

INNOVATION AND INFORMATION TECHNOLOGY CAPABILITY AS ANTECEDENTS OF FIRMS' SUCCESS

Lejla Turulja* and Nijaz Bajgorić

The School of Economics and Business Sarajevo
Sarajevo, Bosnia and Herzegovina

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ABSTRACT

The primary aim of this article is to identify antecedents of firm's success in specific circumstances of the New economy. Many researchers have tried to answer the question "Why do some firms persistently outperform others?". One of the most dominant view on this issue is a resource based view (RBV) or resource-based theory (RBT). According to this theory, sources of competitive advantage begin with the notion that differences in performance are fundamentally due to the distinctive resources and capabilities that are valuable, rare, inimitable and non-substitutable. Information technology as a resource of the company has the increasing importance for the researches and managers. Research on the information technology (IT) value within organizations and firms' IT capabilities have expanded over the past decade. IT capability is defined as the existence of IT infrastructure, IT knowledge and IT operations within company. The purpose of this paper is to analyse the interaction impact of IT capability and firms' innovation on business performance. The study uses survey data from managers and structural equation modelling to assess the relationships between IT capability, firm's innovation and business performance. This study finds that both IT capability and innovation capability play important role in achieving greater business performance. The findings indicate that managers should focus on development of the IT function within company, taking into account importance of IT investment as well as IT knowledge, and promotion of innovativeness.

KEY WORDS

information technology capability, innovation, resource based view, business performance

CLASSIFICATION

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*Corresponding author, *η*: lejla.turulja@efsa.unsa.ba; +387 61 990 788;
The School of Economics and Business Sarajevo, Trg oslobođenja – Alija Izetbegović 1, Sarajevo, BiH

INTRODUCTION

Many scholars have tried to answer the question “Why do some firms persistently outperform others?” [1]. One of the approaches to answering this question began to dominate this discussion and it focused on what were known as a firm’s distinctive competencies and capabilities. “Distinctive competencies are those attributes of a firm that enable it to pursue a strategy more efficiently and effectively than other firms” [1]. This discussion led to the development of the several theories and approaches of which one of the most prominent is resource based theory [1-3]. Resource based theory (RBV) suggests that resources enable achievement of competitive advantage. Barney and Clark [4] have identified four characteristics of resources essential for gaining sustainable competitive advantage, namely, value, rarity, imperfect imitability, and organized to capture value, known as the VRIO framework. They classified firm resources into four categories: physical capital resources, financial capital resources, human capital resources and organizational capital resources.

In the age of globalization and intense competition, one of the most important resource is information technology (IT) used in a firm, which is a part of physical capital resources. Specifically, there are two main trends of the New economy: trend of globalization and exponential development of information technology [5]. Many scholars have new perspective of firms’ resources pointing out that in modern business, which is characterized by rapid and dynamic changes, the achievement of a successful business and competitive advantage is only possible if firms apply their abilities faster and more wisely than its competitors. In other words, firms’ resource base must be constantly improved and expanded in order to create the dynamic capabilities which are the basis for competitive advantage and a successful business of modern age. In order to answer the main question of this study, and taking care about the theoretical assumptions of the paper, we identified two basic resources typical for modern business: IT capability and innovativeness capability.

IT is a generic term that refers to programs, computers and telecommunications while IT capability is a broader term and refers to the use of these technologies in order to meet the information needs of the company [6, 7]. Also, globalization pressures and rapid technology advances increase the need for firms to continuously adapt, improve, and innovate. Firms with greater innovativeness will be more successful in responding to changing environments and developing new capacities to achieve better performance [8]. The purpose of this article is to analyse the impact of IT capability and firms’ innovation on business performance.

This article is structured as follows. First, we analyse the concepts of IT capability and innovation. We then propose and test hypotheses about the relations between IT capability, innovation and firm performance. Finally, we discuss our findings and implications as well as give suggestions for future research.

LITERATURE REVIEW

INNOVATION

Innovativeness is perceived as “exploring something new that has not existed before” [9]. Hurley and Hult [10] defined innovativeness as “the notion of openness to new ideas as aspects of a firm’s culture.” Innovative capability refers to the ability of a firm to develop new elements or a new combination of already known elements in products, processes, technologies, or management. As a result of innovativeness or innovative capabilities, firms generate different levels of innovations. Innovations can be classified in four categories: behavioural innovation, product innovation, process innovation, and market innovation [11]. According to [11] study, these innovation types are defining as follows:

- Behavioural innovativeness refers to the formation of an innovative culture, the overall internal receptivity to new ideas and innovation, demonstrated through individuals, teams and management enables,
- Product innovativeness refers to the novelty and meaningfulness of new products introduced at the market at a timely fashion”,
- Process innovativeness refers to the introduction of new production methods, new management approaches and new technology that can be used to improve production and management processes,
- Market innovativeness refers to the newness of approaches that companies adopt to enter and exploit the targeted market.

