# RELATIONSHIP BETWEEN MARKET ORIENTATION AND BUSINESS PERFORMANCE IN CZECH AND GERMAN HIGH-TECH FIRMS

## ODNOS IZMEĐU TRŽIŠNE ORIJENTACIJE I POSLOVNE USPJEŠNOSTI ČEŠKIH I NJEMAČKIH VISOKOTEHNOLOŠKIH PODUZEĆA

TRŽIŠTE

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## ABSTRACT

The main goal of this paper is to find out an index of market orientation, and explore the relationship between four components of market orientation in high-tech firms and their business performance. Business performance was studied as a one-dimensional construct. Market orientation in this study is defined as a process of intelligence generation about customers and competitors, intelligence dissemination and integration within the company across teams,

## SAŽETAK

Glavni je cilj rada saznati indeks tržišne orijentacije i opisati odnos između četiriju komponenti tržišne orijentacije visokotehnoloških *(high-tech)* poduzeća i poslovne uspješnosti. Poslovna je uspješnost istraživana kao jednodimenzionalni konstrukt. Tržišna orijentacija u ovom je istraživanju definirana kao proces generiranja informacija o potrošačima i konkurentima, diseminacija i integracija informacija po timovima unutar poduzeća te reakcija na tržišne informacije u obliku

and responsiveness to market intelligence in the form of coordinated action. The statistical sample was represented by 164 Czech and 187 German high-tech firms in the manufacturing industry. Respondents (sales and marketing managers) completed a questionnaire and marked their rate of approval with individual statements on a Likert scale ranging from 1 to 7. Market orientation and business performance level was determined as the arithmetic mean ($\bar{x}$) of the measured values. Depending on the size of the total market orientation index (MOI), Czech ($\bar{x}$=5.2) and German ($\bar{x}$=5.14) high-tech firms are medium market-oriented. The business performance index (BPI) reached a slightly higher value in Germany ($\bar{x}$=5.22) as compared to the Czech Republic ($\bar{x}$=5.13). The main method to reach the target was correlation and regression analysis. This study confirmed a hypothesis about the existence of a correlation between components of market orientation and business performance. Three of the four relationships in the multiple regression model were significant. On the other hand, the study found no positive significant correlation between competitor intelligence generation and business performance.

koordiniranih akcija. Uzorak se sastojao od 164 češka i 187 njemačkih visokotehnoloških poduzeća. Ispitanici (prodajni i marketinški menadžeri) ispunili su anketni upitnik i označili razinu koliko su suglasni s pojedinačnim izjavama na Likertovoj ljestvici od 1 do 7. Tržišna orijentacija i razina poslovne uspješnosti određene su kao aritmetička sredina ($\bar{x}$) izmjerenih vrijednosti. S obzirom na veličinu indeksa ukupne tržišne orijentacije (MOI), češka ($\bar{x}$=5.2) i njemačka ($\bar{x}$=5.14) visokotehnološka su poduzeća srednje tržišno orijentirana. Indeks poslovne uspješnosti (BPI) u Njemačkoj ($\bar{x}$=5.22) dosegao je nešto višu vrijednost u odnosu na Češku Republiku ($\bar{x}$=5.13). Glavne korištene metode bile su korelacija i regresijska analiza. Istraživanje je potvrdilo hipotezu o postojanju odnosa između komponenti tržišne orijentacije i poslovne uspješnosti. Tri od četiriju veza u modelu višestruke regresije bile su značajne. Nasuprot tome, nije potvrđena pozitivna i značajna povezanost između prikupljanja informacija o konkurenciji i poslovne uspješnosti.

# 1. INTRODUCTION

In the last two decades, prominent world researchers interested in the problem of market orientation across many spheres in advanced and developing countries have come to similar, but also considerably different results. This may depend a lot on the point of view because of the differing constructs and definitions of market orientation and company performance that are frequently used in analyses, which may to a certain extent be considered an obstacle in the process of comparing results. The research methods used in this comparative study were mostly the same. The research presented in this paper follows the author's previous studies in the area of market orientation of Czech and German high-tech firms in the manufacturing industry. After thorough analysis and research of the literature, as well as the successful creation of a modified model and measuring scale of market orientation in the Czech Republic, replication of that research on German data was performed and also confirmed the high quality of the market orientation model. These two countries were chosen randomly, but quantitative research studies of the market orientation of high-tech firms using the modified model will gradually follow in other chosen EU countries, as well.

