Competitiveness model designing: Internal approach from resourced-based toward knowledge-based

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Abstract. *Companies that operate in the contemporary environment attempt to realize a competitive advantage. To achieve that, different means need to be employed than two decades ago. The resource-based view (RBV) is a well-known strategic approach that has established the concept of increasing companies' business strength (i.e. competitiveness) through developing valuable resources and capabilities observing the paradigm of industrial age organizations. This paper examines new approaches and introduces a new model for determining organizational competitiveness drawing on the RBV model. Elements of a created knowledge-based (KB) model are incorporated within the framework of the RBV model. Using the conventional RBV model and the modified RBV-KB model, business results of a sample of Croatian breweries were evaluated and their competitiveness levels estimated. It is suggested that the improved model is more appropriate for explaining the business results of Croatian breweries.*

Keywords. Resources, capabilities, learning, knowledge, networks, ICT, competitive advantage

1 Introduction

The so-called resource school of strategy emphasizes the triumph through development and employing superior resources. The strategy does not depend only on possibilities and opportunities of the environment and good positioning on markets, but also on resources owned by the company. Resources and capabilities owned by competing firms may differ, and these differences may be long lasting [2], [23]. Organizational success can be explained by the possession of resources, skills, and abilities that are valuable, rare, and difficult to imitate by competitors. According to a resource based view (RBV), an organization is a bundle of resources which fall into the general categories of: financial resources, physical resources, human resources, organizational knowledge and learning, general organizational resources including the firm's reputation, brand names, etc. Capabilities are related to the processes and functions and represent what the firm can do more effectively than its rivals.

Popularity of The Resource-Based View of the Firm was present among the scientists and participants in the practice [2], [8], [20], [23] etc. The knowledge-based view of the firm builds upon and extends the resource-based theory of the firm [20]. Competitive advantage, due to successful knowledge management, marks the position in which the firm can achieve above average performance over a long period of time if it pursues organizational learning strategies. According to Zack [29], ability of an organization to learn, significantly can support the creation of strategic advantage.

2 Alliances, networks and virtual organizations

Although the RBV popular models for competitiveness evaluation (e.g. [9]) included concept of intangible asset, such an approach is not completely explicit in the sense of recognizing and modeling *the practice of* knowledge management, organizational

learning, but also networking and information management.

The notion of atomistic active participants competing among themselves for the profit in the market is not corresponding for the world today, where companies create alliances and networks of interacting relations. Strategic alliance implies voluntary initiated cooperative agreement which has: barter of technology, common research and development or cooperation in R&D, and sharing complementary asset. Generally speaking, two conditions for the success of alliance are emphasized: complementarities of resources and resemblance of cultures. Increases in productivity occurred in cases when the partners combined resources in a unique way [5]. Hence the conclusion that characteristic partnership, along with unique combination of resources, can be the source of competitive advantages.

As opposed to traditional companies which try to develop their key competences, the participants in virtual organizations rely on the qualities of their partners in certain parts in which they are not good enough. By looking at the total evaluation of the level of resources and capabilities, virtual organization can achieve exceptional results. As key reasons due to which a company has motives to become a member of a virtual organization have been recognized [7]: sharing activities of research and development; linking complementary key competences; acceleration of business processes and acceleration of development of new products; gaining in size, and easier approach to the markets and buyers.

While the question of alliances and networks is a question of structure, knowledge and learning can be the matter of strategy.

3 Learning in organizations

In contemporary organizations the concept of planning under influence of the idea of learning has been transformed into a paradigm „planning as learning“ [12]. According to Senge [24], creative learning organizations actualize synergy of five important components: systemic learning, personal guidance, mental models, building a common vision, and team learning. All modern organizations function more or less as learning systems by owning formal and informal processes and structures for knowledge management. Organizations differ in ways of creating knowledge and maximalization of learning [17].

According to Nonaka and Takeuchi [18], the knowledge management can be understood by using seven dimensions of management practice: the role of top-management in defining the learning focus, the development of suitable organizational culture, new organizational structures, policy of managing human potentials, level of progress in IT, measuring the results, and learning along with the environment, especially through cooperation.

