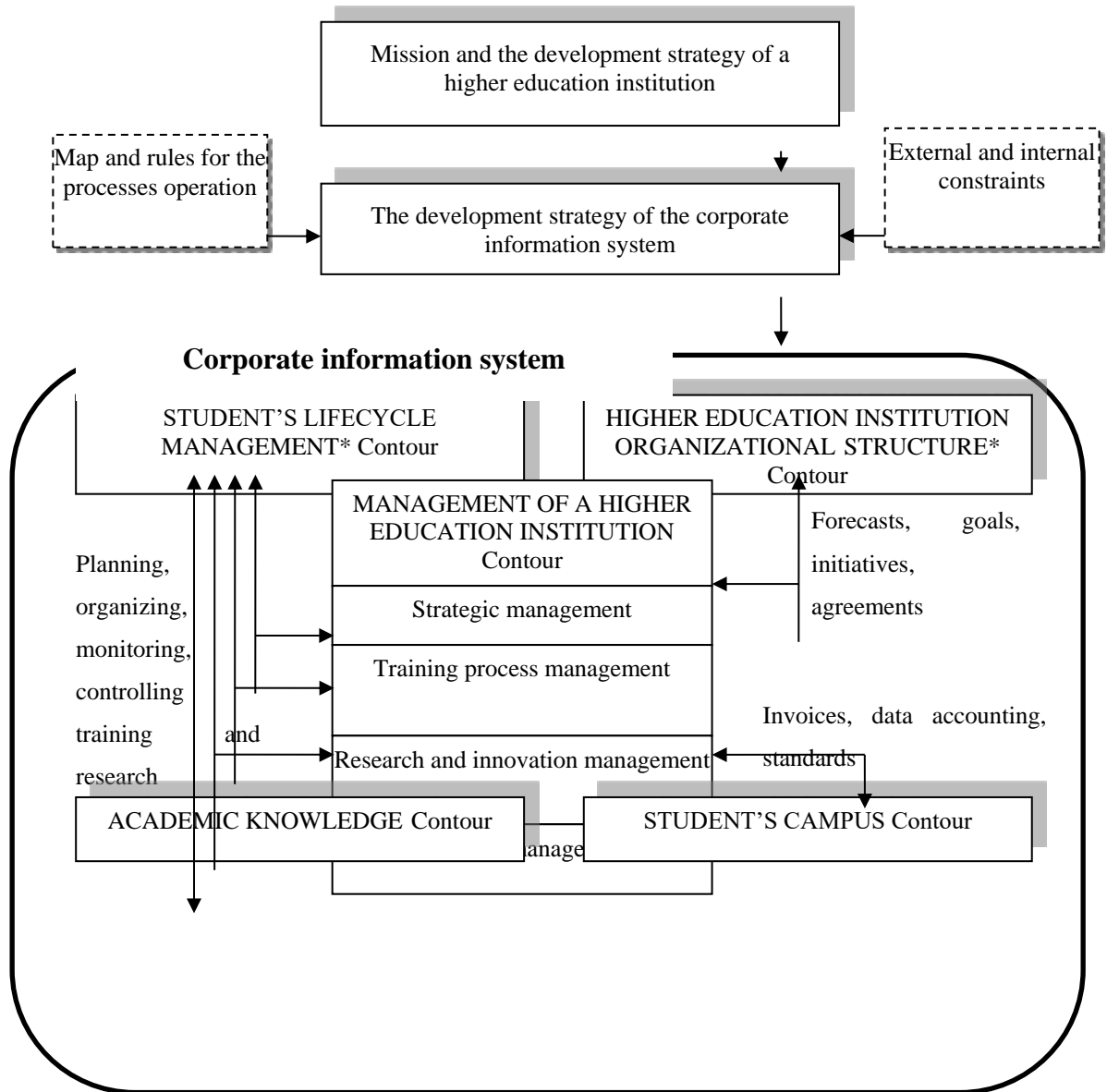
**Figure 1. The place of knowledge for managerial decision making in the organizational knowledge system**

To be oriented to students' lifecycle management, the corporate information system of a higher education institution may include five functional information contours: management of a higher education institution, organizational development, students' lifecycle management, academic achievements, student campus (Figure 2). As Figure 3 illustrates, back up and functional subsystems of corporate information system provide users with access to analytical data through a corporate portal, provide technological support of knowledge for managerial decision making life cycle.