The author defines market orientation as the process of generating intelligence about customers and competitors, disseminating and integrating intelligence, and responding to market intelligence. The main difference in this definition compared to others is that it emphasizes not only the dissemination of market information, but also its integration across all departments and working teams, which is usually neglected by traditional scales. Owning market information in order to gain a competitive advantage is not enough today. Market information is often easily available thanks to information technologies. The success consists in its transformation to knowledge and proper use during coordinated action within the strategic management of company marketing. It depends a lot on the skillfulness and speed of decision-making by top managers. There are also practical reasons for the creation of this new instrument. Firm practice resulted in a requirement to create new and shorter although highly reliable and valid measuring scales. The "Modified Market Orientation Scale" (MMOS; 12 items) was adopted partially from the methodology of Kohli, Jaworski and Kumar (1993), Narver and Slater (1990), and Mohr, Sengupta and Slater (2014). It consists of questions on four fields that compose the market orientation of a company: intelligence generation, dissemination, integration, and responsiveness to market intelligence. Business performance was conceptualized as a one-dimensional construct and was measured by three items (growth of sales, profitability/ROA, and market share). This study follows the standard procedure of a research article. Secondary data were obtained from numerous sources (such as databases, conferences, and the academic literature), and the documentation was analyzed using a deductive process. Primary data were collected by means of a quantitative questionnaire. It was carried out from September 2014 to December 2014 in the two countries separately, and each of the datasets was analyzed individually. The summarized results of both analyses were compared and are illustrated in the tables at the end of the paper.

This article will contribute to the better understanding of the phenomenon of market orientation, and measurement of market orientation and business performance on the Czech and German markets. The lack of sufficient research in this area, especially in empirical work concerning the market orientation of companies in the high-tech sector was also a motivation to pursue this particular field of interest. The high-tech sector has a significant position in today's economy, particularly in connection with innovations and business performance. This sector was chosen, based upon consultation with professionals, because of its suitability for analysis of market orientation and business performance.

## 2. MARKET ORIENTATION AND BUSINESS PERFORMANCE

The first studies of the theoretical construct and measurement of market orientation were conducted in the United States, starting to appear in the 1990s. Results of the first measurements of market orientation were published in 1990, prompting authors from all continents to replicate it. Gradually, replications of this measurement from Canada, Australia, and Western Europe began to appear in the international professional literature. In general, fewer studies were conducted in transforming economies, such as those of Central and Eastern Europe or Asia and Africa. Over the past 25 years, several measuring scales differing only in the number of dimensions and items have gradually been created. The most popular are MKTOR (Narver & Slater, 1990), MARKOR (Kohli & Jaworski, 1990), MOS (Lado, Maydeu-Olivares & Rivera, 1998), MORTN (Deshpande & Farley, 1998), MOPRO (Narver, Slater & NacLachlam, 2004) and MOCCM (Carr & Lopez, 2007). There is in fact a range of very similar scales, so this enumeration is not complete at all. MORTN consists of 10 items and measures so-called reactive market orientation. All of the above-mentioned authors recommend the use of either a five- or a seven-point Likert scale for the subjective measurement of market orientation in firms. The last-mentioned scale (MOCCM) interconnects MARKOR and MKTOR. Although it is a prospective area of marketing research, very few authors have dealt with this problem so far in the professional Czech literature, and many managers and academics are not familiar with the principles of market orientation at all. There is in effect only one method of measurement used in our country – the Tomášková Method (Tomášková, 2005). There is no information available to review the construct validity of this scale.

According to Tomášková (2005, 2009), in the 1990s Kohli and Jaworski (1990) dealt with this topic in large engineering companies, Deng and Dart (1999) conducted similar research in smaller organizations, and Langerak (1997) did a comparable study of product manufacturers. Hooley, a British marketing professor, and co-authors studied the service sector in the transition economies of Central Europe (Hooley et al., 2003). The field of non-profit organizations was elaborated by authors Balabanis, Stables and Phillips (1997). The field of developed markets was studied by Liu (1995), and transforming economies by Akimova (2000) in Ukraine. Harris and Ogbonna (2001) dealt with the implementation of and obstacles to market orientation. Bhuian (1997), Flohr et al. (2003), Jangl and Mikuláštík (2013) all focused on the banking sector. Factors of market orientation in the private insurance industry in Belgium and Spain were compared by Lado and Rivera (1996). Liechtenhal and Wilson (1992) inserted aspects of social structure into the implementation of market orientation. In the mid-1990s, American Nobel laureate Milton Friedman spoke many times about the suitability of strategy, innovations, and utilization of sources influencing company performance. German author Fritz (1992) is also worth mentionin; in the 1990s, he emphasized the importance of a company's orientation towards its own employees, production, and costs. Chang, Chen and Caruna (2003) had a similar approach as the above-mentioned authors. In the Czech Republic, research was carried out by Tomášková (2005, 2009) and Chalupský, Šimberová, Tomášková and Kaňovská (2009) in power companies and high-tech firms; Nožička and Grosová (2012) in small and medium innovation companies; and Frejková (2014) in aviation companies.

