

**Understanding the influence of innovation on
firms competitive advantage in Saudi Arabia**

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Abstract

The rapid change in markets is one of the most significant challenges currently facing firms around the world and they need to adapt to these changes in order to improve or maintain their strategic position and to achieve a competitive advantage. The purpose of this study is to examine the influence of innovation on competitive advantage in the context of Saudi Arabian firms, therefore to examine this relationship, a quantitative method was applied by conducting a questionnaire among Saudi Arabian firms. The total sample of this study was 409 respondents that were useable for analysis and the results showed that innovation has a positive and significant influence on competitive advantage. This study contributed to the literature of strategic management and competitive advantage by empirically examining the influence of innovation on competitive advantage. This study is one of only a few studies that investigate this topic in the context of Saudi Arabia. Findings, implications, and recommendations of this study can assist firms to adopt a strategy that focuses on innovation.

Keywords: Strategic management, Competitive Advantage, Innovation, Saudi Arabian.

1. Introduction

Innovation has become an important tool and solution for firms' new requirements and market needs and many enterprises seek to accomplish competitive advantage through innovation. There is a special focus on strategy and competitive advantage; however, attention on innovation: has increased, specifically in disruptive environments (D'Aveni et al., 2010). New and rapid changes have affected many organizations, for example

new of technologies and COVID 19 pandemic, have increased uncertainty and disruption in both local and global markets. Lack of innovation can diminish enterprises' ability to formulate and implement their strategy (Pella et al., 2013). Therefore, some firms' strategies have concentrated on innovation and implementation of new technology to enhance their position and accomplish competitive advantage.

On the other hand, competitive advantage is a necessary goal for a firm to be competitive, therefore, firms formulate a strategic plan to accomplish their long-term vision goals. From a planning perspective, it is necessary for firms to strategically allocate their resources and capabilities and search for new strengths. It is the role of good management to extend the maturity phase of strategic management and sustainability through innovation and creativity (Witek – Crabb, 2016). Some firms suffer because they are not able to allocate their capabilities and to create new ones. Dynamic changes in environments require firms to think differently and encourage creativity and innovation.

Firms in Saudi Arabia are not different from firms elsewhere; they too are looking to a better position in markets and are attempting to shape their road map towards sustainable competitive advantage. However, uncertainty and new changes make it difficult for many to maintain good performance and grow sustainably. Several previous studies explored some of the drivers of competitive advantage including quality, time-to-market, delivery, innovation, and cost/price. However, this research aims to explore a solution for firms to stay competitive by

examining the influence of innovation on competitive advantage despite tough competition.

2. Literature review and theoretical background

2.1 Competitive advantage (CA)

Firms have to use their strengths and capabilities to be distinguished from their rivals and accomplish competitive advantage. Many theories of strategic management are concerned with developing strategies for firms, for example, Resource-Based View (RBV) was established by Barney (1991) suggesting that a firm can achieve a competitive advantage by using its strategic internal resources. On the other hand, Dynamic Capabilities Theory (DCT) was developed and defined by Teece, Pisano, & Shuen (1997) as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments". This theory focused on dynamic changes in the industry and the adaptation of its existing resources.

Competitive advantage is defined at the firm level as "productivity growth that is reflected in either lower costs or differentiated products that charge premium prices" (Porter, 1990). Barney (2001) defined competitive advantage as "when a firm can implement a value-creating strategy not simultaneously being implemented by any current or potential competitors." Moreover, Sachitra & Chong (2015) suggest an operational definition of competitive advantage as "a specific way of using the resources available and other precise activities to keep the firm separate from its competitors as well as to keep it active and growing". These definitions explain that competitive advantage is about being unique and being

able to achieve a competitive position, which why it has become the focus of many strategies.

Our world is changing faster than ever which requires a firm to be flexible and responsive. Agha et al., (2011) mentioned that some studies have concentrated on two dimensions of competitive advantage, namely flexibility and responsiveness. Flexibility is defined as "the firm's intent and capabilities to generate firm-specific real options for the configuration and reconfiguration of appreciably superior customer value propositions" (Johnson et al., 2003). Another dimension is responsiveness that refers to "the firm's ability to respond quickly to customer needs and wants" (Sousa et al., 2010).

It is been reported by previous studies that competitive advantage has drivers. Examples of these drivers are quality, cost, flexibility, delivery (Awwad, Khattab, & Anchor, 2013), company image, lower product price (Sipa et al., 2015), innovation (Urbancova, 2013), quality, delivery dependability, time to market (Sachitra, 2016) and flexibility (Diab, 2014). However, this study will focus only on innovation and its influence on competitive advantage.