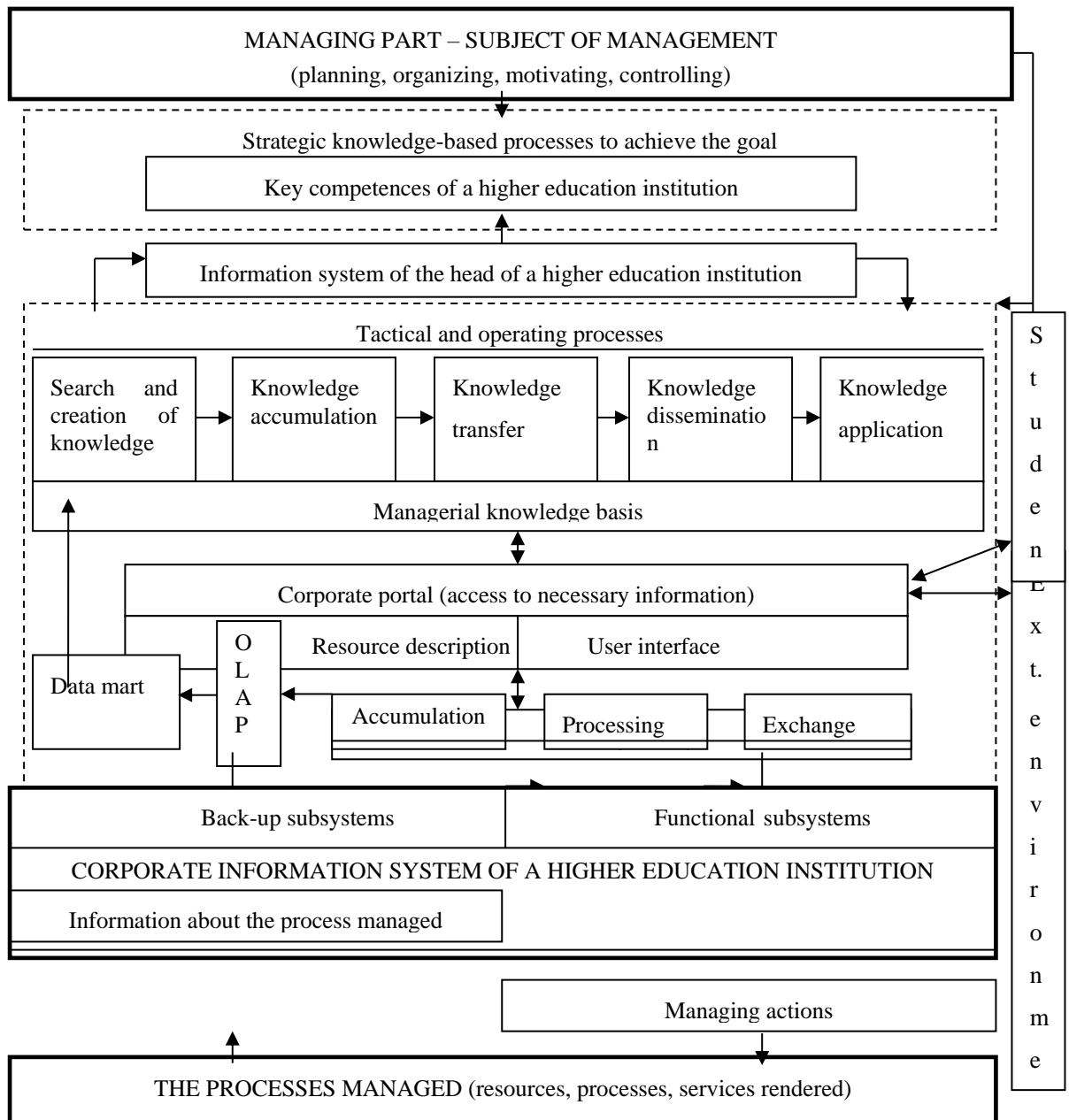
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\*- contours that automate processes with involvement of employers.

**Figure 2. The structure of the corporate information system of a higher education institution**



**Figure 3. A conceptual model of knowledge system for managerial decision making of a higher education institution**

#### 4. DISCUSSION

Networked environment of a higher education institution is an aggregation of information systems, information and technical infrastructure, databases, knowledge and users. It provides with conditions and opportunities for education, research, innovation, international cooperation, development and accumulation of intellectual potential regardless of users' location . The networked environment of HEI includes informational





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and educational environment together with information-analytical one. The latter comprises softcopies, databases, analytical sources and tools to process and analyze them for strategic, tactical and operational management. Thus, networked environment includes information technologies of knowledge management which contribute to creation of the following competitive advantages of educational services:

- decrease of transformation and transaction costs;
- accessibility of educational services, tailoring consumers' preferences, and market expansion;
- consistent and integrated synergetic effect of accumulation and transformation of knowledge and skills into graduates' expert knowledge (competence) in their professional field;
- development of internal competitive environment and quality improvement of educational services.