The closeness of the relationship between market orientation and performance was mostly judged according to Spearman's or Pearson's correlation coefficient. Medium correlation results correspond to a positive relationship, and strong correlation results correspond to a highly positive relationship. The influence of the individual components of market orientation on a dependent variable was mostly analyzed by means of multiple regression or structural equation modeling. Narver and Slater (1990) were the first to claim that there is a relation between market orientation and profitability. Subsequent

studies mostly confirmed the original results. Oudan (2012) discovered a positive influence of market orientation on company performance in developing countries of South America and the West Indies. Ramayah, Samat and Lo (2011) also proved the influence of the market orientation on business performance. Others who found that there is a significant positive correspondence between market orientation and company performance were Kaňovská and Tomášková (2012) in the Czech Republic, Panigyrakis and Theodoridis (2007) in Greece, and Dauda and Akingbade (2010) in Nigeria. However, mixed results were confirmed in Sri Lanka: only some components of market orientation and performance showed a mutual relationship. Partial correlation between market orientation and the business performance was confirmed by the research of Malaysian authors Mokhtar, Yusoff and Arshad (2009). Sukato (2014) claimed that there is no direct influence of market orientation on the business performance of small and medium firms in Thailand.

It is apparent from the above-mentioned survey that previous studies of market orientation examined particularly dyadic relations between the market orientation of firms and strategy or between market orientation and success, with emphasis on the performance of the firms. A great number of publications dealing with the development of measuring instruments and concepts of market orientation are based upon the works of authors such as Narver and Slater (1990) or Kohli and Jaworski (1990). It would be proper to point out that the majority of studies performed proved a direct positive relationship between a company's market orientation and its performance. Studies proving weak or even no such dependence appear to be mere exceptions to the rule. The questions to be addressed here are the following: (1) How can market orientation be measured in our cultural conditions?; and (2) What is the causal relationship between market orientation and performance in the Czech Republic and Germany?

**Table 1:** Selected results of the measurement of market orientation of firms and their performance

| Author | Year | Result |
|---|---|---|
| Narver and Slater | 1990 | positive relationship |
| Pitt, Caruana and Berthon | 1996 | positive relationship |
| Chang and Chen | 1998 | positive relationship |
| Raju, Lonial, Gupta and Ziegler | 2000 | positive relationship |
| Slater and Narver | 2000 | positive relationship |
| van Wood, Bhuian and Kiecker | 2000 | strong positive relationship |
| Harris and Ogbonna | 2001 | positive relationship |
| Ramaseshan, Caruana and Pang | 2002 | strong positive relationship |
| Pulendran, Speed and Widing | 2003 | positive relationship |
| Qu and Ennew | 2003 | positive relationship |
| Caruana, Pitt and Ewing | 2003 | weak positive relationship |
| Santos-Vijande et al. | 2005 | positive relationship |
| Tomášková | 2005 | positive relationship |
| Martin-Consuegra and Esteban | 2007 | positive relationship |
| Panigyrakis and Theodoridis | 2007 | positive relationship |
| Haugland, Myrtveit and Nygaard | 2007 | strong positive relationship |
| Farrell, Oczkowski and Kharabsheh | 2008 | positive relationship |
| Megicks and Warnaby | 2008 | strong positive relationship |
| Nwokah | 2008 | weak positive relationship |
| Singh | 2009 | positive relationship |

Source: Own elaboration based on Wong & Tong (2012)

# 3. HIGH-TECH SECTOR

According to information from Eurostat, the high-tech sector is normally defined as a combination of economic activities that utilize modern technologies during production and provision of services to a large extent. Development in this sector is pulled forward due to innovations, which may be somehow related to the market orientation of firms.

The most frequently mentioned characteristic features of high-tech firms are the following:
o  high rate of innovations
o  industrial environment for quick growth
o  considerable share of qualified employees with university degrees
o  cooperation with science and research
o  short lifetime of products.

The Czech Statistical Office divides the activities of the high-tech sector into two main categories – manufacturing and services. For purposes of this study, only the firms from the high-tech manufacturing sector will be addressed. According to the classification of CZ-NACE (the Czech version of NACE, i.e. *Nomenclature générale des Activités économiques dans les Communautés Européennes*), high-tech economic operators are divided into the following sections and groups by their prevailing economic activity:
o  production of pharmaceutical products and services (section 21);
o  production of computers and electronic components (groups 26.1, 26.2);
o  production of consumer electronics and optical instruments (groups 26.3, 26.4, 26.7, 26.8);
o  production of measuring, testing, navigation and medical instruments (groups 26.5, 26.6);
o  production of planes and their engines, spaceships and associated equipment (group 30.3).

In order to maintain a long-term competitive advantage in the market, high-tech firms must be dynamic and innovative. At the same time, there is a close affinity to market research and the examination of hidden needs of customers. According to Mohr, Sengupta and Slater (2014, p. 106), high-tech firms must excel at three activities: opportunity identification, product and process innovation, and product commercialization. Because one of marketing's tasks is to listen to the customer and define a broad set of opportunities, a strong marketing capability implies that marketing is able to identify a wide range of markets and customers' applications for innovative technology. The voice that marketing brings to the innovation process must be joined with the knowledge that R&D brings in order to develop an offering that effectively addresses customer needs.