2.2 Innovation

Many studies have indicated that innovation is one of the major determinates of competitive advantage (Sachitra, 2016). It can help to produce new products and expand an assortment of related products (Bezic et al., 2011). It is has been known that customer's needs and new demands demands evolve with the developments in the environment. Therefore, companies must adapt to changes in the markets and introduce new products and features to maintain or develop their position. Innovation is defined as

an organization being "capable of introducing new products and features in the market place" (Bratic, 2011). Another definition of innovation is "the ability of a firm to introduce new products and features in the market place" (Sachitra, 2016).

According to Urbancova (2013), innovative activity influences firms' competitiveness which means producing better quality at less cost. Innovation may take different forms such as a new product or service, a new structure, a new production practice, a new market, or a new administration system (Gustafsson and Witell, 2011). Achieving competitive advantage needs innovation (Vanathi and Swamynathan, 2014; Sipa et al., 2015). Innovation is a key source of a competitive advantage that determines the economic success of each organization (Urbancova, 2013). On the other hand, in highly competitive markets incremental innovation may not help a firm maintain a competitive advantage in the long-term but may help in the short-term, therefore, firms have to produce a novel innovation (Sirmon et al., 2011).

It is been argued that the adoption of technology will result in innovation (Yee-Loong Chong et al., 2014), therefore, firms can either obtain innovations externally or create internal innovative capabilities and encourage new innovation efforts (Sirmon et al., 2011). Consequently, focusing on out-of-the box innovation may lead to a better position in the industry. When innovation is formed through internal and external environment, it will create firm value (Lee et al., 2015), moreover, innovative capabilities can increase firms' success and enable them to adapt to new changes.

3. Research problem

This research aims to answer the question "what is the influence of innovation on competitive advantage in the context of Saudi Arabian firms. From previous literature, it is evident that several studies have investigated the relationship between competitive advantage and factors that can influence a firm's competitive advantage. However, only a few studies have discussed the influence of innovation on competitive advantage. Hence, this study will examine the relationship between competitive advantage and innovation only due to two reasons.

First, the dynamic changes and level of uncertainty in global markets have become important factors for firms wishing to grow and to be competitive. Teece et al. (2016) stated that adaptation of innovation is necessary as dynamic capabilities to accomplish a competitive advantage. The new trends of customers' needs and unprecedented events such as COVID 19 have increased the pressures on all firms' survival. Thus, firms need to find new ideas to remain competitive and grow. The results of this study can assist firms to understand the influence of innovation on achieving competitive advantage. Second, there are only a few studies about competitive advantage and its drivers in the context of Saudi Arabian firms. Saudi Arabia's market is considered one of the largest in the middle east and this study can improve the knowledge and practice of Saudi firms regionally and globally.

4. Research framework

Based on the previously mentioned literature review, a research model is generated to examine the influence of

innovation on competitive advantage. Figure 1 illustrates the conceptual model of this study.

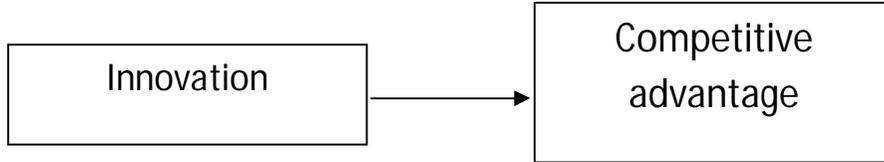


Figure 1. Research Framework

The proposed research conceptual framework was designed to illustrate the link between innovation and competitive advantage which has not previously been studied in isolation, Figure 1 shows the constructs and variables of the current study. Innovation represents the independent variable of the study while competitive advantage represents the dependent variable. This framework will guide us to investigate the influence of innovation on competitive advantage. Therefore, to achieve the purpose of this research, the following hypothesis was developed:

H1: innovation has a positive and significant influence on competitive advantage.

5. Research methodology

Since this study was concerned about the influence of innovation on competitive advantage, a survey research design was adopted. A survey questionnaire was conducted to achieve the aim of this study. the construct of (independent variable) innovation was adopted from Zhang, (2001), while the constructs of (dependent variable) competitive advantage (flexibility and responsiveness)

were adopted from Agha et al., (2011). This study took place in Saudi Arabia; therefore, the data was gathered from Saudi Arabian firms.

