Business rules in the agricultural area

Podniková pravidla v zemědělství

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Abstract: The identification of the improvement areas and utilization of information and communication technologies in agriculture, as the support of the agricultural development in line with the environmental sustainability criteria, have gained importance and priority in our knowledge driven society. Rules define constraints, conditions and policies of how the business processes are to be performed but they also affect the behavior of the resource and facilitate the strategic business goals achieving. They control the business and represent business knowledge. The article deals with business rules and rule technology and identifies the business and technical opportunities they afford company. It shows also how to specify and classify business rules from the business perspective and to establish an approach to managing them that will enable a faster change in business processes and other business concepts in particular business in agricultural area. This article could provide business analysts with an essential approach to understanding, redesigning and communicating what really happens in the business processes.

Key words: business rules, structural rule, operative rule, management of business rules, rule technology, decision table

Abstrakt: Identifikace oblastí pro vylepšování a používání informačních a komunikačních technologií v zemědělství, jako podpora vývoje zemědělství ve shodě s kritérii udržitelného rozvoje je důležitou prioritou v naší znalostní společnosti. Pravidla definují omezení, podmínky a zákony v oblasti podnikových procesů a týkají se rovněž podnikových zdrojů a cílů. Řídí podnik a prezentují podnikové znalosti. Článek pojednává o podnikových pravidlech a technologii jejich správy a řízení a vysvětluje principy kategorizace pravidel a příležitosti a výhody jejich zpracování pro podniky. Součástí příspěvku jsou příklady pravidel vhodných pro oblast zemědělských společností.

Klíčová slova: podnikové pravidlo, technologie pro podniková pravidla, strukturální a operativní pravidlo, řízení podnikových pravidel, rozhodovací tabulka

A key challenge facing every company in the 21st century is how to be more adaptive to change. But many of the company's business rules are either embedded in the programming code or dispersed across an unending array of legacy applications or they are implicit in mindless habits and procedures (Rábová 2005). Finding them is very difficult, understanding their business meaning is more difficult and changing them is often almost impossible. And as is mentioned in (Merunka 2006), the attitude of business towards Information Technology is constantly changing as the more and more sophisticated systems and tools become available. It may be applicable for the rules supporting tools and procedures in this article.

MATERIAL AND METHODS

Business rule definitions

Businesses are controlled by the rules that regulate how the business operates and how it is structured. In many cases these rules are worded in an ambiguous and informal structure and often they are not even considered rules but are referred to as "facts" of the business. Rules ensure that the business is run according to the predefined external or internal restrictions and goals (laws, regulations, guidelines). Rules govern policies, terms, pricing, definitions and configurations and affect the business processes,

organizational structures and the behavior of the business. They can be defined on a high strategic level or they can be formulated to specify the detailed requirements on an information system.

Business rule can be defined in several statements (Eriksson, Penker 2000):
– Declarations of policies or conditions that must be satisfied.
– Units of business knowledge.
– Statement that defines or constrains some aspect of the business; it is intended to assert business structure or to control or influence the behavior of the business.

It is very helpful to provide the business analysts with a pragmatic approach to understanding, redesigning and communicating what really happens in today's business processes and activities. In order to communicate how quickly results can be realized, prioritization techniques are taught and practiced.

Guidelines, directions and instructions are provided for selecting a modeling toolkit that best suits some project and business needs. This contribution provides an ample opportunity to think over the real-life process problems in companies and to receive a practical advice about how to resolve them.

This definition expresses two fundamental ideas, both central to business rules, as follows (Ross 2003):
– *At the operational level*, an enterprise is a collection of rules or two levels of enterprise. Businesses must embrace this view to achieve the adaptability they seek. A business is not merely a collection of processes or procedures to execute. This revised view will require new designs for information systems-ones that seek to make easy turning rules on or off. They are called *rule-based designs.*
– Rules could be *data-based*. Wide enterprises are characterized at the operational level by multitudes of "users" with diverse responsibilities and with specific objectives that not infrequently conflict. The concurrency and substantial query requirements are the givens. In such an environment, attempting to enforce rules within processes or procedures ultimately is futile. What all these "users" have in common is their data basis and the need to record and share the persistent results (of processes and procedures) in the standard form. This strongly suggests that the expression of business rules should be based on "data". This, in turn, suggests that their specification should be declarative, rather than procedural.

The question, of course, is exactly how the data-based, nonprocedural (i.e. declarative) expression of rules can be accomplished:

– *Traditional techniques* (e.g. data flow diagrams, action diagrams, pseudo-code, and other forms of procedural models) offer little assistance.
– *Expert systems* provide rules for inference, but these generally are not in a form directly suitable for the enforcement of business policies.
– *Data models* (and certain object models) provide a fertile starting point for expressing rules (they define data types, a basic ingredient), but offer little beyond that.

