Assoc. Prof., PhD, Josef Basl
Prague University of Economics, Czech Republic

THE ROLE OF ERP IN BUSSINES PROCESS INNOVATION

Abstract: The paper deals with the role of ERP software packages in business process innovation. The author presents his innovation map like core element of the whole methodology. The innovation dimensions and levels are defined and then used for monitoring and decision making about effective investment into IS/ICT. The whole approach is based on process and constraint management.

1. INTRODUCTION

The current period brings to individuals, firms and the whole national economics such changes that they have not been never before. These changes are different not only according to their quantity but to predictability of their development and possible influences. The completely new business reality is created in this way. The situation is completely different and the old know rules are not useful used any more. The reason is that they had been codified based on the experience and rules valid in the past. These characteristics are described by many researches.

To survive the firms and organization are enforced to adapt to the new situation. The speed of this adaptation is crucial and there is nodoubt about its necessity. There is one important question to be solved. Are firms and their employees able to accept them and react properly? How these permanent quite new changes could be realized? What paradigm is able to open eyes of responsible people and help them in their orientation? The behavior has to by changed not only in relation to the outside world, mainly to customers and suppliers, and also within organization

What is clear the new situation is asking for new laws and rules but also for and the changed behavior of people. It is necessary to show them and compare this change. They have to be prepared for it and to be sure about the benefit and important. This approach can improve huge investment put today in the many projects in company like for example new technology, new organization structure or new customer relationship management.

The development in process oriented organization that replaces the original function oriented organization is one of these important changes. The main advantage of the process oriented organization is customer and aim orientations. The key enabler is tools form IS and IT branch.

The investment into the IS/ICT (information system and information and communication technology) is of such good example. The companies invested enormous money into the implementation of the software systems like the ERP

(Enterprise Resource Planning,) the MES (Manufacturing Executive Systems), the SCM (Supply Chain management) and lately the CRM (Customer Relationship Management).

2. TRADITIONAL PROBLEMS OF IS/ICT

The implementations of IS/ICT were connected from beginning with pure ability to keep an implementation project within the planned budget and time frame. The complex efficiency was also not often reached. There have been several reactions on this situation since the beginning 90's. Some authors identified the weakest link in IS/ICT tools, some of them identified the needs to change and optimize the business process. The measurement of IS/ICT benefits were another understandable reaction.

There are several ways how to deals with problems of IS/IT but no one is able to solve all troubles and there is not only one truth solution. One of the reason for it is relatively short history of the exploitation of IS/ICT solutions in firms. A good example is the ERP (Enterprise resource planning) systems..

3. KEY POSITION OF ERP AND ITS PROCESS

The ERP systems are good example for presentation of rapid development of IS/ICT. The term ERP was used for the first in time at the beginning of 90's by specialists from Gartner Group. The ERP are next step after MRP II (Manufacturing Resource Planning) applications and the CIM (Computer Integrated Manufacturing) implementation during the previous decade. [SCH_90]

The current ERP systems area very comprehensive and covers not only the back-office but also functionality from front-office like CRM (Customer Relationship Management). The majority of the firm that are in the TOP 100 in many countries use ERP systems to support their business.

From the research perspective is crucial methodical integration of ERP in the business processes on the one hand and informatics processes on the other.
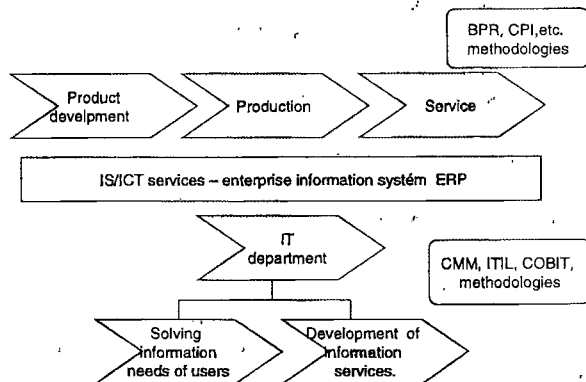

Fig. . Kkey position of ERP between business and IT processes

As we can see on the picture there are special methods for business process modeling and optimization. It is for example BPR (Business Process Reengineering) and CPI (Continuous Process Improvement). There is also set of useful methods for IT processes like CMM (Capability Maturity Model), COBIT or ITIL.

The gap is that there is not sufficient method for similar description of the ERP like IS/ICT service. It will be more useful for innovation of ERP.

Historically the ERP systems have been were implemented in a turbulent way during 90's. The current situation is therefore much more complicated because of looking for effectiveness of implementation. The innovation of ERP is looking for new approaches. It is in many aspects very similar to the standard innovation process of manufacturing or transport technology.

The enterprise information system (ERP) and their support of management and innovation of business processes represent the significant tool for improvement being more competitive.