When providing services by higher education institution as “knowledge-intensive organizations” [Benítez, D., Pérez, D., Questier, F., Zhu, C. 2011], the key role belongs to intellectual resources. This defines the first feature of knowledge for managerial decision making - impact of operational knowledge socialization upon a new cycle of knowledge creation at its transformation phases. Operational knowledge for managerial decision making reflects the result of education, research and other types of operations. To manage explicit operational or administrative knowledge, it is important to technically support the knowledge exchange, each member's contribution, and controlling the use of knowledge [Amaravadi, C.S. 2005]. Orientation of the Russian higher education institutions to lower costs and accessibility of most educational programs, introduction of new forms and learning technologies together with scientific research form another feature of knowledge for managerial decision making which is a flexible adjustment to changes in the processes and to the specific needs of different management levels. A higher education institution, as a company creating knowledge, is an open system which exchanges knowledge with its environment and mobilizes knowledge of its competitors, customers and other participants of the environment [Nonaka, I., Takeuchi, H. 1995]. For example, realization of a new educational program could lead to changes in job specifications set by employers, and the feedback can start a new innovation cycle in the development of educational programs. A significant external determinant of acquiring,



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mastering, transformation and use of knowledge is the strength of relationships with other members of knowledge networks, for, example, organizations as sources of knowledge [Daghfous, A. 2004]. Hence, the third important feature of knowledge for managerial decision making of HEI is networking with customers, i.e. with students, employers and the state.

Analysis of the current Russian computerization practice and generalization of scientific publications made it possible to identify the main problems when accumulating, storing, distributing and transforming knowledge for managerial decision making in a networked environment of a higher education institution.

Firstly, IT strategy formation of HEI, such as adjusting development plans of the corporate information system and IT innovation to the development strategy of the institution; the application of information technology not with the purpose to reduce costs but rather as a knowledge management tool to improve competitiveness.

Secondly, constructing a model of higher education institution processes "as it is": to structure organizational knowledge, to formalize knowledge for managerial decision making and to define needs for knowledge when designing a corporate information system; "linking" knowledge with processes through the development of knowledge management and knowledge-based management, formation of internal regulations; introducing management systems of documents, content, portal solutions, business intelligence tools into the corporate information system.

Thirdly, to ensure the usefulness of analytical information: its accessibility, adequacy, timeliness for different user groups of management pyramid; adaptability and flexibility of the corporate information system to changes in all groups of processes.

Fourthly, integration of resources, objectives, management functions: the creation of a single networked environment through a single repository of data and knowledge, a single interface of their input; integration of management tasks and automation of the educational process and scientific research, including preparation of electronic educational resources and tools to access them; distributing management processes into external environment - integration with other universities, partner organizations, authorities.

For elimination of the revealed problems the following directions of development of system of administrative knowledge of higher education institution are recommended: -



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integrated automation of all processes of higher education institution to ensure a unified networked environment:

- structuring knowledge management and auditing the processes to identify the most important categories of knowledge based on the objectives of education and research, management objectives and core competencies of a higher education institution;
- auditing the infrastructure and information systems to provide functional, technical, software compatibility of subsystems and modules;
- supporting functional development of corporate information systems to adapt them to changes in the higher education institution processes and in the external environment;
- completion of the legal framework which regulates the information systems of education;
- utilising knowledge for managerial decision making from the external market environment (job specifications of employers, examination of curricula and programs, business issues for scientific research, etc.) in order to accumulate knowledge and feasibility of educational services;
- intensive use of knowledge transfer and dissemination technology in order to update the content, tools, and methods of teaching, to integrate research results into educational activities;
- supporting the creation of new knowledge for managerial decision making by the staff in the structural units of higher education institution;
- establishing and maintaining a database of knowledge for managerial decision making;
- benchmarking of advanced knowledge management technologies.

As a result, knowledge system for managerial decision making will allow to take decisions in operational, tactical and strategic management of higher education institution:

- planning and organization of educational activities and monitoring the quality of education;
- planning and organization of scientific research, innovation projects, account of graduate and doctoral students, account of scientific publications, scientometrics;
- planning and control of personnel, financial, material and other resources;
- contract management, planning, organization and control of pricing and commercial activities;



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- performance assessment;
- planning, organization and control of social development;
- feedback from the consumers of educational services;
- analysis of the internal and external environment;
- definition of the mission, objectives and development priorities of the HEI;
- developing strategies of individual processes;
- working out development concepts of the HEI;
- analysis of strategies;
- coordination of the organizational structure.