Need for the classification and managing of business rules

Some situations in which the learning about rules in my contribution can help are (www.brcommunity.com):
– *To learn* a proven, repeatable, simple process framework supported by straightforward techniques.
– *To design* processes and align them to business, technology and human enablers.
– *To incorporate* learning, feedback and knowledge-sharing in all process designs.
– *To manage* policies and commitments continually for all stakeholders.
– *To establish* definite mechanisms and responsibilities at all levels for the aligned and measured process performance that is traceable to the strategic intent.
– *To understand* the appropriate roles of the process architecture, process analysis, system design, and organization design – and how to make them work together.
– *To exploit* the potential of technology to enable the initial process change and the adaptable process execution.
– *To coordinate* all the factors that must be addressed concurrently in Business Process Management.

Companies in the agricultural area many of challenges in that regard, including:
– Time shock is very disorienting if the management is not prepared for rapid change because in this case workers must be guided through unfamiliar procedures and/or business know-how as thoroughly and as efficiently as possible.
– Training is expensive and time-consuming. Yet as the rate of change accelerates, more and more (re)training is required.

RESULTS

Principles of business rules

The important document about business rules and their managing is from the Business Rules community

and it is called *The Business Rules Manifesto* (http://www.businessrulesgroup.org). From this quite long list, I chose some interesting principles:

– *Rules are a first-class citizen of the requirements world and they are essential for, and a discrete part of, business models and technology models.*
– *Rules are explicit constraints on behavior and/or provide support to behavior and they apply across processes and procedures.*
– *Rules must be explicit and are basic to what the business knows about itself -- that is, to basic business knowledge.*
– *Rules build on facts, and facts build on concepts as expressed by terms.*
– *Rules should be expressed declaratively in natural language sentences for the business workers, they should be defined independently of responsibility for the who, where, when, or how of their enforcement.*
– *Business rules should be expressed in such a way that they can be validated for correctness by business people and that they can be verified against each other for consistency.*
– *A business rules application is intentionally built to accommodate continuous change in business rules.*
– *Rules are based on truth values. How a rule's truth value is determined or maintained is hidden from users. The relationship between events and rules is generally many-to-many.*
– *Rules define the boundary between acceptable and unacceptable business activity. Rule violation activity is activity like any other activity.*
– *Rules are about business practice and guidance; therefore, rules are motivated by business goals and objectives and are shaped by various influences.*
– *Rules always cost the business something.*
– *Rules need to be nurtured, protected, and managed.*
– *More rules is not better. Usually fewer 'good rules' is better.*
– *Rules should arise from knowledgeable business people, which can help them formulate, validate, and manage.*
– *Business rules are a vital business asset and are more important to the business than hardware/software platforms.*
– *Rules are fundamental to improving business adaptability.*

Classification of rule types

There are several solutions in the business rule classification. I preferred the following, structural and operative rule:

Structural business rules enable the business to create (i.e. to structure) its own private world of encoded knowledge. They give shape (i.e. structure) to the core notions of the business by precisely establishing clear lines of demarcation for each. Via inferences and computation rules, they also allow the business to extrapolate its knowledge in a highly-organized (structured) fashion.

Here are examples of basic structural rules:
– Structural Rule: *A Customer must be considered Gold Customer if the Customer places more than 12 orders in a calendar year.*
– Structural Rule: *A Customer may be considered a Gold Customer only if the Customer was incorporated more than a year ago.*
– Structural Rule: *The number of individual fields to which the particular pesticide was applied in the selected geographic region is XY.*

During business activity, structural business rules are used to evaluate 'where you are' (current state) as the need arises. For example, is this customer a gold customer or not? Do we owe this customer a discount on this order? Does this bird have an actual test of healthy OK? The conclusion reached in each case is only as good as the logic within the rules. Poor or misapplied logic yields poor or inconsistent results. In that case, some aspect of the encoded knowledge 'breaks down" – it simply does not work properly.

Operative business rules enable the business to run (i.e. operate) its activities in a manner that deems suitable, optimal, and/or best aligned with its goals. Operative rules deliberately preclude specific possibilities (of operation) that are deemed undesirable or less effective. Breaking an operative rule will not 'break" the knowledge, but the threat of sanction is often quite real. Break an operative rule and a clear-cut violation occurs.

In one way or another, operative business rules are always preventative.

Here are some examples:
– Operative Rule: *Surgical gloves must be worn on entering into business with birds.* (This rule is intended to prevent infections.)
– Operative Rule: *A cowman must visit a livestock at least two times in day.* (This rule is intended to prevent inattention to animals.)
– Operative Rule: *A business worker must be allowed access to the cow house only with identification card.* (The rule is intended to prevent any unauthorised access.)

Any aspect of business guidance or know-how that might change should be treated as rules. In forming

definitions, therefore, the practitioner should always focus what is unlikely to ever change – that is, on the fundamental essence of business concepts.

We call such statements *essence definitions.*

For example, consider the definition of '*customer*' proposed by a practitioner in a real-life project, or the definition of number *of business workers, cowmen, for certain number of livestock* in agricultural business.

