

# Capability-Based School of Thought's Relevance and Firms's Competitive Advantage Sources

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**Abstract:** Based on a survey of 225 Slovenian companies this study analyses the sources of competitive advantage as seen by the capability-based school, examine the relationship between these sources and a firm's competitiveness and performance and, based thereon, offer a judgement on the relevance of the capability-based school.

**JEL classification:** M10

**Key words:** firm, capabilities, competitive advantage, performance

## Introduction

Firms whose primary strategic goal is long-term progress, development and success must build up some kind of competitive advantage, which means that certain sources of competitive advantage must exist. The scientific literature usually discusses four basic schools concerning the sources of competitive advantage, i.e. the industrial organisation school, the resource-based school, the capability-based school, and the knowledge-based school. After briefly reviewing the relevant theory on the capability-related sources of competitive advantage, the paper mainly involves a presentation of the empirical findings of a study of 225 Slovenian firms. By comparing the empirical evidence with theoretical findings drawn from the literature, we believe some new insights can be offered to scholars and researchers in the area of competitiveness.

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## Capability-based School on the Sources of a Firm's Competitive Advantage

### *Explaining the Origins of Competitive Advantage Through the Capability-Based School*

Advocates of the capability-based school on the sources of competitive advantage of a firm argue that a firm can win a competitive battle only if it possesses more relevant capabilities than its competitors. Competitive advantage therefore finds its source in capabilities (Collis, 1991; Day, 1994). Different authors use different expressions to describe the sources of capability-based competitive advantage. The most common expressions found in the related scientific literature are core skills (Tampoe, 1994), distinctive capabilities (Snow, Hrebiniak, 1980), organisational capabilities (Collis, 1994; Ulrich, Wiersema, 1989), organisational capital (Prescott, Visscher, 1980), dynamic capabilities (Eisenhardt, Martin, 2000; Luo, 2000), and core competencies (Prahalad, Hamel, 1990; Leonard-Barton, 1992).

In Penrose's (1959) 'The theory of the Growth of the Firm' capabilities are already mentioned as an important factor of firms' growth and development. This proves that the capability-based school at least partially takes its source in the resource-based school. The first step towards the separation between both schools set-in when the authors within the resource-based school started to neglect tangible and stress intangible resources as sources of competitive advantage. In doing so they gradually stopped using the term resources and started to talk about the capabilities/competencies. The ultimate separation between both schools happened when the literature started to discuss capabilities as sources of competitive advantage mostly on the corporate level (Stalk, Evans, Shulman, 1992; Very, 1993; Tampoe, 1994; Long, Vickers-Koch, 1995; Pučko, 2002a) instead on the strategic business unit level.

Another important turning point within the capability-based school was in 1990 when Prahalad and Hamel (1990) published their 'The Core Competence of the Corporation'. Nowadays, their approach is considered to be a significant stream within the capability-based school. The origin of competitive advantage according to this 'sub-school' can perhaps best be explained if we compare a firm with a large tree. In this case, the root system that provides nourishment, sustenance and stability is the core competence, while the trunk and major limbs are core products. These products, which invisibly connect core competencies and end products, are the physical embodiments of one or more core competencies. Out of the limbs (core products) grow smaller branches, which represent end products (Lado, Boyd, Wright, 1992) Firms must understand that in order to shape the evolution of end products it must maintain dominance in suitable core products. Similarly, if it wants to be dominant in core products it has to have unique core competencies (Prahalad, Hamel, 1990).

Many successful firms (such as Benetton, Canon, Honda, IKEA etc.) are said to have built their competitive advantages on the fact that they succeeded in creating some capabilities that their competitors did not have. Their experiences have led researchers to suggest the following basic principles of capability-based competition (Stalk, Evans, Shulman, 1992):

(1) The building blocks of corporate strategy are business processes. Firms should therefore focus above all on their business processes when formulating their strategies.

(2) Competitive success depends mostly on transforming a firm's key processes into strategic capabilities that consistently provide superior value to the customer.

(3) Firms create their capabilities by making strategic investments in a support infrastructure.

(4) (Since the capabilities on which competitive advantage can be built extend across the whole firm, the champion of any capability-based strategy must be the chief executive officer.

If a firm wants to base its competitive advantage on its capabilities several conditions must be met. Since these conditions were already discussed elsewhere (see, for example, Čater (2001)) we will not discuss them in detail again. Let us just mention that capabilities that have a potential to be a source of competitive advantage have to be valuable, heterogeneous, rare, immobile, unsubstitutable and may not be easily imitated (Zupan, 1996; Teece, 1998; Ndlela, Du Toit, 2001).

### *Classification of Capabilities as Sources of Competitive Advantage*

Although there are many different classifications of capabilities in the competitiveness-related literature (see, for example, Ulrich and Lake (1990), Henderson and Cockburn (1994), Kusunoki, Nonaka and Nagata (1998)), the classification proposed by Lado, Boyd and Wright (1992) seems to be one of the most frequent and thorough. This classification divides the capabilities into four categories:

(1) Managerial capabilities/competencies: Broadly conceived, managerial capabilities include (a) the basic managerial capabilities such as planning, organising, leading, controlling, and especially unique capabilities of a firm's strategic leaders to articulate a strategic vision, communicate the vision throughout the organisation, and empower employees to realise that vision (Lado, Wilson, 1994), (b) the unique ability to enact a beneficial firm-environmental relationship (Lado,

Wilson, 1994), and (c) the ability to respond quickly to all environmental challenges (Ahmed, Hardaker, Carpenter, 1996).

(2) Input-based capabilities/competencies: These capabilities encompass different resources, knowledge and skills that enable a firm's transformational processes to create and deliver products and services that are valued by customers. They include (a) the ability to assure sufficient and quality resources needed in the business processes (Hay, Williamson, 1991), (b) the ability to operate with minimal stocks of material (Capon, Farley, Hoening, 1990), and (c) the bargaining power of a firm relative to the bargaining power of its suppliers (Powell, 1996).