INFORMATION TECHNOLOGY CAPABILITY

Considering the growing importance of information in today’s business environment, achieving competence and capability with regard to the tools and processes used to manage information has taken on a new urgency. This capability is known as IT capability. Most of the papers, analysing IT capabilities, focus on IT infrastructure and IT skills necessary to exploit the potential of information technology [6]. Based on it, firms’ IT capability can be defined as the ability of firm to select, accept, configure and implement information technology. In other words, IT capability includes IT infrastructure within the company, as well as the supporting processes and knowledge related to it.

In this article, we use conceptualization of IT capability done by [12]. In the mentioned study, IT capability is seen as a construct or a concept made up of three dimensions:

- IT knowledge is a degree to which the organization understands the capabilities of existing and emerging IT, or how organization is aware of IT possibilities [12],
- IT operations stand for the extent to which the firm uses IT to improve its business effectiveness, or possession of the IT-related methods, processes and techniques,
- IT infrastructure includes hardware, software and support staff, or tools and resources that contribute to the acquisition, processing, storage, dissemination and use of information [12].

Taken together, these three dimensions of IT capability interact and impact the degree to which an organization can leverage its investments in IT for strategic gains [13].

FIRMS’ SUCCESS

Based on the literature review, it was found that the success of the company is measured with indicators of business performance [12, 14].

THEORETICAL MODEL AND HYPOTHESES

On the basis of the previous sections we propose two hypotheses about the relations between IT capability and innovativeness and innovativeness and firm performance.

IT CAPABILITY AND INNOVATIVENESS

During the past decade there has been a growing interest for the importance and value of information technology for the firms. Most of the scholars failed to confirm the direct impact of IT on business performance. Pérez-López and Alegre [12] state that the reason for this inconsistency probably lies in the failure of the authors to recognize various organizational capacities as important intermediaries between IT and performance.

Most IT researches are focused on the analysis of the factors influencing the adoption of IT [15, 16], where the analysed factors can be classified into three categories: factors related

to the firms' staff that will use IT, factors related to the firms' characteristics and factors related to the business environment in which the firm operates [17]. The impact of IT on firms' innovativeness is very little analysed, mainly as the impact of a particular technology to a particular category of innovation. In the study [17], it is analysed the impact of IT on innovation and competitiveness by demonstrating that only the use of various IT does not affect the level of competitiveness, nor affect the level of innovation of the firm. In a small number of researches it has investigated not only the use of IT, but the existence of relating level of IT skills and its impact on innovation. In line with previous studies that have shown that IT alone will not result in increased innovation and competitiveness, but improvement IT skills along with IT processes and IT infrastructure will have positive impact on innovativeness, we propose the following hypothesis:

H1: IT capability has a positive effect on the innovativeness.

INNOVATIVE CAPABILITY AND FIRM PERFORMANCE

“Innovation has become the industrial religion of the late 20th century. Business sees it as the key to increasing profits and market share” [18]. Innovations provide distinct advantages for the firm, helping it to achieve competitive advantages and superior business performance. Firms' ability to innovate is the most important determinant of the success [19]. Innovation is recognized as one of the key assumptions of competitive advantage and business performance of the company, especially in the modern economy [10]. On the basis of these statements, the proposed hypothesis is as follows:

H2: Innovativeness has a positive effect on the firm performance.

METHODOLOGY

The first step of research was to choose population and objects to analyse. Considering that the topic is relevant for all business activities and that research will be done on the case of Bosnia and Herzegovina, which is relatively small market, it is decided to cover companies from all industries and business sectors. The classification of sectors is taken from the statistical classification of economic activities of the European Community – NACE.

In order to collect the data and for the purpose of this study, a questionnaire was distributed to the firms' management as an online survey using LimeSurvey software using mailing lists. All questionnaires included a cover letter explaining the purpose of the study and assuring anonymity. Data was collected in the period of March-July of 2015.

A total of 531 questionnaires were completed and saved. Of these 531 questionnaires, 87 had a high percentage of missing values, so we decided to eliminate them, following the complete case approach described in [20]. Summarily, 444 questionnaires were left for the analysis. The selected sample has characteristics of a convenient because firms are selected for the sample with respect to their availability and firms of each economic activity are included.

MEASURES

All the variables were measured on seven-point Likert scales ranging from 1 – strongly disagree to 7 – strongly agree.

IT Capability

The measurement scale for IT capability (ITC) was created using some of the items from the scales proposed by [21] and [22]. To be precise, IT knowledge and IT infrastructure scales were taken from [21], while IT operations, due to the wording and easier translation were taken from [22]. ITC is second-order reflective measurement model with three first-order factors and 10 indicators.