High-tech companies should show a high rate of market orientation; therefore, this sector seems to be suitable for market orientation analysis. This statement has been confirmed by earlier studies, such as Kaňovská and Tomášková (2014). Other studies likewise show that a market orientation leads to greater creativity and improved new product performance in high-tech firms (Im & Workman, 2004) and that the relationship between market orientation and firm performance is stronger in highly dynamic markets, which are characteristic of technology-oriented industries (Homburg & Pflesser, 2000). Firms in high-tech markets need to excel not only at generating innovations, but also at commercializing those innovations. Superior technology and innovation capabilities must be combined with an effective market orientation to achieve the highest levels of success in high-tech markets. Therefore, the positive relationship between a firm's market orientation and performance outcomes is especially important for high-tech firms (Mohr, Sengupta & Slater, 2014, p. 107).

Manufacturing firms in the high-tech sector are strongly represented in the Czech Republic and Germany. Together, they account for around 26% of the high-tech sector in the EU-28. Table 2 summarizes selected data in both countries.

**Table 2:** Comparison between Germany and the Czech Republic

| Characteristics | Germany | Czech Republic |
|---|---|---|
| Percentage of manufactured exports (2013) | 16.1 % | 14.8 % |
| Percentage of total employment in high-tech manufacturing | 1.7 % | 1.8 % |
| Percentage of women in high-tech manufacturing | 34.7 % | 50.6 % |
| Number of enterprises in high-tech manufacturing (2012) | 8247 | 3441 |
| Turnover in high-tech manufacturing (million EUR) | 113 476 | 13 218 |
| Share of innovative enterprises (from 2010 to 2012) | 66.9 % | 43.9 % |
| Growth in high-tech manufacturing (from 2008 to 2013) | 1.8 % | 3.3 % |
| R&D expenditure – business enterprise sector (2011), (million EUR) | 49 342 | 1735 |
| R&D intensity | 2.84 | 1.84 |

Source: Author's own elaboration based on Eurostat (2013) and Czech Statistical Office (2011) data
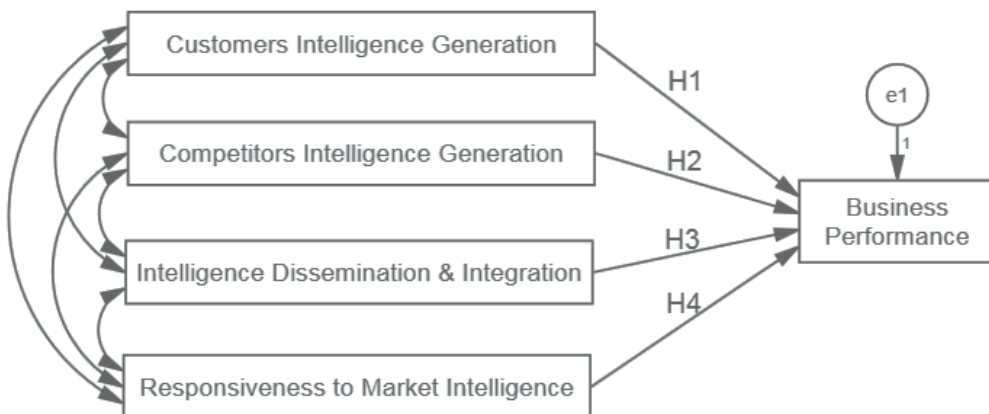
# 4. METHODOLOGY

## 4.1. Description of data set and statistical methods used

The analyzed data consisted of 164 answers from managers of Czech high-tech firms and 187 answers from managers of German high-tech firms. The necessary data were collected using Albertina and Hoppenstedt databases. The measurement was subjective, in which respondents were expressed the extent of their approval with statements on a Likert scale from 1 to 7 (see appendix, MMOS and business performance measurement). The index of market orientation and business performance were calculated as arithmetic means of the individual answers. Reliability of the measuring instruments was checked using the Cronbach alpha coefficient. Causal relationship between the market orientation of firms and their performance was studied by the least squares method (multiple regression analysis). Data were processed by means of the IBM SPSS Statistics version 21 and IBM SPSS AMOS version 22 (graphic outputs) software packages.

**Figure 1:** Conceptual framework



Source: Own elaboration

## 4.2. Hypothesis

A partly positive relation between market orientation and innovations in high-tech sector was confirmed by various independent studies, including Jangl (2015), Nožička and Grosová (2012), and others. It may be assumed that similar dependence will also exist between market orientation and business performance.

The following hypotheses were tested in this research study:

$H_1$: *Customer intelligence generation has a positive significant influence on business performance.*

$H_{01}$: Customer intelligence generation has negative or no significant influence on business performance.

$H_2$: Competitor intelligence generation has a positive significant influence on business performance.

$H_{02}$: Competitor intelligence generation has a negative or no significant influence on business performance.

$H_3$: Intelligence dissemination & integration between departments and staff has a positive significant influence on business performance.

$H_{03}$: Intelligence dissemination & integration between departments and staff has a negative or no significant influence on business performance.

$H_4$: Responsiveness to market intelligence has a positive significant influence on business performance.

$H_{04}$: Responsiveness to market intelligence has a negative or no significant influence on business performance.

