BUSINESS RULES IN KNOWLEDGE MANAGEMENT AND IN INFORMATION SYSTEMS – METHODOLOGY OF MINING BUSINESS RULES AND KNOWLEDGE

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Abstract

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Every organisation works according to principles which define business logic that controls all business processes. However, lot of basic rules of business logic are hidden in companies' guidelines and directives, in informal techniques of experts, processes owners and specialists. The aim of all managers should be a replacement of this incoherent set of information by set of clear and unambiguous terms which describe the way the company is controlled from inside. This notion is a ground of control and administration of business knowledge.

Contemporary practises in development of informational systems demand openness and availability to correspond to constant changes. With the complexity of information system grows the amount of work and its level of difficulty. The rules of business logic are transferred to application logic and implemented into a source code. Therefore, change of the business rule needs change of the code. This means compilation or replacement of the code. Adoption of this new approach would mean more effective possibilities in adjustment of the information systems to environment dynamics thanks to the change of the rules.

The article deals with mining methods and subsequent structure of business rules for easier implementation into information system. Business rules base is at the same time business knowledge base which can serve for different purposes then development and use of information systems.

business rules, business architecture, business process modelling, UML, business logic, application logic, information systems architecture

Companies need to expand to new areas, come up with new products and services, increase commercial potency and position on the market through merging and acquisition in order to keep up with competitors. Therefore, it is more than willing for the companies to have systems in the ways they carry on their activities. Business and application logic includes processes, rules and information support; however, possibilities for their controlled and systems accesses are not usually applied in the companies.

Companies can successfully manage their development and changes in building customers' and providers' relations with formalized support of business rules and processes and they can quickly adapt the internal processes so that they can fulfil the changing needs. Suggested principle of administration of business knowledge is in accord with information systems architecture oriented to services which offer simple adding of functions, users, support of new business models and classifying of solutions in a way that they can support all companies from small to large, distributed, supranational companies. It also unifies the standards and helps to ensure quality with help of centralized description of processes, rules

and approaches and by sharing the recommended methods and expanding the administration of company concepts within the company units.

This solution is intended for managing demanding global organisation by consolidating and standardising processes and related rules and offers visibility and transparency in the whole organisation. Supranational companies can comfortably spread out of the international borders thanks to possibilities to use more languages and currencies and ensuring the conformity with local requirements.

Suggested methodical approach to gaining, formalizing and administrating business rules will simplify respecting the business rules. Companies facing the countless regulation demands, which differentiate from country to country, can help to lower risks and responsibilities connected with managing the firms, to respect the directives and commands and initiatives of customers by consolidation and administration of processes and rules.

MATERIALS AND METHODS

According to (Marek, 2008), rules are one of the key documented business knowledge – it describes what the company knows about its desired behaviour and logic of decision-making. The concept of business rule defines all principles, techniques, restrictions and commands, which exist in the company and according to which the company works and is controlled. If we talk about a rule, we mean the business knowledge – knowhow of everyday processes in the company. Of course theses rules are applied in information systems, data structures, algorithms and in user interface of the individual modules supporting real processes. However, many of the rules are not part of the software applications. In spite of this they must be expressed, kept, archived and controlled. The main advantage of this automated rule is that it cannot be broken. Therefore, there is no need to control it and develop special procedures which would find out such violation and would carry out relevant redress. Automated rule is accomplished when all the necessary data is available. Thanks to this there are no constrictions when the process is waiting for a specialist or authorized person to decide. Non-automated rule is verified in a different way; however it must be saved and formulated as well.

So far, there is no (or we do not know about any) mature and proved or widely tested and respected tool for controlling rules. We can name OCL language (Eriksson, Penker, 2000) which is used for expressing restrictions in object oriented models. It forms superstructure of UML language and enables to create in a better way some aspects of diagrams and UML elements by their specification. So far, the application of this language in information systems has not been sufficiently adopted, which is quite a pity. The problem might be quite a complicated

syntax which is incomprehensible to company managers, owners and many of the users (Rábová, 2008).

In the proposed methodology, we have set up a term "business dictionary" which is not commonly used by the companies. However, shared and correctly structured business dictionary is not used only for software implementation but also for explanation of the meaning of everything what is going on in the company. Under the terms of complex business architecture we save here all information which according to the definition is in accordance with the concept of business rule. We should stress that such dictionary contains mainly semantics of company employees and should support process models supplemented with business rules.