5.1 Data collection

The data were collected from questionnaires that were conducted in the context of Saudi Arabian enterprises. The process of gathering data took about six months from distributing to collecting questionnaires. The questionnaires were divided into three sections: demographic information, business information, and constructs. The constructs section, consisted of questions that are related to dependent (competitive advantage) and independent (innovation) variables. The Likert scale of five-levels was used to measure variables.

Great care must be taken when designing questionnaires to increase the reliability and validity of the survey. A good way to avoid mistakes and enhance a survey is to conduct a pilot survey, hence, a pilot survey was distributed to a small sample of the researcher's colleagues, other experts, managers, and employees. The responses from this sample were beneficial and valuable which helped in revising some questions of the questionnaire. As a result, Cronbach's alpha coefficient showed that the internal consistency was 0.896 which is acceptable and above 0.60. Therefore, the instrument is reliable for use.

Table 1. Reliability Statistics

Cronbach's Alpha	N o Items
0.896	13

5.2 Sample size

This study aims to explain and explore the influence of innovation on competitive advantage in the context of Saudi Arabia. It was reported by the Saudi Ministry of Commerce (2019) that the number of registered enterprises had reached 1.54 million in 2018. Therefore, this study chose to use Krejcie & Morgan's template for sample size (1970). As the approximate number of businesses in Saudi Arabia is $N=1.54$ million, the representative sample would be 384 and so a total of 645 questionnaires were distributed electronically and personally to participants. The retrieved questionnaires numbered 415 which represents about 64 percent of distributed questionnaires. From this total, 409 valid questionnaires were obtained and examined while 6 defect questionnaires were excluded.

6. Data analysis and findings

To accomplish the research purpose, simple linear regression was used to analyze the collected data and test the research hypothesis. Simple linear regression can help understanding the relationship between the dependent variable (competitive advantage) and the independent variable (innovation). The responses within collected data interpret this relationship and assist in predicting and explaining the variation of the dependent variable.

6.1 Demographic information

This section presented the data and findings that related to respondents' and enterprises' profiles.

6.1.1 Respondents' profile

The sample of this study is based on 409 respondents from Saudi Arabian enterprises. Table 2 shows the dominance of male participants. Among the participants, 57 percent were male and 43 percent were female. The data

indicates that employees represented 44 percent of participants, whereas owners and managers represented 22 and 29 percent respectively. In terms of the distribution of the participants by education level in Table 3, most of the respondents (76 percent) held a Bachelor degree and above while 24 percent of participants had a high school diploma. Regarding work experience, 35 percent of respondents had 0-5 years of experience, 20 percent had 16-20 years, 18 percent had 6-10 years, 14 percent had 11 - 5 years, and 13 percent had more than 20 years of experience.

Table 2

Frequency and percentage by participants' position

Position	Male	Female	Total	(%)
Owner	77	15	92	22%
Manager	78	40	118	29%
Employee	88	81	169	41%
Other	19	11	30	7%
Total	243	166	409	100%

Table 3

Educational level frequency and percentage by participants' work experience

Experience (years)	High school	Bachelor	Master	Doctorate	Total	(%)
0 – 5	46	98	-	-	144	35
6 – 10	6	55	14	-	75	18
11 – 15	16	29	10	-	55	14
16 – 20	22	48	8	6	84	20
More than 20	26	9	11	5	51	13
Total	100	239	51	11	409	100

6.1.2 Enterprises' profile

As shown in Table 4, most of the respondents (60 percent) were in the transformative industry (21 percent), health and food (14 percent each), and real estate (11 percent). The other 40 percent of enterprises were distributed among retail and wholesale (9 percent), telecommunication, education and training (8 percent), construction (6 percent), and agriculture (5 percent).

Table 4. Frequency and percentage by business type

Business classification	Frequency	(%)
Education and training	32	8%
Agriculture	20	5%
Health	57	14%
Transformative industry	86	21%
Real estate	45	11%
Telecommunications	45	90%
Construction	24	6%
Retail and wholesale	37	9%
Food	58	14%
Tourism	8	2%
Others	7	2%
Total	409	100

6.2 Research hypothesis testing

According to the results of the Pearson correlation in Table 5, the value of the correlation between the independent variable (innovation) and the dependent variable (competitive advantage) was 0.657 which shows that there is a strong positive relationship between the two variables. Moreover, the results shown in Table 6 prove that innovation has a positive influence on firms'

competitive advantage. Applying a linear regression, the results revealed that

innovation explains 43.2 percent of the variation in competitive advantage with $R^2 = 0.432$ and with significant relationship $p < 0.01$ (Sig = 0.000). Therefore, the illustrated model in Table 7 can explain this relationship between variables and predict the variance or change of competitive advantage due to the change of innovation as a strategy.