## 5. STATISTICAL ANALYSIS

### Reliability

Reliability of the MMOS measuring scale was checked by Cronbach's alpha index. According to the professional literature, the resulting value should range between $\alpha=0.60$ and $\alpha=0.90$ (Hair et al. 2006; DeVellis, 2003). Internal consistency of items in the MMOS scale used is $\alpha=0.83$ (Czech Republic) and $\alpha=0.80$ (Germany), which is a very good value. Reliability for the business performance scale reached satisfactory values of $\alpha=0.71$ (Czech Republic) and $\alpha=0.72$ (Germany). Market orientation consists formed of four factors (12 items), and company performance of factors (3 items), (see appendix).

### Multiple regression analysis

At first, basic statistical assumptions were checked before using the regression analysis. The assumptions of the linear regression analysis were checked for both data sets. Dependent variable performance is an interval variable. All independent variables are also measured at interval level. Independent variables are not highly correlated, the result of which is that multicollinearity is not present. All correlations are statistically significant. The items are not highly correlated, which means that the precondition of multicollinearity absence is satisfied. VIF (variable inflation factor) is below 5, tolerance is not lower than 0.2. Multivariate normality was checked by a histogram of the standardized residuals and a p-p plot of the standardized residuals. The histogram of the standardized residuals is described very well by a Gaussian curve. The standardized residuals lie on the normal distribution line. Linearity of the relations between variables and homoscedasticity was checked by point plot of the standardized

residuals and the standardized predicted values. The plot of the standardized residuals, depending on the standardized predicted values, does not show any relationship between the residuals and the standardized predicted values. The independent variables in the model represent the individual dimensions of market orientation, while the dependent variable is business performance. The model has the following form:

$$\widehat{PERF} = \beta_0 + \beta_1 CUIG + \beta_2 COIG + \beta_3 IDI + \beta_4 RMI$$

## 5.1. Czech high-tech firms

As Table 3 shows, the "customers intelligence generation" factor ($\bar{x}$=5.88) received the highest evaluation, while the "responsiveness to market intelligence" ($\bar{x}$=4.67) has the lowest average evaluation. The two remaining factors of the market orientation (COIG, IDI) and also the business performance (PERF) were evaluated similarly by respondents. Their arithmetic means and standard deviations are very similar. The total index of market orientation ($\bar{x}$=5.2) was calculated as the arithmetic mean of four dimensions (12 items) and the business performance index ($\bar{x}$=5.2) of three items.

**Multiple regression analysis (model properties) – Czech high tech firms**

**Table 4:** Significance of the model

| R | R² | Adjusted R² | F |
|---|---|---|---|
| 0.538 | 0.289 | 0.271 | 16.16*** |

Note: ***(p<0.001); Source: Own elaboration

It results from Table 4 that the model is statistically significant (F=16.16***) at the level of significance of 0.001, which explains the 27.1% variance of the dependent variable.

**Table 3:** Arithmetic mean ($\bar{x}$), Standard deviation (SD), Correlations

| Model | $\bar{x}$ | SD | MO (rate) | Correlations | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | CUIG | COIG | IDI | RMI | MO | PERF |
| Customers intelligence generation (CUIG) | 5.88 | 0.88 | high | 1 | | | | | |
| Competitors intelligence generation (COIG) | 5.13 | 1.21 | medium | 0.43** | 1 | | | | |
| Intelligence dissemination & integration (IDI) | 5.12 | 1.11 | medium | 0.29** | 0.21** | 1 | | | |
| Responsiveness to market intelligence (RMI)+++ | 4.67 | 1.13 | low | 0.35** | 0.46** | 0.41** | 1 | | |
| Market orientation (MO) | 5.20 | 0.78 | medium | 0.68** | 0.75** | 0.67** | 0.78** | 1 | |
| Business performance (PERF) | 5.13 | 1.09 | medium | 0.38** | 0.31** | 0.40** | 0.43** | 0.52** | 1 |

Note: < 5.0 (low rate); <5; 5.5> (medium rate); > 5.5 (high rate)
** Pearson correlation is significant at a 0.01 level; Source: Own elaboration
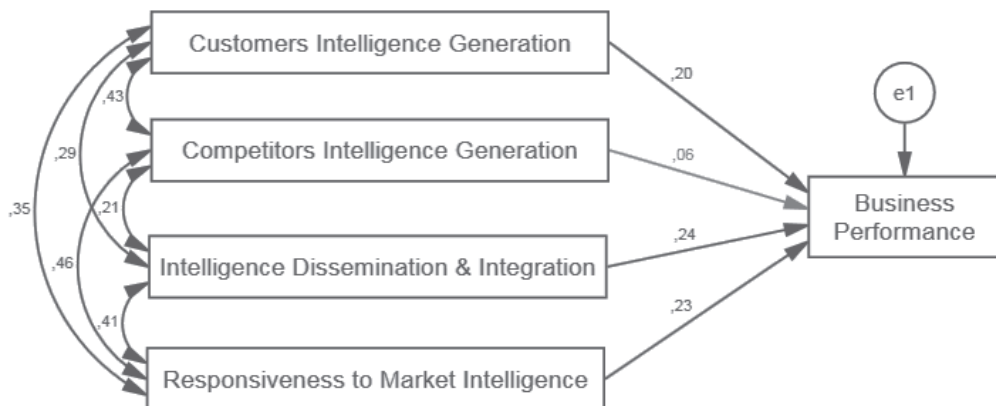
**Table 5:** Coefficients