(3) Transformational capabilities/competencies: Lado and Wilson (1994) describe a firm's transformational capabilities as those capabilities required to advantageously convert inputs into outputs. These capabilities include: (a) the ability of innovation and entrepreneurship (Lengnich-Hall, 1992), (b) the ability to create a positive organizational culture (Fiol, 1991), (c) organisational learning (Pucik, 1988), and (d) the ability to master the business process as a whole (Levary, 1992; McGinnis, Vallopra, 1999), especially the ability to fully utilise a firm's (production) capacities (Capon, Farley, Hoening, 1990), the ability to master the production of core products (Prahalad, Hamel, 1990) and the logistic capabilities (Inglis, 1992).

(4) Output-based capabilities/competencies: These capabilities typically include (a) the ability of developing new and improving old products and/or services (Flynn, Flynn, 1996), (b) the ability to offer a wide variety of products and/or services in broad market, which allows a firm to exploit the effects of the economy of scope (Ghemawat, 1986; Christensen, 2001), (c) the ability to develop and preserve a high level of customer loyalty (Lado, Wilson, 1994), (d) the ability to react flexibly (Overholt, 1997; Hitt, Keats, DeMarie, 1998), (e) the beneficial effects on a firm's (local) environment (Dechant, Altman, 1994; Miles, Covin, 2000), and (f) the bargaining power of a firm relative to the bargaining power of its customers (Powell, 1996).

### *Review of the Past Empirical Research Regarding the Capability-Based School*

As far as the managerial capabilities are concerned, considerable empirical support, i.e. positive influence on a firm's competitive position (Powell, 1993) and performance (Piercy, Kaleka, Katsikeas, 1998), can be found for the ability to enact a beneficial firm-environmental relationship. The managerial capability to respond quickly to the environmental challenges is also important as it is said to have positive effects on a firm's competitive advantage (Larsen, Joynt, 1991), profitability and sales growth (Morash, Droge, Vickery, 1996). Even more empirical support than for the managerial capabilities can be found for the transformational capabilities (Li,

Lam, Qian, 1999; McGinnis, Vallopra, 1999). This support mostly relates to the innovation and organisational learning, which have positive effects on a firm's return on investment, market share and sales growth (Piercy, Kaleka, Katsikeas, 1998). In addition, a firm's ability to innovate has also positive effects on its competitive advantage (Makovec-Brenčič, Žabkar, 2001), and on return on equity (Makovec-Brenčič, 2001), earnings per share (Geroski, 1995) and labour productivity (Kotnik, Mrkaić, 2002). Droge, Vickery and Markland (1994) on the other hand believe that the largest shares of the variance of return on investment, return on sales and market share can be explained by the ability of developing new and improving old products and/or services. Similar results were also obtained by several other authors who believe that the ability of developing new products has a positive effect on a firm's competitiveness (Subramaniam, Venkatraman, 1998), return on investment, market share and sales growth (Piercy, Kaleka, Katsikeas, 1998). Finally, we should also mention a positive influence of the ability to develop and preserve a high level of customer loyalty (as an important output-based capability) on firm performance (Piercy, Kaleka, Katsikeas, 1998; McGee, Peterson, 2000). Some empirical support, although much less cogent than for other types of capabilities, can also be found for the input-based capabilities (Čater, Alfirević, 2003).

As far as the relative influence of different types of capabilities on a firm's competitive advantage and performance is concerned we have to conclude that the relevant literature offers few empirical studies on that. These insights are missing even for the firms in the market economies, while in the transitional economies they are nearly totally absent. Grosse (1992) for example ranked several potential sources of competitive advantage and found out that the managerial capabilities are more important for the creation of competitive advantage than the input-based capabilities. At the same time functional capabilities are ranked even lower than the input-based capabilities. Pučko's (2002b) research on the other hand confirmed the high importance of the managerial capabilities although the marketing (functional) capability and the ability to satisfy customers were assessed as even more important.

## **Methodological Background**

### *Research Hypotheses*

Based on the aim of this study two research hypotheses dealing with the capability-based school on the sources of competitive advantage are developed:

- H1: A firm's competitive advantage positively depends on the sources of competitive advantage discussed by the capability-based school.
- H2: Firm performance positively depends on the sources of competitive advantage discussed by the capability-based school.

### *The Sample of Firms, Collection of Data and Description of Variables*

Empirical research in this paper forms part of a broader study on the strategic behaviour and competitive advantages of Slovenian firms. Data was collected by sending questionnaires<sup>1</sup> to the Chief Executive Officers or members of the top management of randomly selected firms by post. By the end 2002, questionnaires from 225 Slovenian firms were satisfactorily completed and returned to the author, implying a response rate of 44.3%. The respondents were mostly Chief Executive Officers (36.4%), assistant managers (27.6%) or members of the top management (25.3%). In the remaining cases 10.7%, the respondents were the heads of different (mostly advisory) departments such as controlling, accounting etc. If the above structure of respondents holds true, this can be regarded as very satisfactory as in most cases the respondents were individuals who should have fluently mastered the discussed topics.

Because of the broader objectives of the research we have used stratified sampling method. The structure of firms in the sample can be shown according to several criteria:

- Legal form: public limited companies (45.3%), private limited companies (54.7%);
- Sector: manufacturing (33.3%), service (34.2%), trading (32.4%);
- Size<sup>2</sup>: large (33.3%), medium (33.3%), small (33.3%);
- Year of foundation: founded in 1989 or sooner (50.7%), founded in 1990 or later (49.3%).

