New aspects of Expert systems in Business management

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Abstract. A traditional aspects of usage of Expert Systems are often considered as history or often are the Expert systems shown as a part of Information systems in business, which are able to control the Business rules (as a Business rule engines). But here are many new tasks in the Business management, which could be processed with Expert systems. Many managerial decisions need swift "rules of thumbs" or smart and fast classification of customers or products etc. This article presents the new possibility how to use the Expert systems in new perception of Business management. The article includes some examples of managerial activities, where we could see the "knowledge gaps" by making decisions in business.

Introduction

The latest information technologies brings new challenges to all aspects of life. Sometimes the development of IT and new methods in Computer Science is so fast, that the great challenge for researchers is to find their practical opportunities. But on the other hand people have often left the good old principles just to show „the modern approach in their business or they way of life". Young researches talk about their „new foundations" with enthusiasm and the „good old listener with a lot of experience" knows, that these foundations are often only old principles with „a new coat". Here is necessary to join the enthusiasm of young researchers with old practical people, which are able to give „the sense" and the direction of technology usage.

The Expert Systems in the 21. century are often considered as something with clearly defined place in practice to able autonomously solve tasks concerning of a decision processes. Many people in the practice interpreted the Expert systems as a kind of decision support systems (DSS) and so their prefer other DSS, which have not been so expensive in a development phase. Although the assumption, that the Expert systems are able to solve each kind of managerial tasks on the three organizational levels of business management (pic.1) was wrong and the time shows us the limitations of Expert Systems [1] it does not mean, that we have forgot to use ES in tactic or strategic level. Only the role of ES in the both mentioned levels is different.
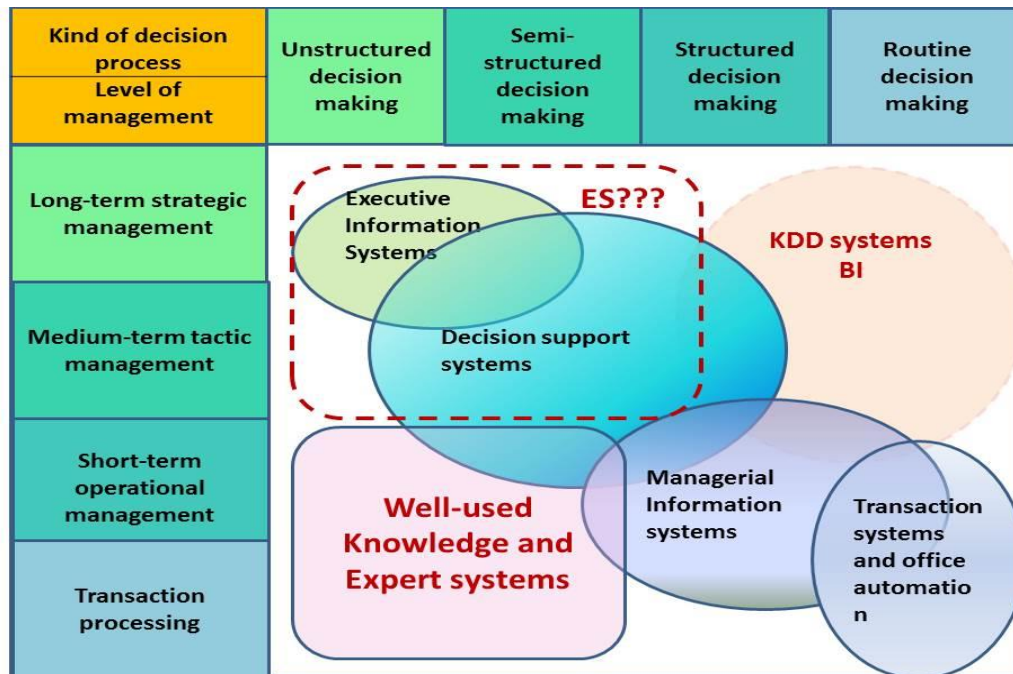
Fig. 1 The position of Expert System - three level business management vs. type of task

However the organiztional level of management provides daily the traditional tasks (table 1), which are well performed by ES or the main principles of ES (especially rule-based systems) are transformed to the business rules engines. Business rules engine allows to have effective performance with fast and exact monitoring and controlling.

Analytic tasks	Synthetic tasks
Classification	Design
Assessment	Modelling
Diagnosis	Scheduling
Prediction	Planning
Monitoring	Assignment
	Configuration design
Their combination	Their combination

Tab. 1 Knowledge intensive -oriented tasks

New role of ES in the tactic but above all in the strategic level of business management comes from something what seems as „the Knowledge Gap" of people (managers).

1 What is "the new knowledge gap"?

The tactical and the strategic decisions in the 21.century, the century of information technologies and knowledge society strongly depends on large databases and much information. Too much information is coming daily from various sources. Although the Internet is a strong source of information, it is not easy to make fast and accurate decisions based on the information. Currently these two mentioned reasons had an impact on failure of the traditional Expert Systems. Expert Systems have usually big complexity and need the adequate maintenance (not only technological), but the primary maintenance comes from "feeding them with new knowledge". Also to gain new knowledge is not easy for managers, which are under stress and tired.

