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**Summary**
Dušan Baran

## Controlling firms conception

The management is aimed at objectives. The comparison of the plan and reality as well as the subsequent analysis of deviations provide important information for the management. However, this feed-back helps only to register the state which already occurred and the emergence of which could be prevented only in the past. Since the knowledge of what was necessary to do in the past can not be in most cases applied to remove the deviations, controlling must not linger on the analysis of the past state. The analysis should serve only as a basis for the preparation of measures for the future period. Hence controlling strives for the feed-forward. Nowadays the enterprise environment is marked by wide range of problems which can be solved with usual methods only with great difficulties. New concepts, tools, methods and technics are used more frequently in order to increase the yield and financial strength of the company. Mainly to reach the two most important aims that is profitability and the liquidity. Very important tool which helps enterprises to solve these problems, and in this way ensure longlosting sucessfull existence of the company, is controlling.

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# MODELLING OF KNOWLEDGE AS AN INSTRUMENT TO IMPROVE RETAIL BUSINESS COMPETITINEVESS

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**Abstract**

As current society is called "knowledge-based", knowledge represents the most important asset. Because a capacity of human's brain is very limited, models of knowledge as basis of knowledge-based systems are in a progress in many areas of entrepreneurship. The article deals with taking advantages on knowledge modelling in the question of retail business competitiveness; focusing especially on small-scale retail because its competitive position is substantially impacted with retail chains´ operations. The article presents a rough draft of knowledge-based model designed in order to enforce small-scale retail competitiveness.

**Key Words**

Competitiveness, Knowledge, Knowledge-based model, Small-scale Retail, Retail Business

## 1 Introduction

From the beginning of the nineties of the last century, retail business in the Czech Republic has passed through many environmental changes; changes in its internal environment and changes in its external environments as well. At that time, in all probability, an element that had the greatest impact on then retail business actions has been a penetration of international retail chains to the Czech Republic. Ever after, the question of small-scale retail competitiveness assumes great proportions.

In the work I deal with the topic of elements determining the competitiveness of small-scale retail that is represented especially with small "village type" shops, it means with outlets of general goods. The problem of defining the small shop is not new, dealing with various characteristics of size, management, turnover, performance, operation scale, etc. In accordance with Sim (1999) the small shop is defined as an outlet with a relatively very small share of the market, managed by its owners in a personalized way, not forming a part of larger enterprise (independent) and having few employees. There also exist many other characteristics of this type of shops but from a specific point of view, the most worthy of notice are especially meagre turnover and succession problems. (Sim, 1999)

These succession problems are rooted in the fact that with the penetration of chain stores to the Czech market the role of small shops has been changed. While these shops represented the primary source of goods in the past, just up to the last third of the nineties of the 20$^{th}$ century, their role is supportive only in present. But it would be incorrect to state that importance of small-scale retail is declining. Its importance is still very considerable not only from the point of localities completing but also because of its indispensability especially for aged citizens.

Competition with chain stores is a key challenge for small independent retailers in the present. Competitive environment is substantially changed in village markets; better traffic conditions lead citizens to drive out of their hometowns and to spend their money "outside".

Miller and Kean (1997) called this phenomenon as "outshopping". Another cause of outflow of small shops´ customers are also the prices of goods, that follows from economic position of the most of the Czech population. This logically causes a lost of small-scale retailers´ turnover. In pursuit to compete the chain stores small-scale retailers strive to emulate their actions, but in very reduced way that could seem more or less comic. These efforts realized by small-scale retailers are really not effective. It is only the waste of money very often.

## 2 Knowledge in retail business

Retail is primarily a last link of products distribution. Fully developed retailing consists in the large complex of activities in various shapes while to distinguish a large-scale and small-scale retail is necessary because it seems logic that competitive advantage of both has not the same basis. If talking about retail business effectiveness, it is impossible to not take into account customers´ satisfaction as well. From my point of view, business effectiveness and customers´ satisfaction are the two elements forming the competitiveness of retail business.[1] Customers are the key factor at formation of retail business competitiveness while their satisfaction and loyalty should be considered as the greatest competitive advantages of small-scale retail outlet. Nevertheless, any creation of customers´ satisfaction and loyalty is absolutely useless if it would cause any ineffectiveness, collapse of a business. So, while considering a retail business's competitiveness both elements mentioned above have to be considered, i.e. customers´ satisfaction at maintaining the effectiveness of retail business processes.