Since the structure of firms in the sample, especially according to the criterion of size distribution, was quite different from the actual structure<sup>3</sup> of Slovenian firms, it cannot be said that the sample is completely representative. The reason for this primarily lies in the use of stratified sampling that was influenced by our broader goals.

Most questions in the questionnaire required an answer in the form of (dis)agreement with the offered statements. Respondents were asked to choose between five answers (a five-point Likert scale was used), where 1 means they completely disagree with the statement, whereas 5 means they completely agree with it. In this way we collected data for two groups of variables, i.e. the sources of

competitive advantage as discussed by the capability-based school and the forms of competitive advantage. Data for the third group of variables, i.e. a firm's performance, were partially collected through the questionnaire (estimations of the nonfinancial performance indicators were obtained in this way) and partly from the *Gospodarski vestnik*<sup>4</sup> (2002) database (the data needed to calculate the financial performance indicators).

In order to test the research hypotheses we need to examine how the number of points for variables representing how firms follow the 'teachings' of the capability-based school influences a firm's competitive position and performance. For this purpose, we first had to carefully study the relevant literature and, based thereon, form a list of variables that measure as accurately as possible how the lessons within the capability-based school are followed by Slovenian firms. Based on these basic variables, the compounded variables (constructs) were then calculated. The formation of these constructs was carried out by calculating unweighted<sup>5</sup> means from the basic variables. The total estimation of the capability-based school was for example calculated as a mean from all individual types of capabilities and the characteristics of these capabilities (see Table 1).

In order to carry out an empirical analyses we also had to group the firms according to their prevailing form of competitive advantage<sup>6</sup>. We created four groups of firms, namely 'firms without a competitive advantage', 'firms with mostly a price advantage', 'firms with mostly a differentiation advantage', and 'firms with a simultaneous price and differentiation advantage'. A firm was said to have a competitive advantage (48.0% of firms) if its competitive position was estimated as positive (at least +1 on the -5 to +5 scale), if its competitive advantage lasted at least a month and if at least one of the forms of competitive advantage was estimated as being very strong (at least 4 on the 1 to 5 scale), while the remaining forms of competitive advantage were not estimated as nonexistent (at least 2 on the 1 to 5 scale). If all of these conditions were not fulfilled, a firm was said to be 'without a competitive advantage' (52.0% of firms). Firms with a competitive advantage were further divided according to their prevailing form. Firms that estimated price advantage higher than differentiation advantage were labelled 'firms with mostly a price advantage' (12.4% of firms), firms that estimated differentiation advantage higher than price advantage were labelled 'firms with mostly a differentiation advantage' (19.6% of firms), while firms with equal estimations of price and differentiation advantage were labelled 'firms with a simultaneous price and differentiation advantage' (16.0% of firms).

The third group of variables consists of different performance indicators. We used several financial and nonfinancial indicators. As for the financial performance indicators, firms were asked to provide the data needed to calculate: (1) return on equity; (2) return on assets; (3) return on sales; (4) revenues-to-expenses ratio; (5)

sales-to-operating-expenses ratio; and (6) value added per employee. They were also asked to provide data on several nonfinancial performance indicators, namely: (1) percentage of loyal customers; (2) percentage of loyal suppliers; (3) turnover (of staff); (4) share of expenses on training and education; (5) share of expenses on research and development; and (6) percentage of reclaimed deliveries. The data for all performance indicators were collected for the period between 2000 and 2002. We then used these figures to calculate a three-year unweighted mean<sup>7</sup> for each indicator. These means were then used in all statistical analyses instead of individual annual indicators.

## Empirical Findings and Discussion

In our study we first wanted to find out how the firms estimate the importance of the sources of competitive advantage within the capability-based school. The results (see Table 1) show that firms on average ascribed the most points to the variables representing the output-based capabilities (Mean = 3.69), the transformational capabilities (Mean = 3.56), the managerial capabilities (Mean = 3.33) and the imperfect imitability of capabilities (Mean = 3.38). All other variables, i.e. the input-based capabilities and the characteristics of capabilities other than imitability, received considerably lower estimates of importance. Among several individual capabilities (which were also studied but are not shown in Table 1) the ability to develop and preserve a high level of customer loyalty (Mean = 3.80), the ability to innovate (Mean = 3.71), permanent organizational learning (Mean = 3.64) and the ability to be flexible in satisfying customers' needs (Mean = 3.62) were ascribed the most points.

Table 1: The Relevance of Capabilities and their Characteristics in Slovenian Firms

Capabilities and their characteristics		Mean	St. deviation
a)	Managerial capabilities	3.33	1.10
b)	Input-based capabilities	2.91	0.96
c)	Transformational capabilities	3.56	1.07
d)	Output-based capabilities	3.69	1.04
e)	Value of capabilities	2.06	0.93
f)	Heterogeneity of capabilities	2.11	0.90
g)	Rareness of capabilities	2.94	1.15
h)	Durability of capabilities	2.06	0.93
i)	Unsubstitutability of capabilities	2.84	1.14
j)	Immobility of capabilities	2.89	1.12
k)	Imperfect imitability of capabilities	3.38	1.02



### *The Connection between the Sources and Forms of Competitive Advantage*

In the first research hypothesis we examine the reasonableness of the capability-based school on the sources of competitive advantage. One possible approach here is to calculate the influence of the total estimation of this school as well as individual sources of competitive advantage within it (independent variables) on a firm's competitive advantage (dependent variable). If the independent variables are metric and the dependent one is nonmetric a discriminant analysis can be used in order to determine whether or not the value of an independent variable has a statistically significant influence on the value of a dependent variable. The calculated values of the Wilks' lambdas and their levels of significance ( $\alpha$ ) (see Discriminant analysis 1 in Table 2) reveal that, based on the total estimation of the capability-based school, we can make a statistically significant ( $\alpha < 0.001$ ) judgement as to whether a firm has a competitive advantage. With regard to individual sources of competitive advantage it can also be concluded that they have a statistically significant ( $\alpha < 0.001$ ) influence on the existence of a firm's competitive advantage. This conclusion is also supported by the calculated canonical correlation coefficients, which are highest (they exceed 0.5) in the case of the imperfect imitability of capabilities ( $R = 0.628$ ), the total characteristics of capabilities ( $R = 0.550$ ), the transformational capabilities ( $R = 0.518$ ) and the output-based capabilities ( $R = 0.508$ ).