Innovation

The measurement scale for innovation (Inno) was adapted from [11] and it consisted of four dimensions: behavioural innovation, product innovation, process innovation and market innovation. Innovativeness is second-order reflective measurement model with four first-order factors and 13 indicators.

Firms' Performance

This scale was adapted from [14, 23] and it consisted of 4 items measuring firm's performance (FP) related to profit, sales, return on investment and market share. This is first-order measurement model.

Conceptual model which will be tested in following section is presented in Figure 1. Because latent variables are unobserved and have no scales of their own, their origin and unit of measurement have defined by fixing first variable to unity [24].

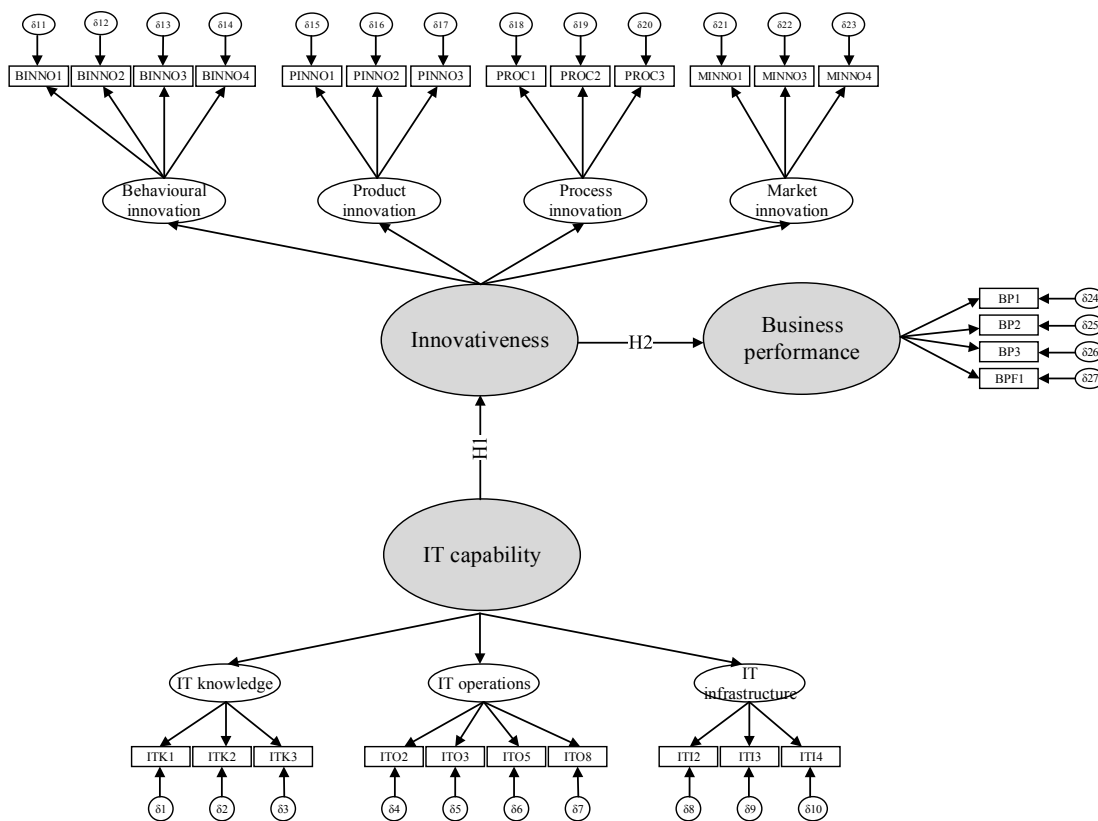


Figure 1. Conceptual Model.

The psychometric properties of the measurement scales were assessed by establishment of content validity and construct validity. Content validity was established through personal interviews with panel of experts: two academics and four managers, during the phase of questionnaire development.

The construct validity of the measures is tested employing confirmatory factor analysis (CFA) using Lisrel 8,8. Reliability is tested checking values of inter-item correlations and item-total correlations. Also, Cronbach's alpha for all three constructs are greater than 0,70.

Standardized factor loadings of all indicators are greater than 0,50 which is an indicator of the convergent validity [20]. This is also proven with average variance extracted (AVE) which is greater than 0,50 for all dimensions. Furthermore, all latent variables in both samples achieved an acceptable level of CR with all values above threshold above the 0,50. Also, the correlation coefficient for all latent constructs and the respective square root of AVE values are reported

in Table 1, showing that discriminant validity is achieved. There is a high correlation between product and market innovation which is already confirmed in earlier researches [10].

Table 2 shows goodness-of-fit indices for measurement models, and all of them are above/below cut-off value.