The frame which can help investigate how many attributes of a “learning organization“ a certain organization has, was defined by several authors with help of categories of a “learning orientation“, that is with help of “supporting learning factors“ [17]. A typical frame used to establish the level of company according to the ideal state of the “learning organization” considers the state of indicators in the domain of: strategies, organizational structures, organizational culture, human resources, and information systems, measuring results, research and development, learning through partnership [26]. Researches have referred to the possibility of distinguishing at least three clusters of companies by viewing the stated group of indicators: learning organizations, traditional organizations and small followers.

4 Information technologies

Strategic aspects of information technology (IT) refer to the understanding IT as strategic resource which is classified by [16], within following three segments: improving organization processes and structures, inclusion of IT in the creation of products and services, and helping the IT while linking to other organizations.

The contributions of ICT to competitive advantages have been described by various authors such as [13], [21]. The evolution of the information-processing paradigm to build intelligence and manage change in business functions and processes has generally progressed over three phases: *automation, rationalization of procedures, and re-engineering.*

Today the paradigmatic manifestation of vertical integration changes under the influence of ICT into more modern forms of chains of values. Here precede the IT industries and consumer electronics, but car industry and others are also included. Companies functioning as centers of such chains i.e. networks excel by far the average of the industry, according to their business results [15]. In order for chains to work successfully, a multitude of process applications, network technologies and web-tools is employed.

5 The model of competitiveness

The resources of companies are positively linked to their performances, but the key element to success is the ability of balancing and running the resources and the capabilities [11]. The activities of managing resources occur by: concentrating the resources, accumulating the resources, linking and completing the resources, stopping the degeneration and reviving the resources. Capabilities imply a complex

cooperation and coordination between human and other resources.

Theoretical and formal frame for the specification of companies' competitiveness is derived from the basic theses called Resource Based View.

5.1 Basic models for determining competitiveness

One uses the methodology developed by General Electric and McKinsey & Co. by the end of the previous century. The essence of this approach is the analysis of the positions of the strategic business units from the portfolio. If we focused on only one industrial branch or sector, the analysis of competitiveness is reduced to the analysis of business strength. The assessment of business strength based on resource theory implies evaluation of main firm's resources (Ri) and capabilities (Ci) relatively to competitors' (Fig 1).

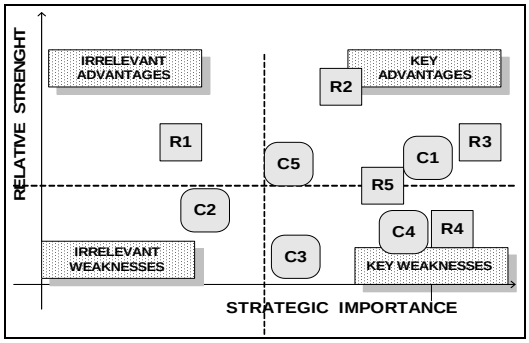

Figure 1. Evaluation of resources and capabilities of companies (modified, Grant, [9, 137]).

Resources are commonly evaluated also by their importance in the industry and total score indicates the state of internal strengths and weaknesses (Fig 1). Due to the combination of the two approaches, this technique can be named „GE-matrix & RBV". Analogous to the evaluation by using the method of the GE matrix, evaluation of main resources and capabilities in the industry are exposed in [9, 133-138]. According to this approach, total indicator of competitiveness of a company A is calculated by using the formula CP = h(R/C), where h is a linear function (Eq. 1) of values of main resources (Ri) and capabilities (Cj):

$$CP^A = k_{1A}'R_1^A + k_{2A}'R_2^A + ... + \\ + k_{1A}C_1^A + k_{2A}C_{2A} + ...k_{nA}C_n^A = \sum_R + \sum_C \qquad (1)$$

Constants k^m_{iJ} in Eq. 1 represents weighting factors, and they are related to strategic importance of resources and capabilities (Fig. 1). According to Grant [9, 136] and [3], in the model of appraising capabilities, such as Eq. 1, could be: product development, purchasing, engineering, manufacturing, financial management, R&D, marketing and sales.