### 2.1 Elements of Retail Business Competitiveness

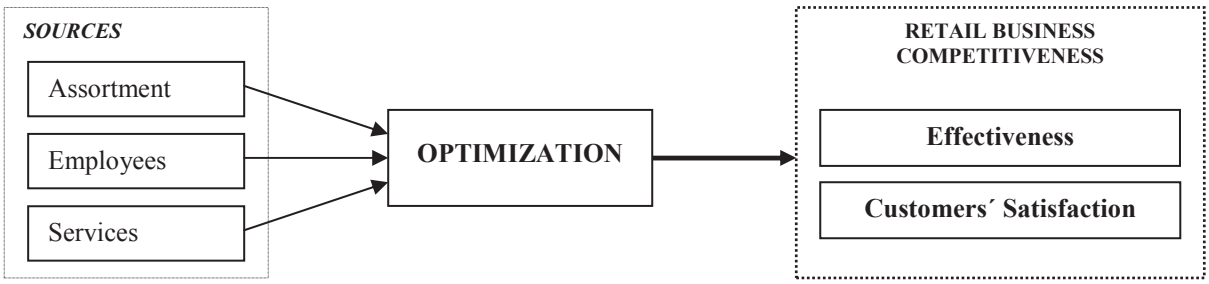
At considering the elements of retail business competitiveness it would be very helpful to base it on the concept of 5-P retail marketing mix consisting of products, place, price, promotion and people. (Stehlík, 2003)

Based on this marketing mix, clustering of these P-s defines three elements which the competitiveness of retail business leans on. They are as follows:

- Assortment (product, place, prices);
- Employees (people);
- Services (as a mean of promotion).

These three elements represent complex groups of activities which retailer's financial funds would be spent on. It means that these three elements are considered as inputs measured with financial expenditures[2]. The right, optimal investments to assortment, employees and services will then impact the business effectiveness and customers´ satisfaction to the intent of quality.

Scheme 1: Model of sources and elements of retail business competitiveness




[1] see Beranová (2007)

[2] also the spent and many other "pieces" of inputs have to be (and are possible to be) evaluated with finance

Knowledge, more precisely wide range of knowledge is necessary here of course. This knowledge has to lead off the environment of knowledge that comes, said in the simplified way, from a system creating customer's satisfaction; it means what customer wants and what impact on business effectiveness it would have.

## 2.2 Concept of Knowledge-based System for Retail Business Competitiveness

Retail business represents a link standing between consumer and producer. So, there are three elements; customer – retail – production while many relations between these subjects exist. At establishing a knowledge-based model supporting retail business effectiveness it would be very useful to divide relations within this triplet into two groups; relations customer – retail, and relations retail – production.

In accordance with such a division the knowledge base and the base of facts are going to be realized with regard to three focused area of interest which are mentioned in chapter 2.1; i.e. assortment, employees and services. As these three areas consist in wide range of activities and processes, it seems logical that the final global model would contain various sub-models targeted especially on management of goods flow, human resources management and influencing of customers.

From the perspective of scope, the sub-model of goods flow is the biggest one; respectively, each sub-model could be divided further. While mentioning the sub-model of goods flow, it would contain at least sub-model of assortment structure, sub-model of goods quantity, sub-model of goods quality ensuring.

## 2.3 Rough Draft of Knowledge-based Model for Retail Business Competitiveness

If a knowledge-based model for the effectiveness of retail business activities is considered here, modelling activities are focused especially on the small-scale retail. The reason for this target is the fact that international retail chains have their own systems of management, quite sophisticated and elaborated in details.

### *2.3.1 Basic Architecture of the Model*

Rough draft of the model architecture is shown at the scheme 2 on the following page. At its development the methodology CommonKADS[3] has been considered and also the knowledge-based model of K4CARE[4] has been watched.

General practical target of this work is to establish a new information model for small-scale retail management that would integrate knowledge and experience of the field of retail business. These knowledge and experience are focused on three aggregated areas, assortment, people and services, as mentioned above. Implementation of such a model would then serve as knowledge-based support to users, small-scale retail entrepreneurs. The model consists in three layers; domain layer, inference layer, task layer.

Base of facts is a passive data structure; it contains the list of data where is not any procedure or algorithm how to deal with these facts. Base of facts is a bearer of particularly given or derived facts, or alternatively, expected even estimated entries of a specific problem. These are the information which is based on a concrete environment, concrete facilities and concrete shop floor. (Štýbnarová, 2006) The data stored in the base of fact then directly

[3] see e.g. Berka (2007); Engineering and Managing Knowledge, 2006 [on-line: http://www.commonkads.uva.nl/]; KADS Conceptual Model, 1996 [on-line: http://ksi.cpsc.ucalgary.ca/KAW/KAW96/coelho/node2.html]

[4] see Lhotska and Riaño (2006); K4CARE (2006) [on-line: http://www.k4care.net/]

determine selection of applicable rules from the knowledge base. It means that the form of their record has to correspond with the knowledge base.