Decision table as one of the techniques of business rules management

As the number of rules in the company improves, the effective means to visualize and manage the entire sets of rules at a time becomes more and more important. Decision tables are excellent in that regard. In general, decision tables can be used where the following three criteria are met:
– A significant number of rules are parallel – that is, they share the same subject.
– Rules have exactly the same evaluation term(s).
– Rules are equivalent (but not identical) in effect.

In other words, the rules all share a common pattern and purpose.

Decision Table 1 establishes the basis for determining the delivery method for an order. There is one of the logistic processes that is applicable for the agricultural area business. Three possible delivery methods (the outcomes) are indicated along the top. Seven decision criteria appear at the left as labels for the rows. (This table therefore involves seven dimensions.) Six of these decision criteria are binary (yes, no or local, remote), whereas one, the category of customer, involves three possibilities (silver, gold, platinum). The choice of the delivery method for an order depends on what appears in the cells of a column. A dash (–) in a cell indicates that the associated decision criteria do not matter in determining the outcome that is any alternative for that decision criteria will produce the same outcome.

The basic rule is: The delivery method for an order is to be as in Decision Table 1.

Other decision tables may be connected with this Table 1, for evaluation term, county, applicable sales tax etc.

DISCUSSION AND CONCLUSION

Quality of business rules

In conclusion of my contribution, I must present some aspects of the business rules quality, because it refers to the fitness of business rules. The business rules are the essential parts of knowledge management process and they influenced also the strategic management. Knowledge has become a resource of the key importance with regard to the competitive advantage of a business (Hron 2006). We can

Table 1. The delivery method for an order is to be as in decision

Decision criteria	Delivery method for an order			
	picked up by customer	shipped by normal	shipped by Premium	note
Rush order	no	yes	yes	
Order includes fragile or living item	no	yes	–	
Order includes specialty item (milk, meal)	no (yes)	no (yes)	–	only with extra charge accordance to durability of food
Order includes high-priced item	no	no	–	we do not offer this duty
Order includes item involving hazardous material (waste, dry-saltery)	no	yes	yes	only with extra charge
Category of customer	silver	gold	platinum	in accordance to the size of receiver (receiver or hypermarket), in accordance to the number of orders in one month etc.
Destination of order	–	local	remote	CZ or EU

say that every business rule present some business knowledge. There are two general areas of evaluating the rule – validation and verification as discussed below. Actually some new opportunities are emerging in this area, especially using automated tools or application systems.

Validation means assessing fitness with respect to the *business purpose*. The goal is not only to ensure the correctness of the rules from the perspective of business people, but also to ensure that when applied, the results will be appropriate in all relevant circumstances. Validation is largely a matter of the diligent analysis, but the automated analysis tools can help in many ways.

For example:
– Diagrams can depict logical or computation dependencies between rules.
– Test scenarios can be retained so the prior results can be compared with new results for the modified rule sets.
– Rules can be analyzed to identify all events where they need to ensure the complete coverage etc.

Verification means assessing fitness with respect to *logical consistency*. Verification is always performed on a set of rules, looking for two or more rules that in combination exhibit some anomaly.

Below there are five common anomalies along with simple examples from the common business such as the agricultural company.

1. Linguistic Equivalences
   – An employee in agriculture must receive an extra charge in hazardous business.
   – An employee who works in hazardous businesses must receive an extra charge.

2. Modal Equivalences
   – An order over 3 000 CZK must not be accepted on credit without a credit card.
   – An order over 3 000 CZK may be accepted on credit only with a credit card.

3. Logical Equivalences
   – A high-risk customer must not place a rush order.
   – A rush order must not be placed by a high-risk customer.

4. Subsumations
   – A rush order must have a destination.
   – An order must have a destination.

5. Conflicts
   – A shipment must include more than one order.
   – An out-of-state shipment may include only one order.

An additional area of concern in the rule quality is *completeness* – that is, whether there are gaps or holes in the coverage of the business rule. In practice, rules are often captured by different people at different points in time, so anomalies such as the above can appear even in the best-coordinated efforts. Such anomalies are not the result of a rule-based approach, rather they are just much easier to spot. Fortunately, a comprehensive detection of such anomalies can be automated. There are only two caveats in that regard, but they are big ones:
– The business vocabulary the rules use must be coordinated.
– The quality must be ensured before the rules are translated into an implementation language (so business's people can better understand them) and/or are used in production.

With a specific reference to a textual language for business rule expression, the following criteria seem to be the most essential:
– *Expressibility* – the language must be capable of expressing a wide range of business rules.
– *Clarity*– rules in the language must be understandable also by non-technical domain experts.
– *Formality* – rules in the language must be unambiguous.

The interest in the business rules and their managing and supporting is steadily growing, due in a large part to the recognition of the impact of business rules on customer service and corporate agility. There are numerous applications areas/needs for business rules, so there are many ways to introduce the business rules approach into an organization. Never before has the business been in a position to shape and refine its own guidance and know-how so directly and proactively. One of the problems in this approach is also who owns the business rules and whether to attack the problem at a departmental or corporate level because the first step to solve a problem is recognizing it.

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Arrived on 3rd May 2006

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