5.2 Network business strength

Respected authors such as [9], does not mention explicitly the variables from the domain of organizational learning, knowledge management, networking and so on, in the competitiveness context. The flow of knowledge in networks was a subject of numerous researches, so the work of Sorenson et al. [25], shows that the influence of alliances generally changes the state of accessible and exploitable resources and capabilities. That is the reason why the concept of business strength (BS) is suggested to change into the concept of the so-called „network business strength" (NBS), as shown in [6]. For its definition one can use the Shapley's calculation of coalition strength, according to the model of game theory.

$$\varphi_A = v_{0A} + k \cdot 1.66 \approx v_{0A} + k \cdot 1.59 = \\ v\{A_{Koal}\} > v_{0A} + k \cdot 1.39 = v\{A\} \qquad (2)$$

The Eq. 2 contains the description for the approximation of the NBS value φ_A, for some company A, which has BS value ($v\{A\}$) when acting independently (v_{0A}, k are constants). In the scenario of simple collaboration between companies A and B, a pure accumulation of the resources leads to BS values $v\{A_{Koal}\}$ [6]. Synergistic effects of interactions between A and B resources and capabilities in the context of coalition accomplishments (Eq. 2) define a new BS of A, network business strength φ_A, estimated according to the contribution of A to a coalition {AB} (Shapley value).

From Eq. 2 one can see that estimations of the BS values need to be changed due to the concept of NBS, and thus approach to the assessment of competitiveness also should be changed. The organization networking is not the only reason why Eq. 1 should be modified.

5.3 Knowledge based competitiveness - learning about competences

When one talks about the indicators for competitiveness, those should be the expected indicators from the future [27]. Organizational capabilities and competencies can be improved due to organizational learning. Expected levels of competencies in the future, satisfies much more as an elements for determining competitiveness than the present indicators. We assume that the learning routines and habits change slowly through the years.

$$C'(t) = C(t+1) = V(C) * C(t) \qquad (3)$$

It means that velocity of learning related to certain organizational competency (capability) V(C) is approximately constant (Eq. 3). Knowing the current level of competency Ci(t) and learning level V(Ci), we can determine the expected level of competency Ci(t+1) in the foreseeable future, at the moment (t+1) (Eq. 3). This estimated capability Ci'(t), satisfies much more as an element for determining competitiveness than the present indicator Ci(t). By formulating the expected future capabilities (Eq. 3) and put this C' values instead of C values in Eq. 1, one can define a more accurate indicator of competitiveness [27].

The correction in the understanding of competitiveness has been recognized through Eq. 3. In modern business the competitive firm is the one to have superior resources and capabilities in the near or distant future. Competences and knowledge regarding information resources are also entwined with the concepts Eq. 2 and Eq. 3, but they are not completely used up.

5.4 New approaches- managing business processes

The presence of information resources, their maintaining, availability and efficient use are important for the company's success. The possession of IT resources for Business Intelligence, Project Management, CRM etc. and the knowledge regarding their successful manipulation in many industries and markets represents competitive advantage. Hence, we could make the addition of R_{ICT}^{A} and C_{ICT}^{A} in Eq. 1.

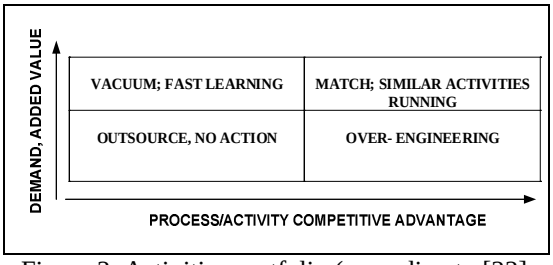

Figure 2. Activities portfolio (according to [22] and [28], modified).

Managing business processes is the relatively new approach in observing the organization. Therefore, according to Fig. 2, an analogous model (and formula) to Eq. 1 could be structured for the key activities and key processes evaluation.

Based on the concepts displayed in chapters 2, 3 and 4, 5.2, 5.3 and 5.4, we can structure an addition to the basic model of determining competitiveness (Eq. 1).

6 Competitiveness evaluation- knowledge based model

In this manner we get a modified model of competitiveness comprising the RBV model and the "knowledge-based" (KB) model as an addition. Such a model should explain in a better way the business success of a company.