The facts are almost recorded in the form of ordered triplet *(object, attribute, value)*. In the intended model of retail business it would be for example:

*(Shop Placement, Demand, Level of Demand)*
*(small village, demand, very low)*

Consequently, e.g.

*(Demand, Turnover, Value of Turnover)*
*(very low, turnover, <500)*

These examples are of course rather simplified with regard on the reality of such a modelling.

Knowledge base represents generally applicable and valid knowledge about rules and orders in a given area. Very important characteristic of the knowledge base is that it is unchangeable during the process. Rules saved in the knowledge base are usually formed like:

$$If\ P_1 \&\ P_2 \&\ P_3 \&\ ...\ \&\ P_n\ then\ Q_1 \&\ Q_2 \&\ Q_3 \&\ ...\ \&\ Q_n$$

On the left side there are the prerequisites $P_i$. When these prerequisites are fulfilled then the inference mechanism would realize the actions, consequences from the right side. (Štýbnarová, 2006) Domain layer then records concepts, facts and relations relevant for given problem area, for a domain. Knowledge is recorded here regardless of a method of their usage for deductions. It is the level of stationary knowledge. In the suggested model this level is formed with two different parts. The first one is "Profiles of Players". The term "players" is understood to be single elements influencing the retail business as a whole. So here, they are retail outlets, customers, suppliers, competitors, and general environment.

The second block of domain layer is created with retail management problems. Sources of ineffectiveness are described here. For this part fulfilment, secondary sources i.e. specialized publications would be used especially. The domain layer and its two parts create the base of facts then.

Following inference layer records conceptual inferences which it is possible to apply on domain knowledge, and relations between them. Realization of rules leads to the stage when two rules come out of every construct to every subject. These rules are as follows[5]:

$$If\ \ v_j\ \ then\ \ O_i\ \ waged\ with\ \ w_{ij}$$

$$If\ \ -v_j\ \ then\ \ O_i\ \ waged\ with\ \ -w_{ij}$$

Wage $w_{ij}$ is given by the product of the *value* $t_{ij}$ from the rating grid and of the *importance* $d_j$ of the j[th] –construct that is multiplied by correction coefficient $f_m$ then.

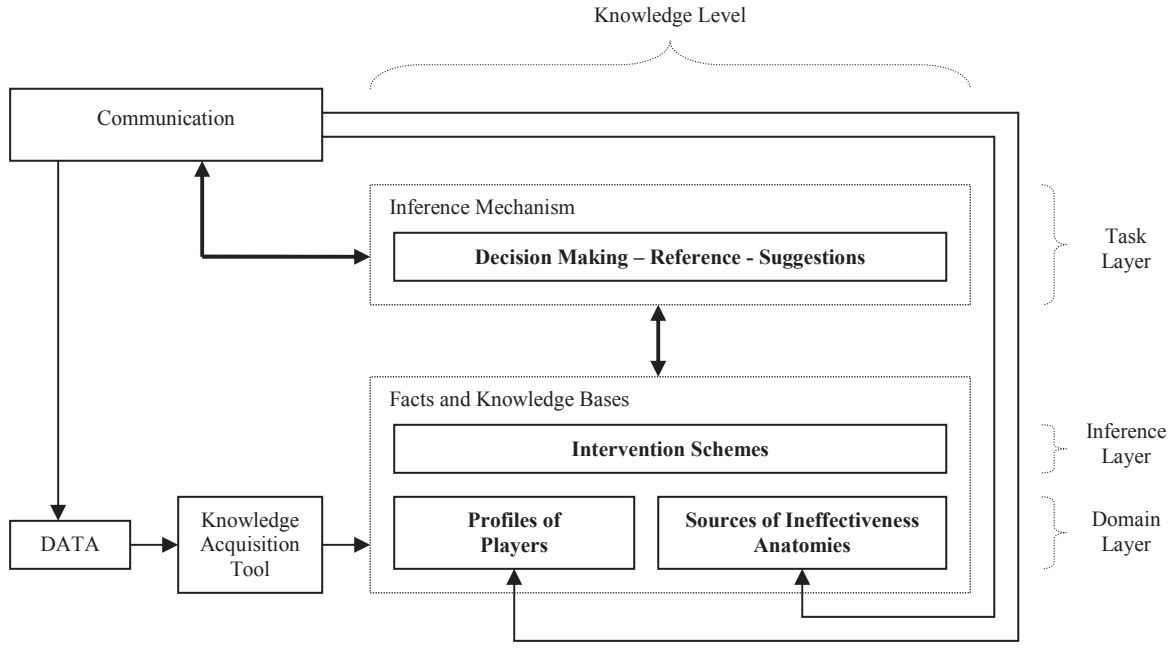
$$w_{ij} = f(m) \times d_j \times t_{ij}$$

(Berka, 2004)

After establishment of all the rules, the stage of testing the knowledge base follows. If results of such a consultation show incongruence another tone down of the knowledge base[6] is done.

