

Information System Implementation Based on Process Approach at Higher Education Institutions

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Abstract

The goal of information technologies applied at higher schools, as in any organization, has to be the maximization of contemporary business performance. In order to help improve business performances, information technologies should be implemented by process way and creative applied, against formal. In this paper the algorithm of such a way of implementing information technologies at higher schools is described as a pre-condition for creating management knowledge system to achieve a global competitive organization. Seemingly, the proposed method is similar to BSP (Bulk Synchronous Parallelism) method of information systems projecting, which IBM developed in the 1960s. However, in contrast to classic BSP method, the basis of proposed projecting approach contains three basic concepts: reengineering business processes in order to maximize contemporary business performances; applying internet services and technologies; involving knowledge management concepts in information system of institution due to increasing quality of summary work institution as students' and teachers' ability for creating new knowledge (innovation, creativity, and working skills).

Keywords: information technologies, processes, knowledge, knowledge management

Introduction

The education system role is teaching students that through processing information to make knowledge and learn skills. In addition, adopted knowledge should be put in a context and focused it on applying on a way that through personally and team competence achieve competitiveness. Information system implemented in an education institution has to support this primary role of the education system, and initiate the same capabilities of employees as well as students.

At first, it is necessary to understand difference between subjects data, information, knowledge, power, acting, competence, and competitiveness, and their mutually coherence. "Knowledge

stairs" in Figure 1 illustrate description and relationship of these subjects (North, 1998).

First stair is subject sign. Letters, numbers, and special symbols, without its own meaning, represent signs. Signs formatted by rules (code, syntax) become data. Data are signs, which have not been interpreted yet. Data with associated semantics are information. Se-

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manipulation context depends on situational and personal conditions. Each data does not have to become information.

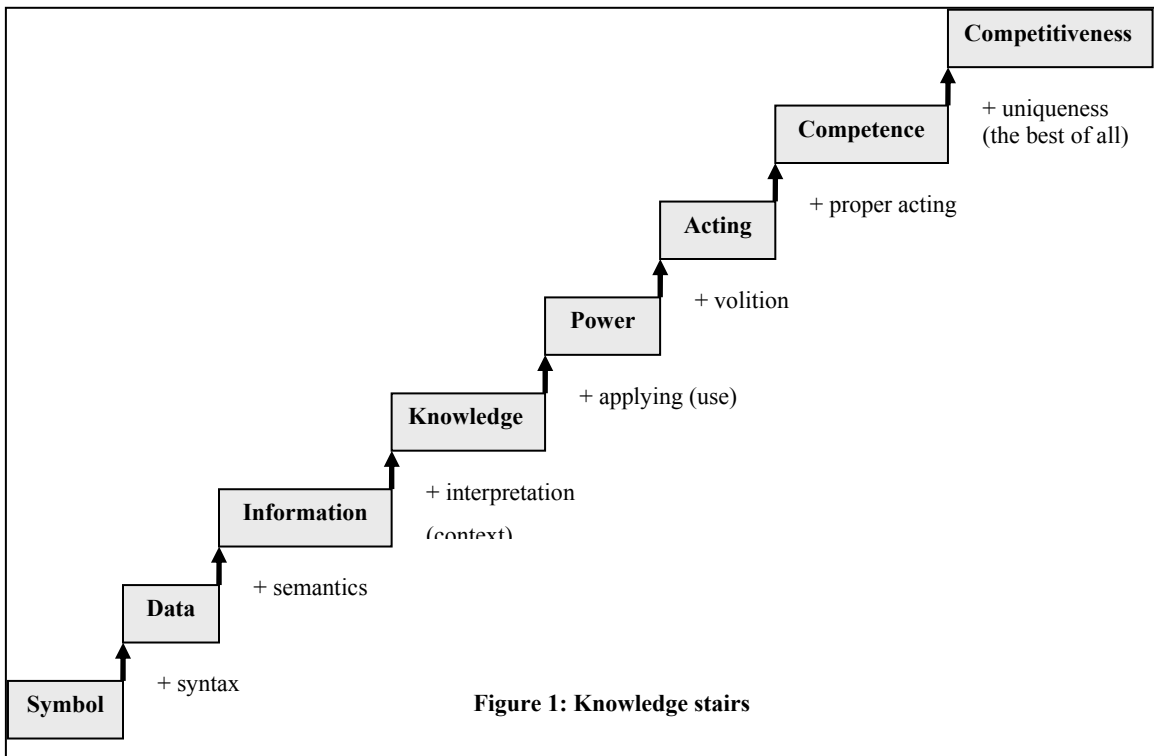
In order to keep real system from growing entropy it is necessary to assemble data that describe it and their transforming to information. In this way, the entropy growth is controlled.