Additionally, Table 7 reveals that $p < 0.01$ which proves that the model is significantly able to predict this relationship and is acceptable for explaining the influence of innovation on competitive advantage.

Table 5.
Correlation between independent and dependent variables

	Competitive advantage	Innovation
Pearson Correlation	Competitive advantage	1.00
	Innovation	0.657
Sig. (1-tailed)	Competitive advantage	0.000
	Innovation	0.000

Table 6.
Model Summary^b

Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate	Burbin-Watson
1	0.657 ^a	0.432	0.430		0.533	1.545
a.	Predictors: (constant), Innovation					
b.	Dependent Variable: Competitive Advantage					

Table 7. ANOVA^a for linear regression analysis

	d.f	SS	MS	F	P-value
Regression	1	87.69539	87.69539	309.31257	0.00000 ^b
Residual	407	115.39145	0.28352		
Total	408	203.8684			

a. Dependent Variable: Competitive Advantage
 b. Predictors: (constant), Innovation

The regression analysis of the data in Table 8 showed the coefficients of the independent variable (innovation) is 0.91 with $p < 0.01$. This indicates when innovation increases by 1, competitive advantage goes up by 0.91. Furthermore, the findings revealed. that the proposed hypothesis (H1) is accepted. Thus, the equation of this proposed model can be expressed as:

$$\text{Competitive Advantage} = -0.02 + 0.91 \text{ Innovation}$$

To conclude, the analysis of the collected data showed that innovation has a significant influence on competitive advantage. H1 which postulates that innovation has a positive and **significant influence on competitive advantage**, is accepted.

Table 8. Coefficients for dependent variable

	Coefficients	Std Err	t Stat	p-value	H0(5%)	Beta
Intercept	-0.02026	0.21184	-0.09566	0.92384	Accepted	
Innovation	0.91085	0.05179	17.58728	0.00000	Rejected	0.65712

7. Discussion

Although competitive advantage has been studied in previous research, only a few studies have discussed the influence of innovation on competitive advantage,

particularly in the context of Saudi Arabian enterprises. To fill the gap in literature, this study has therefore explored and investigated the influence of innovation on competitive advantage. The findings presented in the previous section confirm that innovation positively influences competitive advantage. On the basis of this study findings, the value of R^2 and coefficients showed that innovation has a positive and significant μ influence on competitive advantage ($R^2 = 0.432$, Coefficients = 0.91, and $p < 0.01$). The study findings support the hypothesized influence of innovation on competitive advantage.

Innovation can explain 0.432 percent of the variance in competitive advantage. Moreover, innovation contributes 0.91 percent to the change in competitive advantage. Hence, the study findings confirm that innovation influences competitive advantage. In other words, enterprises can achieve a competitive advantage through innovation. Consequently, the confirmed proposed model is:

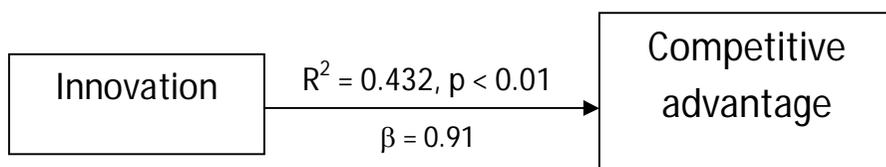


Figure 2. The confirmed research framework

The findings of this study are consistent with previous studies (Sirmon et al., 2011; Urbancova, 2013; Vanathi and Swamynathan, 2014; Sipa et al., 2015; Aziz and Samad, 2016). Our results is in line with the results of a study by Aziz and Samad (2016), however, their study was

conducted in a different context (Malaysia) and focused on SMEs and confirmed that innovation positively affects competitive advantage. In contrast, this study is concerned about Saudi Arabian enterprises in general. Some of the other previous studies did not focus specifically on the influence of innovation on competitive advantage. Instead, these studies investigated innovation from different aspects such as supply chain, knowledge, organization culture, business model, or among other determinants of competitive advantage.