So we can see the first "gap" between fast technology improvement and adequate usage of latest technology in practice. Many times the foundation of new technology or new methods is stopped in the phase of research or isolated project. The top managers are not able to follow all new projects and choose one, which is adequate for their business and they often rely on IT specialists, which have no idea about making top managerial decisions. So here are two different points of view and the "knowledge gap" is between these two approaches.

The second "gap" is based on new generation of managers. The old generation of managers in practice uses the "rules of thumb", which comes from their long-life experience. But the practice shows us that the positions of managers are given to young people. Although they are clever, flexible, communicative and they studied very hard, they have not enough experience and complex point of view over problem solving processes. They prefer "ready-made solutions", "patterns" then "rules of thumb". It is natural, but the hectic environment does not allow them acquire adequate experience joined with the inferencing, reasoning and comparing the new situation with old one and study books. The second gap indicates us the need for all ways of thinking by tactical and stretegic decisions.

The third "gap" is related to large databases. The main priority of present time is how to find new relation, new information and new knowledge in the large databases. People without information technologies are not able to handle so many data. But IT specialists are not able to offer simple and fast solutions for many problems. They offer standart database solutions as datawarhouses and datatechnologies, but forget the other kinds of approaches. And it lead us again back to communication between IT specialists and managers (users of IT) and so we can see the same significant "knowledge-communication gap".

The only three main problems were described, those come from

- Fast evolution of technologies,
- Contradiction between the rapid change of market requirements and ability of appropriate use of new technologies
- Differences in people's knowledge (e.g. strictly determined study fields at Universities –management vs. information technologies)

2 New role of Expert systems in business management

Traditional role of Expert systems was perceived as solitaire systems, which are designed as "closed systems". The primary role of Expert system was to replace the companies' most experienced employees and autonomously solve problems. But the big complexity of Expert systems turned the attention of researches to the task how to use some principles from ES and add them to larger programming systems.

One practical input is the usage of business rules engines [1], which contains the business rules. The business rules can be called as services (e.g. Web Service), when it is needed or they can have a form of Expert system inside of Information systems to handle specific point of tasks. They are able to offer some specific information back to Information Systems or Decision Support Systems. The business rules sometimes are known as "ruleflows" or "rulesets" and the philosophy of "small chunks of rules" is natural in the rapid changed business environment. Today companies wish to prepare the changes by themselves very fast and they do not need to pay extra for maintenance of knowledge base of ES. Thanks to object oriented programming languages (JAVA, C#,

Python, Ruby etc.) the implementation of web services as a business rules is more effective, flexible and it allows change the Business Processes rapidly. Business rules are very effective in the operational level of business management. But here the question arises: how to use the business rules or rule-based small ES in the tactic or strategic management? The Picture 1, shows that the strong position in long-term and medium-term management has the set of Decision Support Systems and the Executive Information Systems as the subset of DSS. Decision Support systems often use the methods of multicriterial decision process [1] and the appropriate software solution. Many of these methods depend on weighted values, where the primary weight comes from experience and knowledge of experts (top managers in company) and so these estimations are not independent on human factors. It leads us to possibility how to find the way of usage the Expert systems in the process of making the "good weights". The reasons are:

- The good experts in companies are not "never-dying", they could leave the company and their advice is out
- The young managers (experts) need the "pattern for their weighted values" and possibility to compare their decisions with reality (however from last time)

So the type of Expert system (rule-based, case-based etc.) depends on concrete type of tasks, which are often solved in the company. This question is related also to saving the data of multicriterial decisions into the large databases and with techniques of Knowledge Data Discovery (KDD, see Pic.1). The large databases saved the hidden solved tasks of last time and here is a possibility to find "some patterns of cases" how to set the weight by multicriterial decisions. It goes also by "small chunks of rules" as was mentioned. So this is the first sketch of the new role of Expert systems in business management.

The traditional role of Expert system could be preserved, but the domain area would cover the "knowledge-communication gap" between IT specialists and managers. A very simple example is the usage of Expert system by evaluation effectivity and efficiency of the information technologies in business processes and business workflows. On the web sides we are able to find the advisory Expert systems for buying and implementing the best information systems (or other programming system) into companies (firms) for effective performance. For example the Technology evaluation centers (TEC) offers a few types of ES for IT in business, but also in the education [9]. The new aspects of ES are closely related to new technologies, especially to semantic technologies. One of them mentioned earlier is usage of web services, where we are able to "construct" the semantic of prococess (choreography of web services [10]. Other approach comes from ontologies, which are the strong tool for keep the semantic and allow make fast reasoning and finding relation in large databases. Ontologies serve specially by classification tasks (classification of customers, products, supliers etc.). However the technologies are strong, without exact analysis of management needs in companies, is not possible to wait good effectivity of them.

3 Conclusions

The article only sketch wide possibilities of usage Expert systems. Many firms, those are dealing in development and use of Expert systems [7, 8], offer professional solutions in all fields and levels of management. But it is not easy to "cut out" clearly the core of Expert system from the complex programming

system and the daily users and the managers only guess if their system use the rule-based principles or offers the case-based solutions in the practice. It is not important for them, but from the point of knowlege management and knowledge engineering it is very important to analysing the all needs of modern companies. So it is necessary also to change thinking of students in the technical fields and show them importance of analysis the business processes. On the other hand is important to elucidate the problems of information technologies to students of management.

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