A similar but more detailed analysis can be carried out when the dependent variable has four possible values, i.e. firms without a competitive advantage, firms with mostly a price advantage, firms with mostly a differentiation advantage, and firms with a simultaneous price and differentiation advantage. The calculated values of the Wilks' lambdas and their levels of significance ( $\alpha$ ) (see Discriminant analysis 2 in Table 2) again reveal that, based on the total estimation of the capability-based school as well as on the estimations of all individual sources of competitive advantage within it, we can make a statistically significant ( $\alpha < 0.001$ ) judgement on the type of a firm's competitive advantage. Also in support of this conclusion are the calculated canonical correlation coefficients, which again are highest (they exceed 0.5) in the case of the imperfect imitability of capabilities ( $R = 0.639$ ), the total characteristics of capabilities ( $R = 0.558$ ), the transformational capabilities ( $R = 0.535$ ) and the output-based capabilities ( $R = 0.513$ ).

Table 2: Examination of the Influence of the Total Estimation of the Capability-Based School and Individual Sources of Competitive Advantage within this School on the Forms of Competitive Advantage Using the Discriminant Analysis

Independent variable (X) = Total estimation of the capability-based school and individual sources of comp. adv. within this school	Aver. of X		Discrim. analysis 1		Average of X				Discrim. analysis 2	
	Y = no comp. adv.	Y = comp. adv.	Wilks $\lambda$ ( $\alpha$ )	Can onical cor rel. coef.	Y = no comp. adv.	Y = lower price	Y = dif erentiat.	Y = simult. comp. adv.	Wilks $\lambda$ ( $\alpha$ )	Can onical cor rel. coef.
Capability-based school	2.51	3.29	0.682 (0.000)	0.564	2.51	3.19	3.28	3.39	0.676 (0.000)	0.569
Managerial capabilities	2.98	3.71	0.857 (0.000)	0.379	2.98	3.47	3.63	3.99	0.834 (0.000)	0.407
Input-based capabilities	2.64	3.05	0.933 (0.000)	0.258	2.64	3.10	2.99	3.07	0.932 (0.001)	0.26 1
Transformat. capabilities	2.98	3.92	0.732 (0.000)	0.518	2.98	3.64	3.96	4.09	0.714 (0.000)	0.535
Output-based capabilities	3.05	3.93	0.742 (0.000)	0.508	3.05	3.78	3.94	4.02	0.737 (0.000)	0.513
Characteristics of capabil.	2.19	2.98	0.698 (0.000)	0.550	2.19	2.86	2.95	3.12	0.689 (0.000)	0.558
Imperf. imitab. of capabil.	2.57	3.64	0.605 (0.000)	0.628	2.57	3.49	3.56	3.83	0.592 (0.000)	0.639

Although based on the discriminant analysis we can reach a conclusion on hypothesis 1., this hypothesis can be further verified by using metric independent and dependent variables. Here, the values of dependent variables, i.e. the strengths of different forms of competitive advantage, are directly defined by the managers' answers, which is another advantage over the analyses presented in the previous paragraphs. The fact that both groups of variables (independent and dependent) are metric allows us to further verify hypothesis 1. by using the univariate (linear) regression analysis. The results (see Table 3) show that the strength of a firm's competitive advantage is positively dependent on the total estimation of the capability-based school as well as on the estimations of all individual sources of competitive advantage within this school ( $\alpha < 0.001$ ). By the total estimation of the capability-based school we can explain a considerable share (44.7%) of variance of the strength of a firm's competitive advantage. Of all studied sources of competitive advantage, the greatest share of variance of the strength of a firm's competitive

advantage can be explained by the imperfect imitability of capabilities (52.5%) and the transformational capabilities (41.1%). The results regarding both basic forms of competitive advantage, i.e. lower price and differentiation, are very similar as both forms of competitive advantage are again positively dependent on the total estimation of the capability-based school as well as on the estimations of all individual sources of competitive advantage within this school ( $\alpha < 0.001$ ). Based on both statistical methods, namely the discriminant and regression analyses, we can conclude that hypothesis 1. can be confirmed, as a firm's competitive advantage indeed does positively depend on the sources of competitive advantage discussed by the capability-based school.

Table 3: Examination of the Influence of the Total Estimation of the Capability-Based School and Individual Sources of Competitive Advantage within this School on the Forms of Competitive Advantage Using the Univariate (Linear) Regression Analysis

Dependent var. (Y) = Form of competitive advantage		Independent var. (X) = Sources of comp. adv. within the capability-based school						
		Capability school	Manager. capabilities	Inp.-based capabilities	Transform. capabilities	Out.-based capabilities	Charact. of capabilities	Imperfect imitability
Total	R <sup>2</sup>	0.447 <sup>(*)</sup>	0.246 <sup>(*)</sup>	0.145 <sup>(*)</sup>	0.411 <sup>(*)</sup>	0.375 <sup>(*)</sup>	0.384 <sup>(*)</sup>	0.525 <sup>(*)</sup>
	$\alpha$	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lower price	R <sup>2</sup>	0.341 <sup>(*)</sup>	0.164 <sup>(*)</sup>	0.157 <sup>(*)</sup>	0.264 <sup>(*)</sup>	0.269 <sup>(*)</sup>	0.291 <sup>(*)</sup>	0.411 <sup>(*)</sup>
	$\alpha$	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Differentiation	R <sup>2</sup>	0.445 <sup>(*)</sup>	0.260 <sup>(*)</sup>	0.122 <sup>(*)</sup>	0.439 <sup>(*)</sup>	0.384 <sup>(*)</sup>	0.384 <sup>(*)</sup>	0.516 <sup>(*)</sup>
	$\alpha$	0.000	0.000	0.000	0.000	0.000	0.000	0.000