[5] according to Berka (2004)
[6] e.g. adding of new characteristics, making changes in rating grid etc.

Scheme 2: Basic Architecture of RBC[7] Model




Inferences represent elementary deriving processes. (Berka, 2007) At the beginning of its work, the inference mechanism puts "starting item" into the base of facts. It means that if it is not possible to apply any rule the work goes to be finished. The inference mechanism works within the three-step sequence[8]:

1) Comparison of the rule's condition with the item from the base of facts;
2) If more than one suitable rule is found the inference mechanism decides which one to apply, i.e. "conflicts solving" is in the process;
3) Application of the chosen rule and following addition of the new item to the base of facts, possibly also deleting of an existing item, and return to the step one.

Inference layer contains the intervention schemes here. This block represents the knowledge base where possible ways of ineffectiveness elimination with regard to players´ profiles and source of ineffectiveness are recorded.

Task layer specifies what information would be really applied on a given problem. It is a procedural side of deduction. Every inference from the inference layer is understood as a primitive task. These primitive tasks are grouped into hierarchies of tasks and joined by procedural operations. The top layer here represents the decision making mechanism giving suggestions for retail business effectiveness improvement.

### *2.3.2 Model Realization*

At realization of the model, it is necessary to take into account the wide research, primary research and secondary research as well. These researches are the sources of data. By use of the means of data-mining methods and also other knowledge acquisition methods the parts of the base of facts, and knowledge base are filled in. As was partially mentioned above, profiles of players are based especially on primary research. Sources of ineffectiveness mostly come from publication sources of information but usage of primary research information is not out of the question.

[7] Retail Business Competitiveness
[8] according to Brožová (2006)

Intervention schemes are then the proper "combinations" of profiles of players and of sources of ineffectiveness anatomies directing to possible methods of ineffectiveness elimination. Finally the inference mechanism is constructed as a decision making element based on the statistic methods, especially Discriminant analysis, and Principal components and Factor analysis, and on the fuzzy logic. At the inference mechanism construction a certain level of uncertainty has to be composed into it; then the Bayesian models are on the scene. So, when one is considering a difficulty of the practical realization, the most difficult stage would objectively consist in the base of facts and knowledge base filling in; it is de facto the part of research.

## 4 Conclusion

Small-scale retail has its problems since the second half of the nineties of the 20th century. Even if the organizations supporting the small-scale retail business exist this field of entrepreneurship is permanently in survival troubles. From a certain point of view, great problem of small-scale retailers is their insufficient education. It means, they try to compete but they usually apply improper means imitating the super and hyper markets. Of course, these means have positive impacts on the chain stores´ performance, but they are mostly suitable only for this kind of retail outlets; their application in the small-scale retail causes ineffectiveness. It is always necessary to know what knowledge is needed in which process with the aim of added value performing. Knowledge is an asset that has to be assembled in order to gain a new quality.

From a certain point of view, insufficient education of small-scale retailers is one of their great problems. So, the main target of the research is to develop knowledge-based tool in order to help small-scale retailers to improve competitiveness of their businesses. Submitted draft of the knowledge-based model for retail business effectiveness will be elaborated into the pure form. The effort for that is based on the necessity of small-scale retail survival, just from the reasons which everybody is able to deduct, and as is also mentioned in this paper.

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**Summary**
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**MODELLING OF KNOWLEDGE AS AN INSTRUMENT TO IMPROVE RETAIL BUSINESS COMPETITINEVESS**

The problem of small-scale retail competitive position has come into recency in last ten years, namely because of the trans-national retail chains´ entering Czech market. The article deals with the competitiveness of small-scale retail of the rural type of grocery, of general goods. Especially these retail outlets have suffered the greatest injuries because of super and hyper markets´ arrival. Super and hyper markets have gained significant market share and a great popularity of customers. This has meant a real change of small groceries´ function. These small retail outlets have lost the prime position of shopping. Today small groceries subserve a supportive and supplementary function. Managing processes of retail business poses a wide and complicated set of interactions where the knowledge represents the substantial element.

Traditional architecture of knowledge-based system is composed of four parts; base of facts, knowledge base, inference mechanism and communication module. While base of facts and knowledge base are passive data structures, inference mechanism is "living organism". Inferences there represent elementary deriving processes. In the submitted model, the base of facts is represented by "profiles of players" and "retail management problems´ index". Intervention schemes of possible interferences on business ineffectiveness elimination are contents of the knowledge base. Then, inference mechanism specifies what information would be really applied to a given problem. It is a procedural side of deduction.

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