Nowadays, in many organizations there are employees from different divisions who have problems with communication, because they live in different semantic worlds. Therefore, well-controlled and correctly structured business dictionary could be the main thing in everyday company activities and is absolutely indispensable for process and rule control tool. We also think that it should be accessible and sufficiently interactive and supported by controls and correction possibilities (similarly as the spelling check in text editors).

Developing and controlling such a dictionary means including business knowledge from company oriented employees and managers who perfectly command their job in the first place and gaining knowledge from established practice from some outer source or similar community in the second. Accomplishments, connected with the core of such business knowledge, are the basis for the company analysts.

In the next stage, we are preparing automated support of the business dictionary, which is as important for effective company communication as is the integration of big sets of business rules and business processes. However, the main element is creating the database of rules with structure containing not only unambiguous identifier and description of the rule, but also its type, relation to the process, relation to the information system, responsible person and possibly connection to another rule. Before we can fill this rule database, we have to mine these rules from heads of experts, responsible officials, manager seniors and from company documentations.

Methodological technique for gaining and structuring business knowledge is a very useful tool. The main idea of the presented material is its first processing, proposal of the process model, which consists of activities suitable for gaining rules for the purpose of their management and control. Model is made in the standard UML notation, we used activity diagram, object oriented developing diagram based on Petri Net Semantics (Arlow, Neustadt, 2007). Model is supplemented with text explaining the individual thoughts and techniques.

In (Rábová, 2010) the concentrating is focused on the format of business rules. Firstly, rules are separated into groups (Ross, 2006) according to whether they are rules expressing the main company terms and facts or rules expressing value calculation or rules containing condition or rules containing value calculation. Then, for each type of rules there are designed patterns for its formalization.

These structures are formats which can be applied on nearly all rules in the company. Their main value lies in the fact that there can be gradually used in algorithm and they can be saved in the information system source code. The set of rules can then be put into database, furnished with attributes and controlled and managed outside the information system as it was said in (Rábová, 2008b). Activity model diagram in the picture number 2 has classification in one of its parts and is therefore natural broadening of existing considerations of structuring and managing rules and it works on the previous publications (Rábová, 2006).

RESULTS AND DISCUSSION

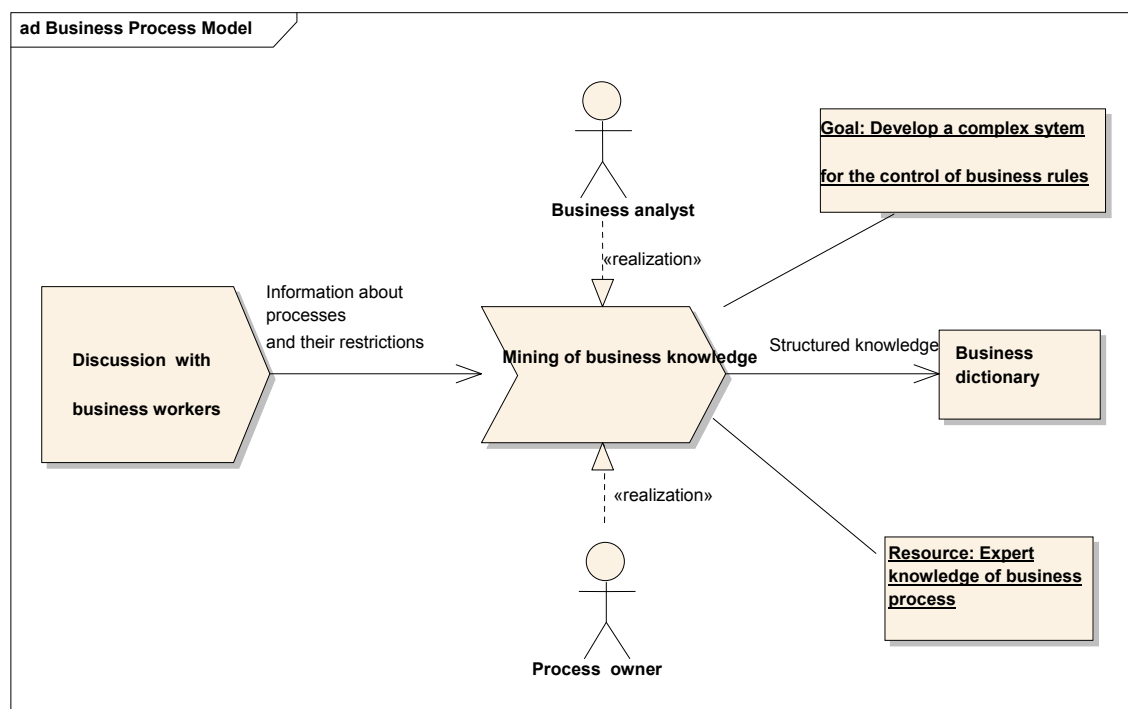### Process model of business rules mining