In our investigation we also examined the relative influence of the studied sources of capability-based advantage on a firm's competitive position. If the independent variables are metric and the dependent one is nonmetric a discriminant analysis<sup>8</sup> with several independent variables can be used. The results (see Discriminant analysis 1 in Table 4) show that where the dependent variable has two possible values, i.e. firms without a competitive advantage and firms with a competitive advantage, only two independent variables enter the model. In step 1, the variable representing the imperfect imitability of capabilities is entered, while in step 2 the variable representing the transformational capabilities is entered. As the dependent variable has only two possible values we only deal with one discriminant function. Almost without any risk ( $\alpha < 0.001$ ) we can conclude that this function is able to distinguish between both groups of firms (i.e. both values of the dependent variable). The calculated canonical correlation coefficients ( $R = 0.659$  and  $0.669$ ) show that the contribution of the second independent variable (the transformational capabilities) to

the strength of the relationship between the dependent and independent variables is relatively weak.

If the dependent variable has four possible values, i.e. firms without a competitive advantage, firms with mostly a price advantage, firms with mostly a differentiation advantage, and firms with a simultaneous price and differentiation advantage, an additional question about the number of discriminant functions rises and this makes the analysis more complex. Again two independent variables are entered in the model, in step 1 the variable representing the imperfect imitability of capabilities and in step 2 the variable representing the transformational capabilities. The results (see Discriminant analysis 2 in Table 4) show where both independent variables are in the model it is reasonable to use only one discriminant function as it contains 98.5% of the variance of both independent variables, whereas the second discriminant function contains only 1.5% of the variance. If we ignore the second discriminant function the results of this analysis, i.e. the values of Wilks' lambda ( $\lambda = 0.568$ ) and canonical correlation coefficient ( $R = 0.653$ ), are almost identical to the results of the analysis with only two possible values of the dependent variable. Based on both analyses we can conclude that a firm's competitive advantage depends mostly on the imperfect imitability of capabilities and the transformational capabilities.

Table 4: Examination of the Influence of the Sources of Competitive Advantage within the Capability-Based School on the Forms of Competitive Advantage Using the Discriminant Analysis

Independent variable (X) = Sources of comp. adv. within the capability-based school	Aver. of X		Discrim. analysis 1		Average of X				Discrim. analysis 2		
	Y = no comp. adv.	Y = comp. adv.	Wilks' $\lambda$ ( $\alpha$ )	Canonical cor. rel. coef.	Y = no comp. adv.	Y = lower price	Y = differentiation	Y = simultaneous comp. adv.	Wilks' $\lambda$ ( $\alpha$ )	Explained var. (%)	Canonical cor. rel. coef.
Imperf. imit. of capabil.	2.57	3.64	0.605 (0.000)	0.628	2.57	3.49	3.56	3.83	0.592 (0.000)	100.0	0.639
Imperf. imit. of capabil., transform. capabilities	2.57	3.64	0.590 (0.000)	0.641	2.57	3.49	3.56	3.83	0.568 (0.000)	98.5	0.653
	2.98	3.92			2.98	3.64	3.96	4.09	0.989 (0.293)	1.5	0.105

The relative influence of the studied sources of capability-based advantage on a firm's competitive position can be additionally verified by using metric independent and dependent variables, which means the partial correlation analysis can be used. This analysis differs from the bivariate correlation analysis in that it excludes the

disturbing influence of all other variables when calculating the relationship between two variables. The results (see Table 5) show that the imperfect imitability of capabilities has the largest positive influence on all forms of competitive advantage (the coefficients of partial correlation are between 0.310 and 0.356). For all other studied sources of competitive advantage (except the transformational capabilities) this influence is no longer statistically significant ( $\alpha > 0.05$ ) as also indicated by the low values of the coefficients of partial correlation (approximately between 0 and 0.1). Based on both statistical methods, namely the discriminant and partial correlation analyses, we can conclude that different sources of competitive advantage within the capability-based school have a relatively different influence on a firm's competitive advantage and its two basic forms. The most relevant seem to be the imperfect imitability of capabilities and the transformational capabilities. The relative influence of all other sources is much smaller. Based on the results of the partial correlation analysis the input-based capabilities take third place, the managerial capabilities fourth place, the output-based capabilities fifth place and the total characteristics of capabilities sixth place.

Table 5: Examination of the Influence of the Sources of Competitive Advantage within the Capability-Based School on the Forms of Competitive Advantage Using the Partial Correlation Analysis

Dependent var. (Y) = Form of competitive advantage		Independ. var. (X) = Sources of comp. adv. within the capabil.-based school					
		Manager. capabilities	Inp.-based capabilities	Transform. capabilities	Out.-based capabilities	Charact. of capabilities	Imperfect imitability
Total	Part. R <sup>(rank)</sup>	0.037 <sup>(4)</sup>	-0.038 <sup>(3)</sup>	0.183 <sup>(2)</sup>	0.029 <sup>(5)</sup>	0.012 <sup>(6)</sup>	0.356 <sup>(1)</sup>
	$\alpha$	0.589	0.577	0.007	0.668	0.856	0.000
Lower price	Part. R <sup>(rank)</sup>	0.003 <sup>(6)</sup>	0.062 <sup>(3)</sup>	0.084 <sup>(2)</sup>	0.019 <sup>(4)</sup>	-0.010 <sup>(5)</sup>	0.310 <sup>(1)</sup>
	$\alpha$	0.967	0.359	0.215	0.778	0.879	0.000
Differentiation	Part. R <sup>(rank)</sup>	0.052 <sup>(4)</sup>	-0.091 <sup>(3)</sup>	0.216 <sup>(2)</sup>	0.031 <sup>(5)</sup>	0.024 <sup>(6)</sup>	0.342 <sup>(1)</sup>
	$\alpha$	0.446	0.177	0.001	0.647	0.724	0.000