| Model | Unstandardized coefficients | | Standardized coefficients | t-Value | Results |
|---|---|---|---|---|---|
| | B | Std. error | Beta | | |
| Constant | 1.123* | 0.546 | - | 2.058 | - |
| Customers intelligence generation (CUIG) | 0.252** | 0.095 | **0.20**** | 2.643 | **Reject H$_{01}$** |
| Competitors intelligence generation (COIG) | 0.058 | 0.072 | **0.06** | 0.812 | **Accept H$_{02}$** |
| Intelligence dissemination & integration (IDI) | 0.233*** | 0.073 | **0.24***** | 3.185 | **Reject H$_{03}$** |

Note: PERF (dependent variable); ***(p<0.001); **(p<0.01); *(p<0.05)
Source: Own elaboration

It is clearly visible that three coefficients in the model are positive and statistically significant (see Table 5). There is a positive relationship among the factors of "customers intelligence generation", "dissemination & integration of market information", "response to market information" and the company performance; therefore, the null hypotheses H$_{01}$, H$_{03}$, and H$_{04}$ were rejected. The opposite situation occurred with the "competitors intelligence generation" factor, which is not statistically significant, so the null hypothesis H$_{02}$ was not rejected. On the basis of the standardized beta coefficient, we may state that dissemination & integration of information inside the firm ($\beta_3$=0.24***) and responsiveness to market intelligence ($\beta_4$=0.23**) have the highest influence on business performance. The model has the following form: PERF = 1.123 + 0.252CUIG + 0.058COIG + 0.233IDI + 0.222RMI.

**Figure 2:** Graphic representation of the model



Source: Own elaboration

## 5.2. German high-tech firms

**Table 6:** Arithmetic mean (x̄), Standard deviation (SD), Correlations

| Model | x̄ | SD | MO (rate) | Correlations | | | | | |
|-------|-----|-----|-----------|------|------|------|------|------|------|
| | | | | CUIG | COIG | IDI | RMI | MO | PERF |
| Customers intelligence generation (CUIG) | 5.74 | 0.99 | high | 1 | | | | | |
| Competitors intelligence generation (COIG) | 5.16 | 1.07 | medium | 0.43** | 1 | | | | |
| Intelligence dissemination & integration (IDI) | 5.03 | 1.17 | medium | 0.38** | 0.27** | 1 | | | |
| Responsiveness to market intelligence (RMI) | 4.64 | 1.08 | low | 0.38** | 0.50** | 0.51** | 1 | | |
| Market orientation (MO) | 5.14 | 0.81 | medium | 0.71** | 0.73** | 0.74** | 0.80** | 1 | |
| Business performance (PERF) | 5.22 | 1.05 | medium | 0.41** | 0.31** | 0.41** | 0.40** | 0.51** | 1 |

Note: < 5.0 (low rate); <5; 5.5> (medium rate); > 5.5 (high rate)
** Pearson correlation is significant at a 0.01 level; Source: Own elaboration

On the sample of German firms, the factor of "customers intelligence generation" (x̄=5.74) also got the highest value. On the contrary, the factor "responsiveness to market intelligence" had the worst result (x̄=4.64). The three remaining factors were evaluated almost identically by respondents. Their arithmetic means and standard deviations are very similar. The total index of the market orientation has the value of x̄=5.14, with the value for company performance at x̄=5.22.

**Multiple regression analysis (model properties) – German high-tech firms**

**Table 7:** Significance of the model

| R | R² | Adjusted R² | F |
|------|------|-------------|----------|
| 0.524 | 0.274 | 0.258 | 17.191*** |

Note: *** (p<0.001); Source: Own elaboration

It results from Table 7 that the model is statistically significant (F=17.191***) at the level of significance of 0.001, which explains the 25.8% variance of the dependent variable.
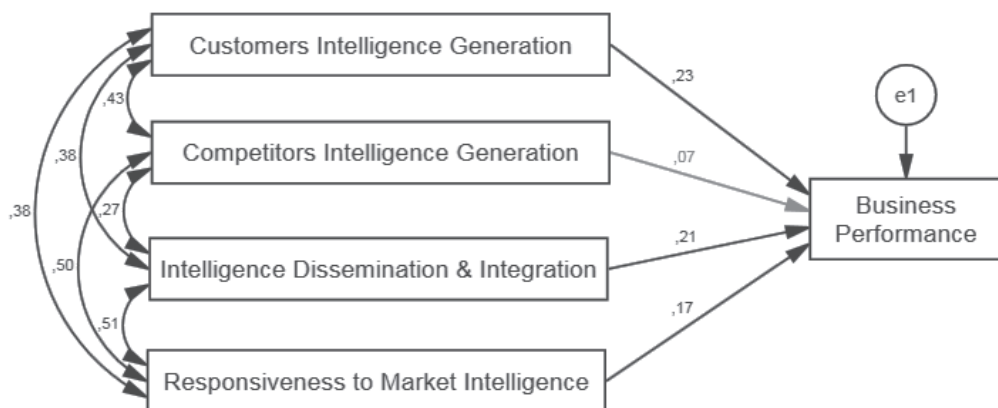
**Table 8:** Coefficients