The process model is presented here at two levels of abstraction. At the highest level, which is presented in the picture number one, is shown one process of mining information. Its input are general, unstructured information and pieces of knowledge, results from workshops and discussions of company analyst with key employees, process owners or people responsible for it (rudiments of the future

rules in the database). The output of this is then a business dictionary (homogenous set of rules with its attributes prescribed according to a suggested structure). The inseparable parts of this model are responsible roles of actors. These are company analyst and process owner, who take part in the model process, and the aim of the process, which is to create complex system of business rules.
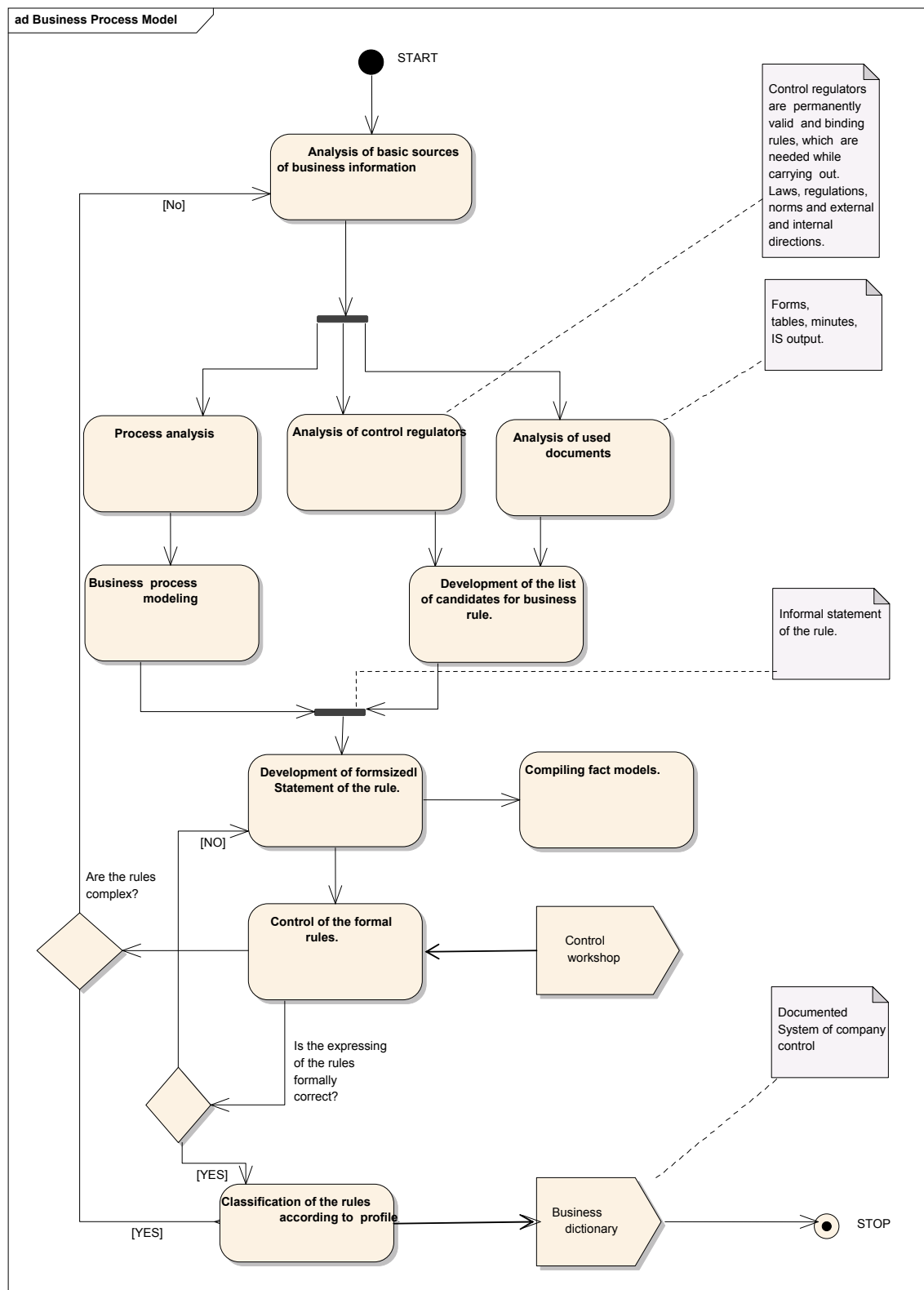
Methodics of business rules mining

In the next picture, this process is modelled with the help of activity diagram with lower level of abstraction. This diagram specifies in detail the sequence of activities which fill up the business dictionary with rules, knowledge, directives and regulations in structured form. After the start, analysis of basic information and business knowledge is carried out. This knowledge is saved in processes, control regulators and another company documents.