The subject of author research is oriented therefore on:

- methodical integration of ERP into the business processes support
- creation of model of ERP integration
- methodology for business oriented ERP innovation

The works of many researchers indicate that there has not been established general accepted approach. The different method and terminology are used. Furthermore as was mentioned different authors concentrate on the different problematic areas. The classical book by Hammer and Champy [HAM_93] dedicated to process aspects of IS/ICT improvement is one such source that are used by author of this paper. The next core stone of the research is the application of Goldratt's theory of constraint (TOC).

The whole complex author's approach is on the following picture. There are three main areas and approaches:

- Description of firm reality is based on system approach (input, output, system and subsystems), process approaches (the system is set of processes with process owners, process goals, process effectiveness and efficiency). Finally constraint approach where the crucial process (constraint) limiting higher throughput is identified
- Integration and information platform of ERP within enterprise like key source of innovation
- Innovation management base on communication and innovation map as well

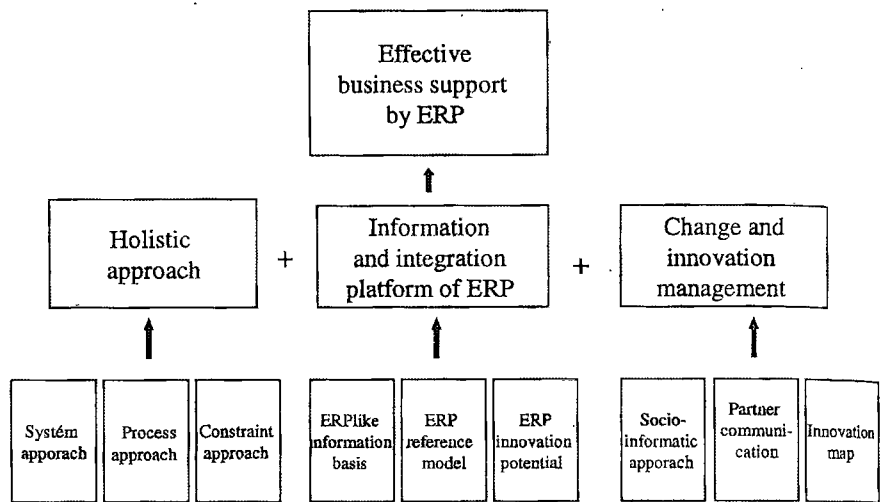The innovation map is described in the following text.

Fig.2. Scheme of the proposed methodology

4. INNOVATION MAP OF ERP

The latest work in the ERP area emphasis the trend to ERP, eventually IS/ICT innovation. There is hardly imaginable to increase the firm position significantly.

The author creates his own methodology. It uses:

- traditional approach to innovation known in late 50's and the innovation degrees are used
- traditional methods like capability maturity model and COBIT, e.g. approach known in IT management since late 80's.

The both approaches, e.g. complex integration of ERP into business processes on the one hand and the innovation levels on the other are basis for the axes of innovation table

Innovati on level	Description	IS/ICT users	Decision support	IS/ICT funkcionality	ICT support	IT department management	IT department processes
-1	dencration						
0	regeneration						
1	ad-hoc apporach						
2	reactiv approach						
3	proactive approach						
4	proactive approac with measures						
5	radical change						

Fig. 3. Main axises of the innovation map

From all three levels are two most important dimensions taken:

Business process:
- user of IS/ICT (ERP
- way of decision making

IS/ICT (ERP) tool:
- functionality of ERP
- IS/ICT support level

IT processes
- IS/ICT management)
- IS/ICT processes

All six dimensions are situated on the "y axis". The second "x axis" is created from seven innovation levels:

Innoation on level	Description	IS/ICT user	Decision support	ERP funcitonality	ICT suupport	IT department management	IT department processes
--1	deneration	No training	None	Lost of functionality	Obsolence	None	Undescribed
0	regeneration	Skills keep at the same level	Reports	Functinality kept at the same level	Basic maintanence	Based on an internal needs	Only main business processes described
1	ad-hoc apporach	Ad-hoc dispersion of knowledge	Ad-hoc SW support	Partial improvement of exististng ERP	Renovation by own power	Ad-hoc according to user needs	Described due to other project
2	reactiv approach	Basic dispersion of knowledge	Special query and reports	Adding of new funcitonality to exististng ERP	Purchase of new components	Permanent according to user needs	Only main IT processes described
3	proactive approach	Planned dispersion of knowledge	Business inteligence	Upgrade of exististng ERP	Purchase based on ICT plan	Based on plan	All IT processes described
4	proactive approac with measures	Benefit oriented dispersion of knowledge	BI with „cockpit" apporach	Replace of exististng ERP with a new one	Purchase based on ICT plan with business measures	Based on plan with measures	Measurable IT processes described
5	radical change	Radical staff retraining	Competitive intelligence	ERP based on a new concept	Outsorcing ASP	Based on methods (CMM, ITIL, Cobit, ..)	Optimisation of IT processes