Evaluation of competitiveness based on the previously described models is performed in a pattern of companies of Croatian beer producers (Fabac, R.: *Improvement of model for competitiveness evaluation*, 2004, disertation). This is about a suitable industry which includes several prominent competitive companies.

6.1 Research in the beer industry- competitiveness and success

Based on the data collected by means of questionnaire with almost fifty questions filled by companies' managers in the line of business (27 examinees, connoisseurs) one can see certain values of business strengths i.e. competitiveness of breweries, according to the formula of the GE-matrix&RBV and also the suggested new model.

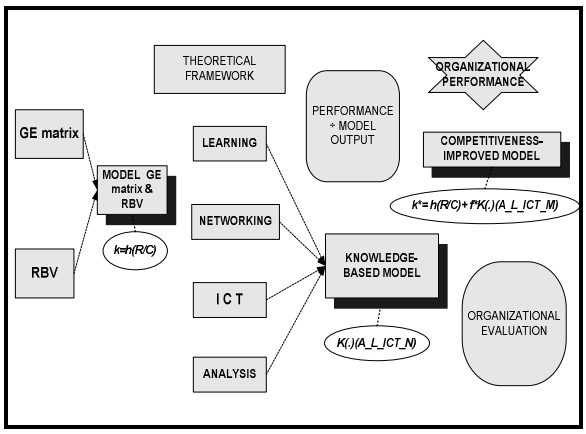

Figure 3. Framework for improvement of RBV- model for competitiveness.

The intention was to compare the obtained indicators of competitiveness of companies, according to the two models, with their actual performance. Although this is an older collected data, their treatment is topical today, for the reason of research models of firm's competitiveness are very rare, and even more rarely quantified. So here the first published results open space for new researches.

The aim of the questionnaire created was to offer possible answers to the questions regarding the state of certain organizational resources and capabilities (GE-matrix&RBV~ R/C), and additional elements of competitiveness (KB model) linked to: organizational learning, alliances and networking, the state of ICT

technologies, and practicing advanced analytical methods and procedures.

Table 1a, 1b and 1c. Breweries evaluation.

BREW.	*B1*	*B 2*	*B3*	*B4*	*B5*	*B6*
Table 1a. **GE-matrix&RBV**						
M (R/C)	5,47	7,15	8,44	7,83	9,28	6,12
Table 1b. **Knowledge-Based Model**						
Analys.	2,49	2,99	3,54	3,20	4,00	2,26
Learn.	3,17	3,00	2,53	3,79	3,87	3,08
ICT	3,11	3,59	3,73	4,08	4,36	2,68
Network.	0,00	2,95	2,38	0,38	3,78	2,62
M (A_N)	2,19	3,13	3,04	2,86	4,00	2,66
Table 1c. **Business results**						
M (BR)	1,13	3,63	5,48	2,79	9,10	2,76

Evaluation of organizational learning is made with help of theoretical frames Nevis et al. [17] and Terra [26]. While evaluating the networking and the development of alliances, we used for the most part [7] and [5]. Regarding the representation of the IC technologies, relevant questions were formed based on [30]. Contribution of [18] was universally applicable. The results of evaluation are shown in Table 1.

The research also examined the *indicators of success*, *business results*, from financial reports and accordingly the "goal function" was determined (Table 1c). This function contained equally evaluated following elements: value added, change of v.a., income, change of income, asset, profit, change of profit, profit/asset, and export/income.

Figure 4 shows the correlation of indicator of competitiveness according to the basic model RBV (evaluations from Table 1a, VAR1 in Fig. 4) and the measured business results (BR) according the "goal function" (Table 1c, VAR2 on Fig. 4) for six companies. Correlation is pretty high (r= 0.89).

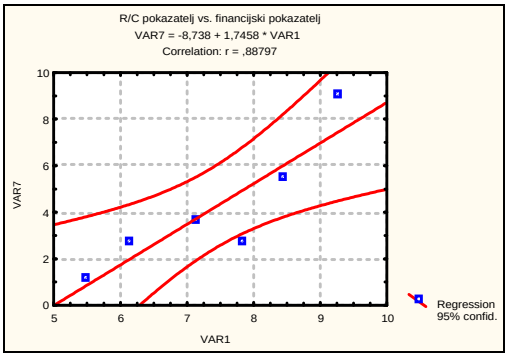

Figure 4. Fitness of GE-matrix&RBV model.