### *The Connection between the Sources of Competitive Advantage and a Firm's Performance*

The second hypothesis examines the reasonableness of the capability-based school by testing the direct influence of the total estimation of this school and individual sources of competitive advantage within it on a firm's performance. The fact that both groups of variables (independent and dependent) are metric allows us to use the univariate (linear) regression analysis. The results (see Table 6) show that the total estimation of the capability-based school as well as all individual sources of

competitive advantage within this school have a positive influence on most performance indicators, except on turnover and the percentage of reclaimed deliveries (which was fully expected since smaller turnover and less reclaimed deliveries mean better performance). In spite of all that, relatively small shares of variance of financial (between 15 and 25%) and nonfinancial (between 5 and 15%) performance indicators can be explained by the total estimation of the capability-based school. Of all studied sources of competitive advantage, the greatest shares of variance of most performance indicators can be explained by the imperfect imitability of capabilities, the transformational capabilities and the output-based capabilities. Based on the above discussion, we can conclude that **hypothesis 2** can be **confirmed**, as a firm's performance indeed does positively depend on the sources of competitive advantage discussed by the capability-based school.

Table 6: Examination of the Influence of the Total Estimation of the Capability-Based School and Individual Sources of Competitive Advantage within this School on Firm Performance Using the Univariate (Linear) Regression Analysis

Dependent variable (Y) = Firm performance		Independent var. (X) = Sources of comp. adv. within the capability-based school						
		Capability school	Manager. capabilities	Inp.-based capabilities	Transfor. capab.	Out.-based capab.	Charact. of capab.	Imperfect imitability
Return on equity	R <sup>2</sup>	0.217 <sup>(+)</sup>	0.177 <sup>(+)</sup>	0.026 <sup>(+)</sup>	0.227 <sup>(+)</sup>	0.177 <sup>(+)</sup>	0.182 <sup>(+)</sup>	0.272 <sup>(+)</sup>
	α	0.000	0.000	0.015	0.000	0.000	0.000	0.000
Return on assets	R <sup>2</sup>	0.264 <sup>(+)</sup>	0.189 <sup>(+)</sup>	0.053 <sup>(+)</sup>	0.258 <sup>(+)</sup>	0.201 <sup>(+)</sup>	0.215 <sup>(+)</sup>	0.335 <sup>(+)</sup>
	α	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Return on sales	R <sup>2</sup>	0.256 <sup>(+)</sup>	0.166 <sup>(+)</sup>	0.107 <sup>(+)</sup>	0.292 <sup>(+)</sup>	0.258 <sup>(+)</sup>	0.190 <sup>(+)</sup>	0.331 <sup>(+)</sup>
	α	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Revenue-to-expenses ratio	R <sup>2</sup>	0.188 <sup>(+)</sup>	0.120 <sup>(+)</sup>	0.079 <sup>(+)</sup>	0.224 <sup>(+)</sup>	0.193 <sup>(+)</sup>	0.142 <sup>(+)</sup>	0.257 <sup>(+)</sup>
	α	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sales-to-operating-expenses ratio	R <sup>2</sup>	0.191 <sup>(+)</sup>	0.140 <sup>(+)</sup>	0.087 <sup>(+)</sup>	0.203 <sup>(+)</sup>	0.177 <sup>(+)</sup>	0.138 <sup>(+)</sup>	0.232 <sup>(+)</sup>
	α	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Value added per employee	R <sup>2</sup>	0.143 <sup>(+)</sup>	0.130 <sup>(+)</sup>	0.052 <sup>(+)</sup>	0.143 <sup>(+)</sup>	0.132 <sup>(+)</sup>	0.096 <sup>(+)</sup>	0.171 <sup>(+)</sup>
	α	0.000	0.000	0.001	0.000	0.000	0.000	0.000
Percentage of loyal customers	R <sup>2</sup>	0.080 <sup>(+)</sup>	0.043 <sup>(+)</sup>	0.031 <sup>(+)</sup>	0.080 <sup>(+)</sup>	0.054 <sup>(+)</sup>	0.056 <sup>(+)</sup>	0.070 <sup>(+)</sup>
	α	0.000	0.002	0.008	0.000	0.000	0.000	0.000
Percentage of loyal suppliers	R <sup>2</sup>	0.034 <sup>(+)</sup>	0.014 <sup>(+)</sup>	0.004 <sup>(+)</sup>	0.035 <sup>(+)</sup>	0.027 <sup>(+)</sup>	0.024 <sup>(+)</sup>	0.031 <sup>(+)</sup>
	α	0.005	0.076	0.344	0.005	0.014	0.021	0.008
Turnover (of staff)	R <sup>2</sup>	0.145 <sup>(-)</sup>	0.071 <sup>(-)</sup>	0.041 <sup>(-)</sup>	0.066 <sup>(-)</sup>	0.081 <sup>(-)</sup>	0.148 <sup>(-)</sup>	0.174 <sup>(-)</sup>
	α	0.000	0.000	0.002	0.000	0.000	0.000	0.000
Share of expenses for training	R <sup>2</sup>	0.121 <sup>(+)</sup>	0.074 <sup>(+)</sup>	0.012 <sup>(+)</sup>	0.120 <sup>(+)</sup>	0.106 <sup>(+)</sup>	0.129 <sup>(+)</sup>	0.152 <sup>(+)</sup>
	α	0.000	0.000	0.103	0.000	0.000	0.000	0.000