In summary, this study proves that innovation has a strong and positive effect on competitive advantage. The findings indicated that greater innovation will yield a greater competitive advantage. Thus, it is recommended for enterprises to focus on innovation as a driver for their future in order to be competitive and to achieve growth. The current dynamic changes in the global markets require firms to shift towards innovations. Innovation may take different forms such as a new product or service, a new structure, a new production practice, a new market, or a new administration system (Gustafsson and Witell, 2011).

8. Research Implications

This section of the study will discuss research implications in both aspects of theory and practice. Additionally, it will provide some recommendations for policy-makers, owners, managers, and strategists.

8.1 Theoretical implications

This research aims to investigate the influence of innovation on competitive advantage which enhances the current knowledge in the field of management and

contributes to the literature of strategic management and the concept of competitive advantage. Additionally, it adds, more understanding of competitive advantage by conducting empirical research in the context of Saudi Arabian enterprises and exploring the influence of innovation on competitive advantage. The findings of this study confirm that innovation has a positive and significant influence on competitive advantage which is consistent with some of the previous studies.

Moreover, the proposed model of this study explains the relationship between the variables of this study and can be adapted by future researchers. Future studies can build on this study to explore other significant factors that are related to competitive advantage. Finally, the findings of this study can be generalized and extended to other countries because enterprises around the world all seek to achieve a competitive advantage.

8.2 Practical implications

Understanding the role and influence of innovation on competitive advantage will assist enterprise owners, managers, employees to acknowledge the strong relationship between innovation and competitive advantage. Uncertainty, customers' needs, and rapid changes in the world are obstacles that face many firms. Therefore, the finding of this study will encourage firms to launch initiatives that may develop innovative ideas. This study can be a guideline for enterprises in improving their administration, operations, culture, and products or services which will place them in better positions in the markets.

Many enterprises do not see the importance of innovation in achieving sustainable competitive advantage.

This study sheds light on the necessity of innovation as a driver for competitive advantage. Therefore, it is recommended for enterprises and policy-makers to create an environment for supporting innovation in the public and private sectors. Ultimately, innovation should be one of enterprises' present and future goals.

9. Conclusion

This study aimed to examine the influence of innovation on competitive advantage. The findings of this empirical study proved that innovation has a positive and significant influence on competitive advantage. These findings can encourage firms to shift towards strategies that concentrate on innovation and creativity so that they may be competitive and sustainably grow. Also, owners and managers have roles in creating an environment that helps in adopting a culture of innovation. Introducing and developing new ideas can improve a firm's position in the market. As mentioned earlier, innovation is not limited to products or services, but could also include a new structure, a new production practice, a new market, or a new administration system.

Given that the results of this research are limited to Saudi Arabian firms, future researches could examine the influence of innovation on competitive advantage in other countries or contexts. This will generate a better and comprehensive understanding of this relationship. Another limitation of this study is that it focused mainly on the influence of innovation on competitive advantage while there might be other variables or factors that influence and moderate this relationship. Thus, there is a place for future studies to explore these factors and extend this study for the further understanding of competitive advantage.

References

- Agha, S., Alrubaiee, L. and Jamhour, M. (2011), "Effect of Core Competence on Competitive Advantage and Organizational Performance", *International Journal of Business and Management*, Vol. 7 No. 1, pp. 192-204.
- Awwad, A. S., Khattab, A. A. Al and Anchor, J.R. (2013), "Competitive Priorities and Competitive Advantage in Jordanian Manufacturing", *Journal of Service Science and Management*, Vol. 6, pp. 69-79.
- Aziz, N. N. A. and Samad, S. (2016), "Innovation and Competitive Advantage: Moderating Effects of Firm Age in Foods Manufacturing SMEs in Malaysia", *Procedia Economics and Finance*, Elsevier B.V., Vol. 35 No. October 2015, pp. 256-266.
- Barney, J. (1991), "Fit i it Resources and Sustained Competitive Advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99-120.
- Bezic, H., Cerovi6, L. and Galovi6, T. (2011), "Changes in the competitive advantages of Croatia's manufacturing industry", *Zbornik Radova Ekcnomskog Fakultet -Au Rijeci*, Vol. 29 No. I pp. 465-487.
- Bratic. D. (2011). "Achieving a Competitive Advantage by SCM", *1131kfA Business Review Journal*, Vol. 2011, pp. 1-13.
- D'Aveni, R.A., Dagnino, G.B. and Smith, K.G. (2010), "The age of teniporwy advantage", *Strategic Management Journal*, Vol. 31 No. 13, pp. 1371-1385.
- Gustafsson, A. and Witell, L. (2011), "Heiko Gebauer Eawag : Swiss Federal Institute of Aquatic Science and Technology Competitive advantage through service differentiation by manufacturing companies", *Journal of Business Research*, Vol. 64 No. 12, pp. 12701280.