When carrying out these tasks, new opportunities to gain competitive advantage and innovative development of educational services can be obtained.

The "Management of a higher education institution" information contour of the corporate information system consists of four information systems and is basic for student lifecycle management, academic knowledge, the strategic management of a higher education institution organizational development. This information contour forms operational, system, conceptual and strategic knowledge for managerial decision making and there is a connection between management entities, controlled processes and the external environment. Thus, the corporate information system of a higher education institution is the basis for the proposed conceptual model of knowledge for managerial decision making.

In the conceptual model conceptual model of knowledge system for managerial decision making consolidated reporting and monitoring is performed at the tactical level based on the analytical system. This analytical system integrates data to analyze and performs analytical queries to different data sources based on the analytical data repository and data mart. A data repository is the basis for building support systems for decision making. The required data can be retrieved from several functional subsystems, converted and uploaded into a single data repository.

The analytical system has the tools to automatically generate reports on configured schedule, tools for reporting integration, tools for reports exchange. Also there is an analytical unit for students with performance results and the lists of training courses by educational programs and degrees of education. Data mart contains thematically combined data according to activities of a higher education institution, types of



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consumers, forms of training, educational programs, current data on the development targets of the institution (the number of students, academic performance, personnel, payroll, research, applicants, library fund, funding sources and their distribution across responsibility centers). At the strategic level the information system of a head is used. It manages strategically creation of competitive advantages and core competencies of the higher education institution based on positional and target knowledge for managerial decision making. It contains a predefined set of regulated queries on development targets of the higher education institution by its departments, educational programs, training areas (projects) for daily review. This is an area of the detailed data. To provide flexibility, information system of a head includes ad hoc queries through the use of information retrieval systems and systems of online analytical processing. Thus, integrated data structure allows to obtain aggregated indicators. To synthesize conceptual and system knowledge for managerial decision making and to support decision making, it is possible to apply information retrieval system and operational analytical data processing systems, business intelligence system. These systems enable the administration of a higher education institution to identify trends in consumer behavior, the relationship between the data on the performance, duration of training, educational programs, to compare financial revenues by type of activity and types of consumers, to identify trends in innovation and other opportunities.

### **5. SUMMARY**

The strategy for developing knowledge system for managerial decision making and general recommendations on networking with customers which are presented in the article may help improve HEI network environment, its management, and contribute to the innovative development of educational services. The main features of knowledge for managerial decision making of a higher education institution presented in the paper such as the socialization of operational knowledge, flexible adjustment to changes in processes, networking with the external environment provide an in-depth view of the general conditions to create knowledge for managerial decision making in a networked environment of a higher education institution. it seems appropriate to implement the strategy for developing knowledge system for managerial decision making of a higher education institution in order to gain competitive advantage of educational services: expanding the segment of the market, increasing the availability and quality of services,



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tailoring consumer preferences and etc. The relationship between strategy for developing knowledge system for managerial decision making and competitive advantages of the HEI seems useful to substantiate the conceptual model of HEI knowledge for managerial decision making. In this context it is particularly important to link information processing technologies, subjects and levels of management, internal processes and the external environment in the conceptual model of knowledge for managerial decision making of higher education institution. Significant purpose of the model is not only to create and use resources of knowledge for managerial decision making, but also to benefit enormously from them through sustainable competitive advantage. Thus, the knowledge system for managerial decision making can set a target for all processes - to implement key competences of the higher education institution and to manage rendering educational services with easy-to-use software tools for monitoring and analyzing the results, to increase efficiency and the quality of the decisions made.

### **6. CONCLUSIONS**

The paper makes it obvious that specificity of knowledge for managerial decision making of a higher education institution is determined by the diversity and plenty of processes when implementing its activities, as well as by complexity of information flows. Studies on the example of Russian computerization practice have shown four sets of issues in creation of knowledge for managerial decision making of a higher education institution: devising an IT strategy of a higher education institution, construction of process models "as they are", ensuring the usefulness of analytical information, integration of resources, goals and management functions. Solution of the problems identified involves comprehensive automation, audit of processes, infrastructure and information systems, adaptability of corporate information system and utilization of knowledge management technologies in it. Theoretical provisions proposed in the article develop ideas about the formation of the HEI knowledge for managerial decision making, define and promote the strategic directions for further development of methods for their implementation. Further empirical researches of the knowledge for managerial decision making life cycle in knowledge networks can be extremely valuable in networking with partner organizations, the development of consortia of higher education institutions, research project teams, implementation of distance learning programs.



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