| Model | Unstandardized coefficients | | Standardized coefficients | t-Value | Results |
|---|---|---|---|---|---|
| | B | Std. error | Beta | | |
| Constant | 1.711*** | 0.446 | - | 3.837 | - |
| Customers intelligence generation (CUIG) | 0.248** | 0.078 | **0.23**** | 3.187 | **Reject H$_{01}$** |
| Competitors intelligence generation (COIG) | 0.070 | 0.074 | **0.07** | 0.942 | **Accept H$_{02}$** |
| Intelligence dissemination & integration (IDI) | 0.191** | 0.067 | **0.21**** | 2.839 | **Reject H$_{03}$** |
| Responsiveness to market intelligence (RMI) | 0.164* | 0.079 | **0.17*** | 2.079 | **Reject H$_{04}$** |

Note: PERF (dependent variable); ***($p<0.001$); **($p<0.01$); *($p<0.05$)
Source: Own elaboration

The null hypotheses H$_{01}$, H$_{03}$, and H$_{04}$ were rejected but the null hypothesis H$_{02}$ was not. On the basis of the standardized beta coefficients, we may say that "dissemination & integration of information" ($\beta_3=0.21**$) and "customers intelligence generation" ($\beta_1=0.23**$) have the highest influence on business performance in Germany. No significant correlation of the "competitors intelligence generation" factor to company performance was found, even on the sample of the German high-tech firms. The model has the following form: $\widehat{PERF} = 1.711 + 0.248CUIG + 0.070COIG + 0.191IDI + 0.164RMI$.

**Figure 3:** Graphic representation of the model



Source: Own elaboration

**Table 9:** Summary of results (descriptive statistics)

|  | Germany (MOI) | Czech Republic (MOI) | Germany (SD) | Czech Republic (SD) |
|---|---|---|---|---|
| CUIG | 5.74 (high) | 5.88 (high) | 0.99 | 0.88 |
| COIG | 5.16 (medium) | 5.13 (medium) | 1.07 | 1.21 |
| IDI | 5.03 (medium) | 5.12 (medium) | 1.17 | 1.11 |
| RMI | 4.64 (low) | 4.67 (low) | 1.08 | 1.13 |
| MO | 5.14 (medium) | 5.20 (medium) | 0.81 | 0.78 |
| PERF | 5.22 (medium) | 5.13 (medium) | 1.05 | 1.09 |

Note: Market Orientation Index (MOI); Standard Deviation (SD); Source: Own elaboration

**Table 10:** Summary of results (regression analysis)

| Independent variable | Dependent variable | Hypotheses | Beta (Czech sample) | Beta (German sample) |
|---|---|---|---|---|
| CUIG | PERF | $H_1$ | **0.23**** | **0.20**** |
| COIG | PERF | $H_2$ | **0.07** | **0.06** |
| IDI | PERF | $H_3$ | **0.21**** | **0.24***** |
| RMI | PERF | $H_4$ | **0.17*** | **0.23**** |

Note: ***$(p<0.001)$; **$(p<0.01)$; *$(p<0.05)$; Source: Own elaboration

# 6. DISCUSSION

The model of market orientation was formed from four dimensions, and business performance was measured as a one-dimensional construct. For each dimension the arithmetic mean ($\bar{x}$) was calculated. The modified market orientation scale (MMOS) that was used, including the business performance measurement, is part of the supplement. Universal classification of the firms according to the calculated average value on a Likert scale from 1 to 7 was carried out by Frejková and Chalupský (2013). These authors divided the firms into three categories: (a) total index of the market orientation ($\bar{x}$) higher than 5.5 (strongly market orientated), (b) index lying in the interval from 5 to 5.5 (medium market orientated) and index below the value 5.0 (weakly market orientated). According to this classification, both Czech firms ($\bar{x}$=5.20) and German high-tech firms ($\bar{x}$=5.14) seem to be medium market orientated. The results may be con-

sidered as almost identical. Generally, the firms may be advised to pay attention to dimension four, "responsiveness to the market information" as the worst ranked in both countries. It is a particular coordinated strategic action, which may practically include improvement in areas such as: revealing new market segments, expansion abroad, higher flexibility in solving customer dissatisfaction with final products, faster development of new products, reacting to competitive advertising campaigns, etc. Improvement would automatically lead to an increase in total index of the market orientation. Authors Nožička and Grosová (2012) calculated the index of market orientation in the Czech Republic at $\bar{x}$=5.88; Frejková (2014) came to the value of $\bar{x}$=5.19; and Tomášková (2005) calculated the value for the Czech power industry firms at $\bar{x}$=5.74. Although all the above-mentioned scholars used a seven-point Likert scale, their questionnaires and samples of firms were different; that is why their results are only partially comparable. The company performance turned out a bit better for

the German high-tech firms (x̄=5.22) than for the Czech ones (x̄=5.13).