Consciously processed and linked information create knowledge. Information wisely managing could be defined as knowledge. Expending knowledge depends on its appliance and use (practice conduction) on daily basis.

In this way, we step the stairway of power (capability skill). Here the knowledge transforms into skills, i.e. what is learned transforms into practice work. If besides power, there is volition (wish, motivation) we step on the next knowledge stair – acting. Knowledge by acting becomes obvious.

When personal or team knowledge appliance attains routine, professional experience, then we talk about competence. Last stair on knowledge stairway is competitiveness. It means that institution's (or person's) competitiveness enables relevant competition.

Therefore, in development of information system we must have in mind that system have to manage knowledge, not just data and information.



Business Processes and Performances

In the age of knowledge, information-communication technologies enable a changing of business processes that tends to significant improvement contemporary business performances of organization.

Contemporary business performances are (Lovrekovic, 2003; 2005):

1. level of customer's satisfaction
2. ability of product/service delivery according to needs, requirements and specifications of known customers
3. quality
4. price and time delivery
5. level of employee's satisfaction

The institution of higher education should be considered as a firm delivering its own product/service: knowledge, skills, and attitudes necessary for customers (students) to acquire abilities for work and progress in professional area. Therefore, we have to contemplate how information technologies can help in enhancement of contemporary business performances in the education area. The answer is process approach in the internal restructuring of the education institution in order to grow business performances, and its own competition on the education market.

Choice of Main Processes at Higher Education Institution

Main business processes are those that are of crucial value in a firm trading, and whose changes bring the most advanced actual business performances. Defining the main processes depends on an individual's experience, creativity, and ability. In addition, it depends partly on the institution entity. Practice indicates that the number of main business processes is between 5 and 10 (Davenport, 1992). The main business processes at the institution of higher education should be next:

- a. Prospective students' animation
- b. Students' enrolment
- c. Teaching execution
- d. Students' assessing
- e. Teachers' further education and evaluation
- f. Tuition fee charge
- g. Certification, degree, students' record issuing
- h. Collaboration with industry
- i. Evaluation processes previous numbered

Specification Current Processes

Actual performing of above-mentioned processes should be described (Davenport, 1997; Drucker, 1999; Koulopoulos, 1997). In this way, we can see the current state and goals that have to be attained. (Figure 2)