- Johnson, J.L., Lee, R.P.W., Saim, A. and Grohmann, B. (2003), "Market-focused strategic flexibility: Conceptual advances and an integrative model", *Journal of the Academy of Marketing Science*, Vol. 31 No. 1, pp. 74-89.
- Lee, C.Y., Lee, T.-R. and Kao, C.-K. (2015), "Study on the Adaptation of Corporate Business Strategy to E-commerce Practice", *Advances in Management & Applied Economics*, Scienpress Ltd, Vol. 5 No. 6, pp. 25-43.
- M. Diab, S. (2014), "Using the Competitive Dimensions to Achieve Competitive Advantage A Study on Jordanian Private Hospitals", *International Journal of Academic Research in Business and Social Sciences*, Vol. 4 No. 9, pp. 138-150.
- Ministry- of commerce. (2019), "Enterprise growth of 16% and limited liability companies 11% in 2018 compared to 2017", available at:
<https://mci.gov.sa/ar/mediacenter/News/16-02-19-0.aspx>.
- Pella, M.D.A., Sumarwan, U., Daryanto. A. and Kirbrandoko. (2013), "Factors affecting poor strategy implementation", *Gadjah Made International Journal of Business* vol. 15 No. 2, pp. 183-204.
- Porter, M. (1990), "Competitive Advantage of Nations". *Harvard Business Renew*. Vol. 68 No. 2, pp. 73-93.
- Sachitra, V. (2016), "Review of Competitive Advantage Measurements: Reference on Agribusiness Sector", *Journal of Scientific Research and Reports*, Vol. 12 No. 6, pp. 1 - 11.
- Sachitra. V. and Chong, S. (2015), "Enhancing Competitive Advantage of Sri Lankan Minor Export Crops", *Journal of Global Economics, Management and Business Research*, Vol. 4 No. 4, pp. 185-194.
- Sipa, M., Gorzei-Mirka, I. and Skibinski, A. (2015), "Determinants of Competitiveness of Small Enterprises: Polish Perspective", *Procedia Economics and Finance*, Vol. 27 No. 15, pp. 445-453.

- Sirmon, D. G., Hitt, M. A., Ireland, R. D. and Gilbert, B. A. (2011), "Resource orchestration to create competitive advantage: Breadth, depth, and life cycle effects", *Journal of Management*, Vol. 37 No. 5, pp. 1390-1412.
- Sousa, C. M. P., Ruzo, E. and Losada, F. (2010), "The Key Role of Managers' Values in Exporting: Influence on Customer", *Journal of International Marketing*, Vol. 18 No. 2, pp. 1-19.
- Teece, D., Peteraf, M. and Leih, S. (2016), "Dynamic capabilities and organizational agility: Risk, uncertainty, and strategy in the innovation economy", *California Management Review*, Vol. 58 No. 4, pp. 13-35.
- Teece, D. J., Pisano, G. and Shuen, A. (1997), "Dynamic capabilities and strategic management", *Strategic Management Journal*, Vol. 18 No. 7, pp. 509-533.
- Urbancova, H. (2013), "Competitive Advantage Achievement through Innovation and Knowledge", *Journal of Competitiveness*, Vol. 5 No. 1, pp. 82-96.
- Vanathi, R. and Swamynathan, R. (2014), "Competitive advantage through supply chain collaboration - An empirical study of the Indian textile industry", *Fibres and Textiles in Eastern Europe*, Vol. 22 No. 4, pp. 8-13.
- Witek-Crabb, A. (2016), "Maturity of strategic management in organizations", *Oeconomia Copernicans*, Vol. 7 No 4, p. 669.
- Yee-Loong Chong, A., Ooi, K.-B., Bao, H. and Lin, B. (2014), "Can e-business adoption be influenced by knowledge management? An empirical analysis of Malaysian SMEs", *Journal of Knowledge Management*, Vol. 18 No. 1, pp. 121-136.
- Zhang, Q. (2001), *Technology Infusion - Enabled Value Chain Flexibility: A Learning and Capability-Based Perspective*, ProQuest Dissertations and Theses, University of Toledo.