The CFA returns an acceptable level of fit-for-all of three measurement models reported in Table 2. RMSEA was less than 0,08, while SRMR was less than 0,05 and CFI and NFI were all greater than the 0,95 cut-off value [20].

Table 1. Results of Reliability and Validity Tests for Measurement Models.

Dimensions		CR	AVE			α	
ITC	IT Knowledge (ITK)	0,867	0,685	0,828		0,860	
	IT Operations (ITO)	0,869	0,624	0,788	0,790	0,867	
	IT Infrastructure (ITI)	0,794	0,566	0,714	0,778	0,752	0,775
INNO	Behavioural innovation (BINNO)	0,890	0,670	0,931		0,887	
	Product innovation (PINNO)	0,941	0,841	0,560	0,917	0,939	
	Process innovation (PROC)	0,840	0,638	0,738	0,645	0,786	0,834
	Market innovation (MINNO)	0,770	0,529	0,614	0,838	0,706	0,727
BP	Business performance (BP)	0,889	0,671			0,885	

Table 2. CFA Results for Measurement Models.

Measures	Items	χ^2/df	RMSEA	SRMR	CFI	NFI
IT capability (ITC)	10	2,63	0,0590	0,0299	0,990	0,985
Innovation (INNO)	13	3,87	0,0805	0,0426	0,980	0,974
Business performance (BP)	4	2,49	0,0580	0,0115	0,997	0,992

RESULTS AND DISCUSSION

To test the proposed hypotheses of this study a structural equation model was estimated. The analysis for the present study was conducted using Lisrel 8,8. Maximum likelihood (ML) method was deployed to estimate the parameter values. Although several methods can be used for the SEM testing, but ML is used most frequently and has the advantage of being statistically efficient. Results are presented in the Table 3.

As Table 3. shows, the overall model demonstrates an acceptable fit. Indices NNFI, CFI, RMSEA, NFI and SRMS are at acceptable levels. Also, χ^2/df is 2,16 is below acceptable cut-off values of 3,00 or 5,00 [20].

Further, the results show that there is a positive and significant relation between IT capability and innovativeness, as it is suggested with H1: $\beta = 0,64, t = 9,27, p < 0,01$. Also, the results show that there is a positive and significant relation between innovativeness and firms' performance: $\beta = 0,51, t = 8,87, p < 0,01$.

Our findings provide empirical support for the relation between IT capability and innovation. IT capability facilitates innovation and indirectly affects firms' performance. This result is consistent with the results of previous work in the literature [21].

Table 3. Hypothesis Testing and GOF Indices for Conceptual Model.

Hypothesis	Unstandardized estimates	Standardized estimates	t - value	R ²	Result
H1: ITC → INNO	0,570	0,638	9,269	0,407	Accepted
H2: INNO → BP	0,909	0,511	8,869	0,262	Accepted

$\chi^2 = 680,804; df = 314; RMSEA = 0,0514; SRMR = 0,0558; NFI = 0,970; NNFI = 0,981$ and $CFI = 0,983$

CONCLUSION

This article proposes and tests a model that establishes an integrative view of the links between IT capability, innovativeness and firms' performance. Our findings provide empirical support, for the relation between IT capability and innovativeness in general. IT capability facilitates innovations. This result is consistent with the results of previous results in the literature [12, 22]. Also, this research shows empirically that innovativeness influence firms' performance positively.

As it is stated before, many authors failed to confirm the positive relationship between IT and business performance. In the study [12], it is suggested to find various organizational capacities as important intermediaries between IT and performance. This study contributes to literature confirming innovativeness as a capability that stands between IT capability and firms' performance. This study proposes a contribution to IT research by clarifying the mediating role played by innovativeness in creating and capturing value from information technology. In order to achieve superior business performance and take full advantages of IT possibilities, it is important for managers to understand the role of innovativeness and proposed relations with IT capabilities and performance. The results confirm that ITC, on its own, is insufficient to generate superior business performance. But, IT capability together with organisational culture that promotes innovation will result with firms' success. This article contributes to the RBV showing how the interaction effect of various resources impact firms' performance. Conclusively, this article has sought to advance the existing body of ITC and innovation as important capabilities in the global business arena, supporting premises of RBV. In this article, the definition of ITC has been clarified and its core components have been unearthed.

Although this research makes a significant contribution to the literature and has important managerial implications, it also has several limitations, and our findings must be interpreted in the light of these. The main limitation of this study may be method of sampling, convenience as opposed to random. Also, subjective measures of managers are used for all items. Objective measures would increase the reliability of the results. Furthermore, our findings were drawn from a setting of transitional economy, and should be tested in developed western countries. Future research should incorporate employee-related capabilities in exploring the effects of capabilities on firms' success.

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