Although the correlation is high, the inclusion of additions in the form of KB model (Table 1b) allows better correlation and better congruence of actualized business results and the assessment of competitiveness (Figure 5).

Basic model RBV is improved by means of added elements of KB model (A_N) with corresponding weights (K_A, K_L, K_I, K_N) so it created a "RBV-KB" model. Correlation between the competitiveness according to RBV-KB model and business results (BR, Table 1c) is shown in Figure 5.

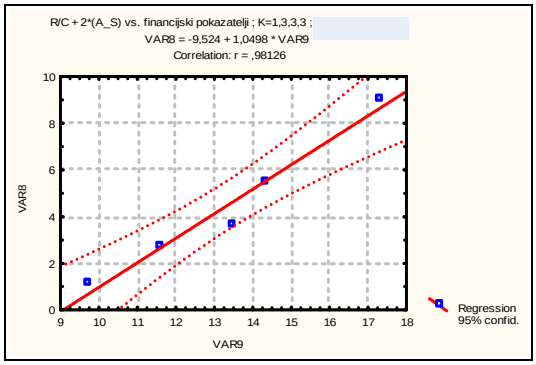

Figure 5. Fitness of *GE-matrix&RBV+KB* model.

From the set of simulations with different K-values we highlight option shown in Fig. 5, when the KB model is included with "bigger weights" for estimated KB variables (A_L_ICT_N; K: 1, 3, 3, 3; Table 1b) and added on RBV values of companies (Table 1a). Results in Fig. 5 are also with one point (brewery) excluded, and *business results* (Table 1c) are now better explained (r= 0.98).

Table 2. Correlations in the explaining of success.

Model GE-matrix&RBV	*Model GE-matrix&RBV plus KB*	
$r_{R/C}$= 0,89	$r_{K\text{-}1111}$	0,93
	$r_{K\text{-}1333}$	0.95
	$r_{K\text{-}1333\ (excl.)}$	0.98

If elements of competitiveness from Table 1b are more important in competitiveness model then model incline toward better explanation of business success (Table 2).

6.2 Competitive advantage and knowledge-management

Majority of contemporary researches is mostly directed toward establishing the influence of the practice of KM and realization of competitive advantage, than toward the evaluation of the level of competitiveness for the firms. Competitiveness is more often used in determining positions of national economies or industries. An organization's competitive advantage can be manifested in market position, mass customization, difficulties in duplicating etc. If we seek to assess how and why KM can yield competitive advantage, researches such as [14] and [1] are distinguished.

By viewing the RBV, knowledge management researchers have identified various KM related resources that serve as potential sources of competitive advantage. In the work [10], the KM infrastructure categorizes: corporate structure, leadership, IT Infrastructure, communities of practice, common knowledge and physical environment. By applying factor analysis and regressive analysis in the research [4] conducted on a great number of companies in different industries, the author showed the existence of significance for *competitive advantage*– for high levels of KM resources: structural, cultural and human.

7 Conclusions

In the contemporary society of knowledge, the real success and competitive advantage are realized by designing organizations oriented toward learning and development of key competences. Such organizations have progressive management of business processes and developed KM systems. Organizations are connected among themselves by using information technologies, and simultaneously they support their own business processes and activities of decision making and managing.

For the quantitative assessment of firm's competitiveness and competitive advantage by using the RBV prism, one should perform evaluation of valuable resources closely related with traditional business functions. But, for the companies that developing in information age, inevitably is to include evaluation of attributes of the organizational learning, the progressive ICT usage and the network structures in which participating. Models formed in such a manner can explain in a better way the firms' results, according to researches presented in this paper.

The exposed RBV-KB model for evaluation of competitiveness, with emphasis on components of KM, which was researched in the industry of beer production, should be also examined in other industries. Efforts in this direction would bring new and useful results regarding the understanding of competitiveness for the companies of 21 centuries.

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