Fig. 4. Full innovation map

The matrix of innovation map covers 7 levels and 6 dimensions. It can help to describe the current level and the demand level in each dimension. The both set of results can be presented in the form of a spider diagram:
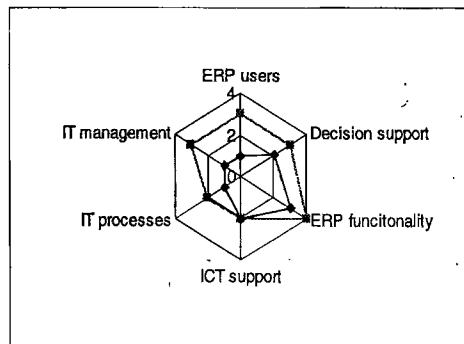
Picture 5 – Innovation potential
of investement

The graph shows innovation potential for improvement in different dimensions. The TOC method can help then with optimisation of decision which investment is better. It means which improvement of dimension brings:

- higher T (throughput – money), event. difference of T - ΔT

- lower OE (operating expenses), event. difference of EO - ΔOE

The main criteria function is then (based on Throughput Accounting):
$(\Delta T - \Delta OE)/ \Delta I$ – where ΔI is investment in inovation.

The whole methodology is applied via process decomposition of the firm. The business processes are described first. The optimisation of them followed. The process owners have the key role for good decision. Their own motivation is important as well. The adequate motivation of these persons that has to be in relation with the firm strategy, goals and politics are necessary conditions as well.

The methodology has been applied till now in the three different types of firms:
- manufacturing company
- utility company
- public sector organisation

Although all three cases are relatively different (in the sense of their core business, number of employees and customers) some common features of successful implementation was identified:
- the firms culture has to be on high level
- the process of change is relatively slow and last long time
- the support of management is needed.
- The system of metrics is absolutely necessary during the project and at its final stage.

The current area of application of this methodology is group of small and medium enterprise.

5. CONCLUSION

The author has created own methodology and applied it in praxis. It is based on holistic system approach where IT/ICT plays the key role for effective decision engineering and innovation politics in firm.
The described innovation map is good tool for such decision making process.
The important part of methodology is the set of proper metrics and system of continuous education of employee. The changes of their behavior are mandatory.

REFERENCES

[BAS_99]   Basl, J., Voříšek, J. : Socioinformatics - Trends in the Field of Business Processes Optimisation, International conference BIT 99 "Business Information Technology Management - Generative Future", Manchester Metropolitan University, Manchester, 1999, ISBN 090053040136, pp. 95-100

[BAS_01a]   Basl, J.: Analysis of the Application of the Constraint Management in the Czech Republic, The 6th IFAC Workshop on Inteligent Manufacturing Systems IMS 2001, Poznan, 2001

[BAS_02b]   Basl, J., Skolud, B., Banaszak, Z.: Socioinfomatics approach to decision engineering based on the constraint management, 9th ISPE conference, Cranfield, Great Britain, 2002, pp. 447-454

[CHA_99]   Champy, J.: It's time for ERP lite, Coputerworld, 8/23/99, 34, p44, 1999

[CMM_02]   Capability Maturity Model® Integration (CMMISM) – Version 1.1 - Continuous Representation, Technical Report CMU/SEI-2002-TR-011, [online], The Software Engineering Institute, 2002, [cit. 2003-06-06], URL: <http://www.sei.cmu.edu/cmmi/>.

[COB_00a]   COBIT 3rd Edition – Control Objectives, [online], IT Governance Institute, 2000, [cit. 2003-06-06], URL:<http://www.ITgovernance.org>, ISBN 1-893209-12-1.

[DAV_93]   Davenport, T.H.: Process Innovation: Reeengineering Work Through Information Technology, MA, Harvard Business Scool Press, Boston, 1993

[GOL_01]   Goldratt, E., Neccesary but not Sufficient, The Norton River Press, Great Barrington, 2001

[LEP_99]   Lepore, D., Cohen, O.: The Theory of Constarints and the System of Profound knowledge, The Norton River Press, Great Barrington, 1999

[MCH_95]   McHugh, P. at all.: Beyond Business Process Reengineering – Towards the Holonic Enterprise, Willey, New York, 1995

[NEW_03]   New ERP systems spurs effinciency, Industrial Distribution, 3,2003, p.35

[NG_99]   Ng, J.K.C., Ip, W.H., Lee, T.C.: A paradigma for ERP and BPR integration, Interantional Journal of Production Research, 06/15/99, 9, 1999