Share of expenses for R&D	R <sup>2</sup>	0.109 <sup>(+)</sup>	0.042 <sup>(+)</sup>	0.031 <sup>(+)</sup>	0.085 <sup>(+)</sup>	0.078 <sup>(+)</sup>	0.095 <sup>(+)</sup>	0.147 <sup>(+)</sup>
	$\alpha$	0.000	0.002	0.008	0.000	0.000	0.000	0.000
Percentage of reclaimed deliveries	R <sup>2</sup>	0.141 <sup>(-)</sup>	0.077 <sup>(-)</sup>	0.027 <sup>(-)</sup>	0.153 <sup>(-)</sup>	0.159 <sup>(-)</sup>	0.113 <sup>(-)</sup>	0.172 <sup>(-)</sup>
	$\alpha$	0.000	0.000	0.014	0.000	0.000	0.000	0.000

Table 7: Examination of the Influence of the Sources of Competitive Advantage within the Capability-Based School on Firm Performance Using the Partial Correlation Analysis

Dependent variable (Y) = Firm performance		Independ. var. (X) = Sources of comp. adv. within the capabil.-based school					
		Manag. capab.	Inp.-based capab.	Transform. capab.	Out.-based capab.	Charact. of capab.	Imperfect imitability
Return on equity	Part. R <sup>(rank)</sup>	0.119 <sup>(3)</sup>	-0.166 <sup>(2)</sup>	0.117 <sup>(4)</sup>	0.002 <sup>(6)</sup>	-0.032 <sup>(5)</sup>	0.257 <sup>(1)</sup>
	$\alpha$	0.079	0.014	0.083	0.982	0.638	0.000
Return on assets	Part. R <sup>(rank)</sup>	0.098 <sup>(4)</sup>	-0.103 <sup>(3)</sup>	0.148 <sup>(2)</sup>	-0.040 <sup>(6)</sup>	-0.056 <sup>(5)</sup>	0.309 <sup>(1)</sup>
	$\alpha$	0.148	0.127	0.029	0.558	0.411	0.000
Return on sales	Part. R <sup>(rank)</sup>	0.033 <sup>(4)</sup>	0.018 <sup>(5)</sup>	0.168 <sup>(2)</sup>	0.014 <sup>(6)</sup>	-0.130 <sup>(3)</sup>	0.299 <sup>(1)</sup>
	$\alpha$	0.628	0.795	0.013	0.841	0.054	0.000
Revenue-to-expenses ratio	Part. R <sup>(rank)</sup>	0.010 <sup>(5)</sup>	0.011 <sup>(4)</sup>	0.147 <sup>(2)</sup>	0.002 <sup>(6)</sup>	-0.119 <sup>(3)</sup>	0.266 <sup>(1)</sup>
	$\alpha$	0.886	0.875	0.029	0.977	0.079	0.000
Sales-to-operating-expenses ratio	Part. R <sup>(rank)</sup>	0.077 <sup>(4)</sup>	0.046 <sup>(5)</sup>	0.130 <sup>(2)</sup>	-0.012 <sup>(6)</sup>	-0.087 <sup>(3)</sup>	0.213 <sup>(1)</sup>
	$\alpha$	0.258	0.494	0.055	0.854	0.198	0.001
Value added per employee	Part. R <sup>(rank)</sup>	0.124 <sup>(2)</sup>	-0.001 <sup>(6)</sup>	0.065 <sup>(4)</sup>	0.018 <sup>(5)</sup>	-0.093 <sup>(3)</sup>	0.190 <sup>(1)</sup>
	$\alpha$	0.067	0.991	0.339	0.794	0.171	0.005
Percentage of loyal customers	Part. R <sup>(rank)</sup>	0.023 <sup>(5)</sup>	0.057 <sup>(3)</sup>	0.138 <sup>(1)</sup>	-0.064 <sup>(2)</sup>	0.016 <sup>(6)</sup>	0.051 <sup>(4)</sup>
	$\alpha$	0.731	0.404	0.041	0.347	0.820	0.456
Percentage of loyal suppliers	Part. R <sup>(rank)</sup>	-0.013 <sup>(4)</sup>	-0.042 <sup>(3)</sup>	0.065 <sup>(1)</sup>	0.006 <sup>(6)</sup>	0.007 <sup>(5)</sup>	0.054 <sup>(2)</sup>
	$\alpha$	0.853	0.540	0.341	0.927	0.916	0.426
Turnover (of staff)	Part. R <sup>(rank)</sup>	-0.046 <sup>(4)</sup>	0.041 <sup>(5)</sup>	-0.062 <sup>(3)</sup>	-0.030 <sup>(6)</sup>	-0.076 <sup>(2)</sup>	-0.179 <sup>(1)</sup>
	$\alpha$	0.498	0.545	0.357	0.661	0.261	0.008
Share of expenses for training	Part. R <sup>(rank)</sup>	0.020 <sup>(6)</sup>	-0.148 <sup>(1)</sup>	0.048 <sup>(4)</sup>	0.047 <sup>(5)</sup>	0.062 <sup>(3)</sup>	0.139 <sup>(2)</sup>
	$\alpha$	0.772	0.029	0.475	0.487	0.359	0.040
Share of expenses for R&D	Part. R <sup>(rank)</sup>	-0.038 <sup>(3)</sup>	-0.033 <sup>(4)</sup>	0.048 <sup>(2)</sup>	-0.004 <sup>(6)</sup>	-0.024 <sup>(5)</sup>	0.210 <sup>(1)</sup>
	$\alpha$	0.574	0.625	0.482	0.959	0.729	0.002
Percentage of reclaimed deliveries	Part. R <sup>(rank)</sup>	0.010 <sup>(6)</sup>	0.120 <sup>(2)</sup>	-0.042 <sup>(4)</sup>	-0.118 <sup>(3)</sup>	0.037 <sup>(5)</sup>	-0.184 <sup>(1)</sup>
	$\alpha$	0.881	0.075	0.539	0.081	0.581	0.006