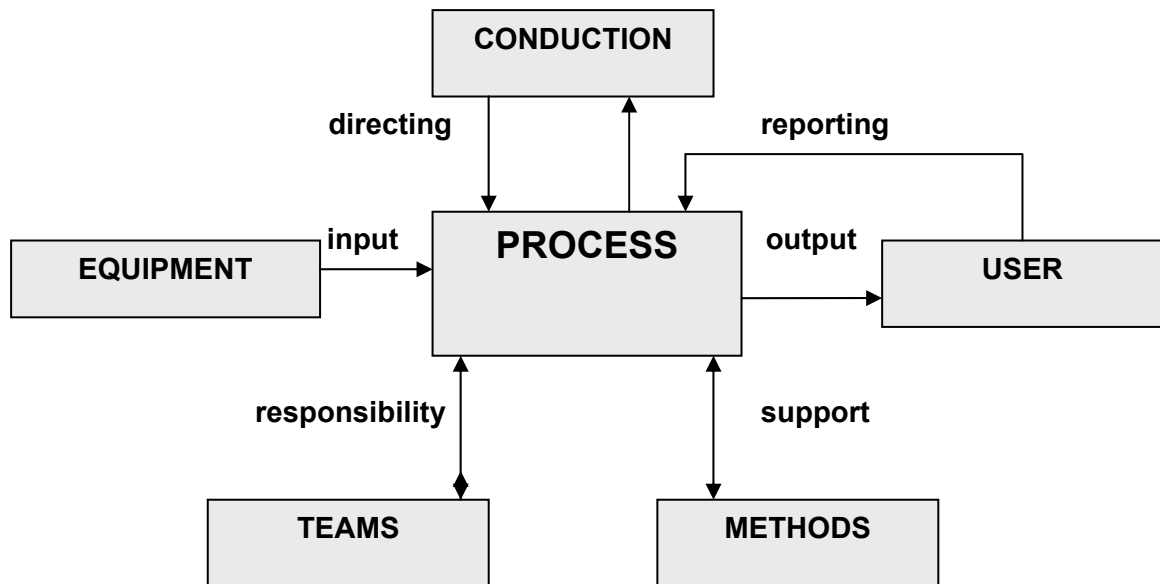


Figure 2: Current business processes

This description has to contain:

- Specification the process goals
- Specification of process inputs
- Specification of process output(s) and users (customers)
- Counting process actors (working cells)
- Counting working activities making process
- Representation process systems' scheme with 3 layers: organizational, technological, and practical. Technological support for data flow (phone, paper documentation, verbally communication...) should be particularly mentioned
- Indication which documents are prescribed by law as well as their form
- Analyzing the goals, their changing or complementing, and if IT (information technologies) can help in better accomplishing the goals
- Analyzing present documents and if it is necessary to change the way of their creation, storage, distribution, or use (in accordance with law)
- Analyzing the need of additional documentation which would help better goals' achievement
- Specification of: data created, stored, transferred, and used in process; which working cell creates data and when does it; in which way they are writing down and stored; which working cell, during which activity uses these data, and how to use them; is there a need of changing or adding something
- How the data are turned into information in the actual process; who makes the information based on the data; who needs these information and when; how to transmit informa-