Modelling of business processes is part of this analysis. In the first version of methodology we deal neither with standards nor with techniques connected with process modelling. In (Rábová, 2008a) is presented a model of business architecture which is used as a model for gaining rules but neither control regulators nor company documents are regarded here. This model will be part of the methodology and will be applied in its final and complex version. Informally expressed rules will be made over to more formal form and analyst will compile their structure for saving, this means fact model.

1: *Process model at highest level of abstraction*

ad Business Process Model

START

Control regulators are permanently valid and binding rules, which are needed while carrying out. Laws, regulations, norms and external and internal directions.

Analysis of basic sources of business information

[No]

Forms, tables, minutes, IS output.

Process analysis

Analysis of control regulators

Analysis of used documents

Business process modeling

Development of the list of candidates for business rule.

Informal statement of the rule.

Development of formsizedl Statement of the rule.

Compiling fact models.

[NO]

Are the rules complex?

Control of the formal rules.

Control workshop

Documented System of company control

Is the expressing of the rules formally correct?

[YES]

Classification of the rules according to profile

Business dictionary

STOP

[YES]

2: *Process model at a lower level of abstraction*

At workshop with the owners of processes, like users, not only the formal side of rephrased rules is discussed but also their semantic correctness and complexity. Only then is created the rules databases which can be, but does not have to be, automatically administered by software support. This new side in our methodology will be called business dictionary.

Methodology is gradually developed. In this report, we present sequence of recommended activities which are presented in well arranged model of single activities.

Let's replenish several methodological recommendations for systematization of rules which are not used in the process model in the picture number two.

- Rule should be expressed complexly but as briefly as possible. Prescribed database structure is not part of this report.
- It is convenient to link the rule with some Business aim, process or source.
- The rule can also be linked to risk if needed.

From the point of view of people interested in the process of gaining the data, we should take into account one more thought. While most of the workers from company sphere would welcome colloquial and informal way of expressing the rule, most of the programmers and implementators of software applications would prefer formal, exact and unambiguous expression, which could be immediately put into source code and according to them could be set up the configuration parameter for customizing information system. The person (translator) who should stand between IT specialist and company expert – implementator, could be company analyst. This is the scope of employment of the analysis discipline.

According to the communication with the user, the analyst develops the model of business subjects, objects and realities and develops a rule on an informal level. It works with pieces of text. This has the advantage of keeping the rule clear and comprehensible but also consistent. The transformation to the formal structure which leads in the closing stage to one or more implementations is also a human activity with possibilities of mistakes and inaccuracies. The way to develop more formal expression of the rule structure in a way that this expression would retain its simplicity and comprehensibility for the people in the company remains a problem. If we offer the analyst pre-defined set of patterns and structures, he could use them for generating equivalent text presentations. In spite of the fact that the shape for the analyst and the company is still in the form of a text, the whole control through the structure could be in the system. Then, it would be possible to think about generating the code from this structure.

The analyst is a mediator between company worker, an expert in his field, who knows all the techniques, conditions for transitions, descriptions of the states and items, calculations and so on and IT specialist whose task is to formally express the business rule. Anyway, human interpretation allows mistakes and inaccuracies. Therefore, the main condition should be that the company worker (manager or process owner) should have direct control over the definition and determination of the rule for this process.

The proposed methodology caters for this and actors taking part in his process are from the company (company analyst, process owner).

SUMMARY

The article deals with the first version of proposed methodic for business rules mining and administration. When enterprises enforce this new method and approach of business rules, can processes remain fixed, although legislative, business constraints and direction change. The processes will be only referencing at their rules. The rules are also independent from business persons that rules control and enforce, so the rules are independent from change of organization person and competencies. In relation to business architecture we search the rule in vision, goals and resources, but especially in processes.

Methodic in its complex version can make for gaining and retrieving of business knowledge and information about business activities, also for controlling of completeness and integrity in business rules file as well as for communication about them. It can support knowledge management and also information system development and customization.

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