In our study we also examined the relative influence of the observed capability-related sources of competitive advantage on a firm's performance. Since

both groups of variables (independent and dependent) are metric, probably the best approach here is by using a partial correlation analysis. The results (see Table 7) show that the imperfect imitability of capabilities has the largest positive influence on most performance indicators. The second largest effect on most performance indicators can be detected for the transformational capabilities. For all other studied sources of competitive advantage this influence is no longer statistically significant ( $\alpha > 0.05$ ) as also indicated by the low values of the coefficients of partial correlation (approximately between 0 and 0.1). Based on the partial correlation analysis we can conclude that different sources of competitive advantage within the capability-based school have a relatively different influence on a firm's performance. The most relevant seem to be the imperfect imitability of capabilities and the transformational capabilities, while the relative influence of all other studied sources of competitive advantage cannot be precisely defined as the ranks of their coefficients of partial correlation differ among different performance indicators.

## Conclusion

By using different statistical methods several important conclusions concerning the relevance of the capability-based school on the sources of a firm's competitive advantage have been reached. These conclusions can be summarised as follows:

- Slovenian firms believe that the transformational and output-based capabilities are the most relevant for creating a firm's competitive advantage. Among different characteristics of capabilities the most relevant and desirable seems to be their imperfect imitability.
- Based on discriminant and regression analyses it is concluded that the more firms follow the teachings of the capability-based school the greater competitive advantage (hypothesis 1 confirmed) and performance (hypothesis 2 confirmed) they achieve.
- Based on discriminant and partial correlation analyses it is to be concluded that among all individual sources of competitive advantage within the capability-based school the imperfect imitability of capabilities and the transformational capabilities have the largest influence on a firm's competitive advantage and performance.

Our findings generally confirm the findings of most empirical research on the sources of competitive advantage within the capability-based school that has so far been carried out in both transitional economies and established market economies. Non the less, we have to mention that this holds true above all for the individual



sources of competitive within the capability-based school while an objective comparison of the relative influence of different types of capabilities on a firm's competitive advantage and performance is almost impossible. The reason for this lies primarily in the fact that similar studies are missing even for the firms in the market economies, while in the transitional economies they are nearly totally absent. In this respect, we can conclude that the value of our study is twofold. On the one hand our research might represent further support of the contemporary theory on firm competitiveness, which teaches us that the 'internal' sources of competitive advantage (such as capabilities) are extremely relevant and important for the creation of competitive advantage and superior performance. On the other hand, we believe our research also enhances our understanding of the capability-based theory on the potential sources of a firm's competitive advantage by offering some new insights that were probably never studied as completely and thoroughly before.

Irrespective of the findings of this research, its possible weaknesses should also be mentioned. Perhaps the most important weakness lies in the fact that real sources of competitive advantage are usually well hidden, making it impossible for a researcher to measure them completely objectively. For this reason, we had to use managers' relatively subjective assessments of the basic sources and forms of competitive (dis)advantage of their firms. This weakness might be partially avoided by personally interviewing managers and/or by observing each firm over a longer period of time. Another possible weakness is the use of stratified sampling. The consequence is that the sample is not completely representative, meaning the conclusions cannot be automatically extrapolated for all Slovenian firms.

## NOTES

<sup>1</sup> On consultation with leading Slovenian professors of management (in order to assure maximal reasonableness and validity) the questionnaire was designed by the author.

<sup>2</sup> The size of the firms in Slovenia (as well as in this research) is statutorily defined. Small firms are those that meet at least two of the following three conditions: (1) average number of employees in the last year does not exceed 50, (2) sales in the last year do not exceed 1 billion SIT, and (3) average assets in the last year do not exceed 0.5 billion SIT. Medium-sized firms are those that are not small and meet at least two of the following three conditions: (1) average number of employees in the last year does not exceed 250, (2) sales in the last year do not exceed 4 billion SIT, and (3) average assets in the last year do not exceed 2 billion SIT. Firms that cannot be defined as small or medium-sized are large firms (Zakon o gospodarskih družbah (ZDG-F), 2001).

<sup>3</sup> The actual structure of Slovenian firms shows that at the end of 2001 there were 83.2% of private limited companies, 8.2% were general partnerships, 2.6% were public limited companies, while the remaining firms (6.0%) involved other legal forms. With regard to the sectors involved, 17.4% of firms were in the manufacturing sector, 45.4% were in the service sector, while 37.2% were in the trading

sector. From the aspect of size, there were 95.0% of small firms, 4.1% of medium-sized firms, and only 0.9% of large firms (Statistical Yearbook of the Republic of Slovenia, 2002).

<sup>4</sup> Gospodarski vestnik is a leading Slovenian business newspaper publisher.

<sup>5</sup> Unweighted means were calculated because we were unable to determine different weights for every variable in an objective way (for example, based on the study of the relevant literature).

<sup>6</sup> Since any discussion about the forms of competitive advantage is more reasonable at the strategic business unit (SBU) level than the corporate level, respondents were asked to take this fact into account. Where a firm was diversified enough to say it has at least two SBUs, respondents were asked to provide answers for the most important SBU. On the other hand, if a firm as a whole was a single SBU respondents were asked to provide answers for the firm as a whole.

<sup>7</sup> The measurement of firm performance based on three-year means was necessary to avoid the influence of unique and random events. At the same time, the measurement of firm performance over several years follows the logic of competitive advantage that is said to be a long-term phenomenon.

<sup>8</sup> The 'stepwise' method and the criterion of Wilks' lambda are used to determine the sequence of independent variables that meet the conditions for entering the model.

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