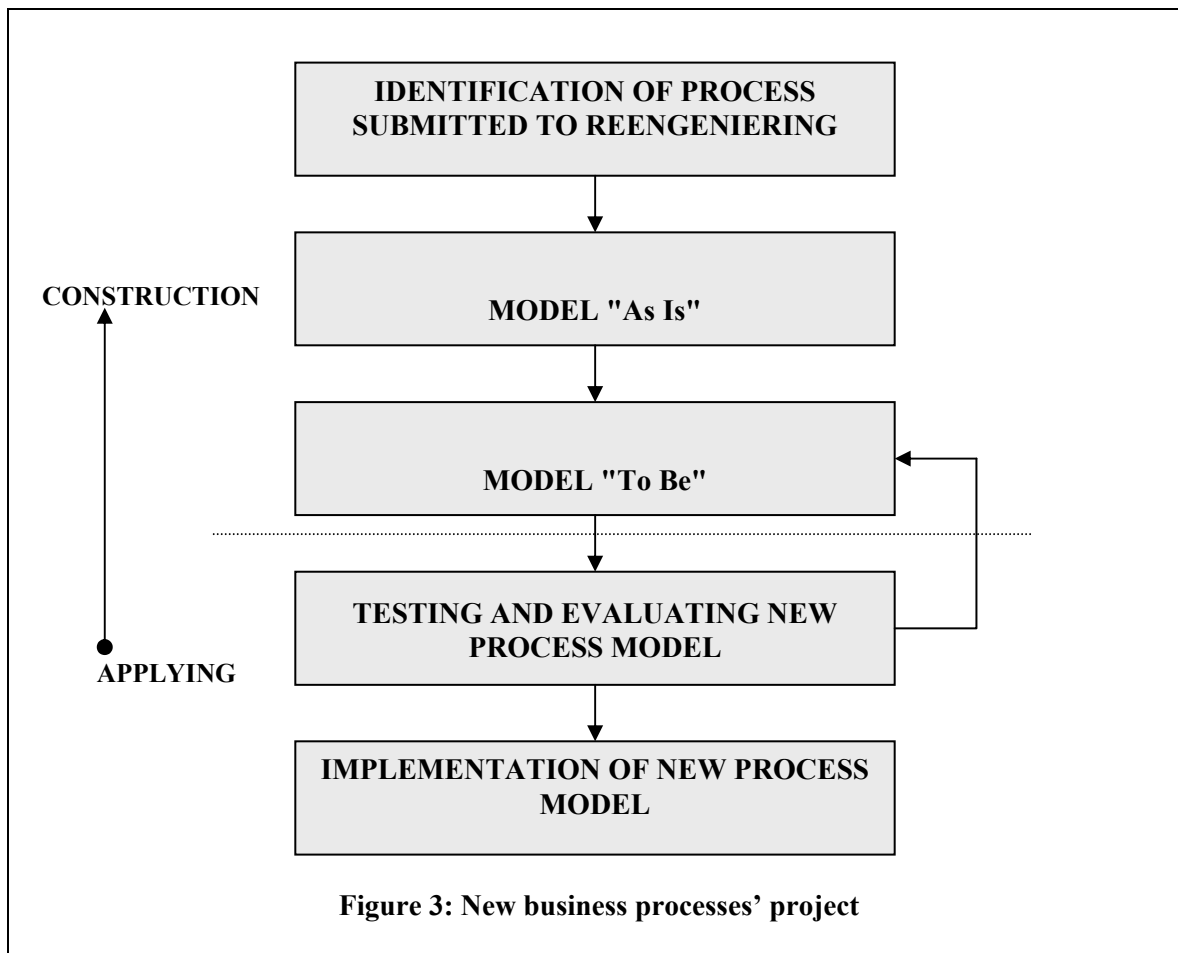
tion; is it possible the data to be turned into information automatically by IT; is there a need of changing or adding something

- How the information are turned into knowledge in the actual process; who creates knowledge based on the information; who needs this knowledge and when; how to transmit the knowledge; is it possible the information to be turned into knowledge automatically by IT; is there a need of changing or adding something
- How much time is spent on performing separate tasks making a process; how much time is spent on transfer between separate working cells from one to another task; how long does it take for a task arrived at a working cell to start performing

Projecting New Processes

A new process should be created and described in the same way as the current one highlighting where IT applying is inducted.

We have to use AsIs and ToBe models. An AsIs model represents the current business processes (Figure 3). A ToBe model shows what we would like our business processes to be. A ToBe model probably is not consistent with the real state. Comparing ToBe model with AsIs model assists process reengineering (Amberg. 1996).



Projecting new business processes includes:

- Analysis performing, transferring, and waiting task's time in order to its minimization applying IT. In this way, totally elapsed time is shorter (Koulopoulos, 1997)
- Which additional current processes' changes are possible by applying IT to maximize business performances
- Specification of new goals
- Specification of inputs and outputs
- Specification of working cells
- Counting working tasks
- Representation of process systems' scheme
- Data, information, and knowledge flow description
- Specification of documents (electronic or in other form); who and when creates and uses it; the way of their transfer

During the creation of a new process, the output (product) should adopt to each individual customer. An ideal process should achieve proposed goals in a way that each customer gets a suitable product delivered in an appropriate way (in accordance with law). In addition, new possibilities applying IT should be used:

- Building of an information system based on technical infrastructure that the Internet enables
- Dynamic web with interactive asynchronous communication (distance filling, updating and using e-forms and web data bases)
- Communication between system and distance users
- Data processing, analyzing, and transformation automatic in order to get information without human involving (tables, graphs, trends, correlations, means, min, max, hidden dependency detection)
- A system user receives automatic information about searched data availability at the moment when it is available
- Defining automatic data accessing rules (reading, reading and editing, deleting)
- Creating discussion groups, chat, e-mail
- Designing tutorials, automated tests for self checking, applying simulation (business games)

In some cases, it is necessary or useful that particularly processes can be executed in different ways. For example, a requirement for certification issuing can be done from home through IS intranet or by coming to student's office register.

The Next Step – Knowledge Management

After projecting new business processes and improving business performances, knowledge management follows whose practice brings global competition. Knowledge management system includes (Davenport, 1997, Tiwana, 2000):

- Instead of prediction and making decision using data extrapolation from the past period, make decision based on knowledge inside and outside your organization in current period
- Applying SWOT analysis based on knowledge and creating knowledge maps for your organization, main competitors, and your business area. SWOT analysis evaluate the Strengths, Weaknesses, Opportunities, and Threats involved in a project
- Identifying missing knowledge and how knowledge management can help to recruit weaknesses
- Determination what is better for your organization: codification or personalization
- Finding the balance in using, researching, just-in-time, and just-in-case distribution knowledge in your system
- Defining questions for employees in order to make a diagnosis of the present state
- Mobilizing enterprise that will make your knowledge management project internally salable, in your organization
- Make a diagnosis and evaluate relationship between business strategy and knowledge management and to use it for the further process of the creation knowledge management system

It is also necessary to understand various components of knowledge infrastructure and identify internal and external knowledge sources integrated in your system. IT components should be chosen for knowledge detecting, creating, building, and applying. Interface elements are defined as clients, servers, runways, and platform. Platform type for communication and collaboration can be web or commercial. In addition, collaborative intelligence components should be identified: artificial intelligence, data warehouses, generic algorithms, neuron networks, expert systems, and decision based on study case.

Knowledge objects bulk has to be optimized according to organization. For each of component provided cost and worth balance should be made as well as «push» and «pull» balance knowledge delivery system.

Creating the building plan of KMS (knowledge management system) considers customizing architecture details of knowledge management system. Each organization requires selecting specific components. KMS should be projected with high interoperability level (the ability of software and hardware of different machines from different vendors to share data) and optimized in order to achieve scalarability and performance.

It is important to understand and apply life cycle management as well as user's interface significance. Area and ambit knowledge management should be stated in a way that benefit exceeds costs. Future system value can be estimated by forecasting method.

Knowledge management system development executes in 5 steps:

- Development of user's interface and creating platform-independent intranet system, optimizing video and audio performances
- Development access and authentication (access permission) system, data security, access and distribution control
- Development intelligence agent and collaborative filter systems
- Development and integration application layer with intelligence and transport layer
- Development data preservation, worth determination, and valuation system

Conclusion

Creative approach to IT applying is means that the goal is not to informatize the present processes, but to start working on what has not been possible so far. Information technologies enable these possibilities, and their applying should bring significant improvement of contemporary business performances, specified in the paper. If it is not the case, then appliance of IT is trivial or inadequate.

Since data are facts defining some transactions and information is interpreted data, as well as knowledge is interpreted information, information technology should be used as much as possible to process knowledge, or at least information, instead of data.

If IT appliance did not result in business processes, or working way change, then implementation is not adequate with business performances maximization aspect, and this has to be the main goal to achieve and keep the global market competition.

Described IT implementation process is not one-time; it is iterative and continuous. Considered values of IT applying are watching, analysis, and modifying business processes in an organization. It is particularly vital to attend processes making product/service for customer and recognition customer's interest (it is changes also) in order to attain better business performances.

When do the changes end? Never! If that happens, it will be the end of an education institution, very sure.

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