Research of the causal relationship between the market orientation of firms and company performance was carried out in two phases. In the first part, the data from the Czech high-tech firms in the processing industry, and in the second part, data from the managers of the German firms were analyzed. In the first case, a statistically significant relation between three dimensions of market orientation and performance was proven. Performance in the Czech Republic is most clearly influenced by the following dimensions: dissemination of information & integration of knowledge inside the firm $(\beta_3=0.24; p<0.001)$, and responsiveness to market intelligence in the form of strategic action $(\beta_4=0.23; p<0.01)$. Customers intelligence generation $(\beta_1=0.20; p<0.01)$ was a bit weaker, but also had a statistically significant influence on company performance. The three hypotheses $H_1$, $H_3$, and $H_4$ were thereby proven on the Czech data. Further, the coefficient beta for the dimension of gathering market information about the competition $(\beta_2=0.06; p>0.05)$ was the only one statistically not significant. Hypothesis $H_2$ was thus not proved on the basis of the results of the regression analysis.

Finally, the regression analysis was carried out on data from the German high-tech firms. It is obvious that no significant relation $(\beta_2=0.07; p>0.05)$ to business performance was prove for the factor "competitor intelligence generation". Hypothesis $H_2$ was not proven, for the same reason as in the Czech Republic. Other relations between components of market orientation and business performance may be considered as statistically significant for the German high-tech firms: customer intelligence generation $(\beta_1=0.23; p<0.01)$, dissemination & integration of information inside the firm $(\beta_3=0.21; p<0.01)$, and responsiveness to market intelligence in the form of strategic action $(\beta_4=0.17; p<0.05)$. As a result, the three remaining hypotheses, $H_1$, $H_3$ and $H_4$, were also proven in Germany.

# 7. CONCLUSION

The objective of this study was to find out the index of market orientation and business performance and also to test four hypotheses about the relationship between the main components of market orientation and business performance in the Czech Republic and Germany. On the basis of this analysis, the firms in the both countries are medium market orientated. Company performance can be assessed similarly. Further, in both countries there is a slightly positive and significant relationship between the variables customer intelligence generation, dissemination & integration of information inside the company, and responsiveness to market intelligence and business performance. On the other hand, no statistically significant correlation was proven between the variables of competitor intelligence generation and business performance either within the Czech Republic or on the studied sample in Germany. Unfortunately, there is no comparable quantitative research in the Czech Republic which is solved by multiple regression analysis; therefore, replication of the research is recommended. When using similar methods in Germany, they repeatedly succeeded to prove similar results in production sector and services.

The calculated indices of market orientation and company performance are also part of the results; they indicated that the firms pay most attention to getting market information about customers, and that largely underestimate their response to often hard-acquired market information. On account of this, it could be recommended that the management place more emphasis on coordinated action, because its influence on company results is the same as on other processes. In other respects, the differences in the high-tech sector between the two countries are not great according to the ascertained indices, which is proof of similar company management. The results of empirical research may serve as feedback for managers and help in the self-evaluation of strong and weak points in the firm, while also en-

abling them/researchers to confirm results with the help of the innovated model.

## Acknowledgements

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# APPENDIX

## The Modified Market Orientation Scale (MMOS)

| Construct | Items |
|---|---|
| Customers Intelligence Generation | 1. We systematically collect and evaluate data about satisfaction or non-satisfaction of customers.<br>2. We have regular meetings with customers in order to learn their future expectations in time.<br>3. We permanently strive for a deeper understanding of the hidden needs and requirements of customers. |
| Competitors Intelligence Generation | 4. We perform evaluations of the strong and weak points of major competitors.<br>5. We try to predict the future behaviour of competitors.<br>6. We monitor mutually competing firms in our branch. |
| Intelligence Dissemination & Integration | 7. We inform each other about successful and unsuccessful experiences with customers across all company departments.<br>8. In our company we hold a lot of formal and informal talks in which we discuss present business successes, market opportunities or risks.<br>9. Market information is integrated in this workplace before decisions are made. |
| Responsiveness to Market Intelligence | 10. Our reaction to a competitor's price campaign is very short.<br>11. Principles of market segmentation control the development of new products in our firm.<br>12. We react immediately if the competition launches an intensive advertising campaign aimed at our customers. |

## Business Performance Measurement

| Construct | Items |
|---|---|
| Business Performance | *13.* Our firm achieved a growth in sales over the last year.<br>*14.* Profitability (ROA) is increased year-on-year.<br>*15.* Our firm increased its market share over the last year. |