AJIEMR
SCIENTIFIC JOURNAL

Academic Conferences Association, z.s.

Academic Journal of International Economics and Management Research

ISSN 2694-7897
VOLUME 1 - NUMBER 1

AJIEMR
SCIENTIFIC JOURNAL

Academic Journal of

International Economics and Management Research

Academic Journal of International Economics and Management Research (AJIEMR)

ISSN 2694-7897
Peer reviewed scientific economics journal

Topics
Economics, Management, Marketing, Business

Published 02/2020
Volume 1 - Number 1

Publisher
Academic Conferences Association, z.s.
Chudenicka 1059/30
Prague 10 - 10200
Czech Republic

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SCIENTIFIC JOURNAL

Academic Journal of International Economics and Management Research

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Table of contents

Gender-Based Differences in Perceived Barriers for Women in Managerial Positions

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Abstract

The number of women in managerial positions has increased significantly over the last few decades. However the rate of progress is slow and uneven. Women are still perceived as being less suited than men for managerial positions and strongly held stereotypes are resistant to change. Although the gender gap is closing, no country has fully closed it yet. Cyprus, a European Union country, ranks low in the "gender gap index", despite the fact that it ranks satisfactorily in the "educational attainment" gap. The related literature on Cyprus is scarce. Using a sample of Cypriot employees, the study provides additional insight into the woman's representation in executive and managerial positions. Specifically, it aims to compare male and female employees' perspectives on this issue. The results show that both genders agree that women managers are faced with career barriers and challenges, where home and family obligations constitute the most insurmountable barrier. Differences in opinions between male and female employees indicate that female employees feel significantly stronger than males than women managers have their work judged more critically compared to their male counterparts and that they have to perform much better than men in order to succeed.

Keywords: gender gap, gender stereotyping, glass ceiling, barriers

Introduction

Over recent decades there has been an upward trend in the number of women having access to education and entering the labor market. However, the rate of progress can be characterized as slow and uneven. Although many women have successfully broken the "glass ceiling", the number gaining access into senior managerial, executive positions is still relatively small (Arfken et al., 2004; Metz & Kulik, 2014). Female managers occupy mostly the middle and lower ranks in the managerial cadre or carry out the same job description as men but with lower titles (Yukongdi & Benson, 2005; Eagly & Karau, 2002; Cordano et al., 2002).

The gender gap is closing worldwide, however no country has fully closed it yet. Cyprus ranks low in the gender gap, despite the fact that it ranks satisfactorily in the educational attainment gap (The Global Gender Gap report, 2018). The legislative framework for equality of men and women is in harmonization with the EU Directives, but the share of Cypriot women in managerial positions is still very low. The related literature regarding Cyprus is scarce and not much empirical evidence exists from surveys that examine employees' opinions on women managers. Focusing on Cyprus, the aim of the study is to provide additional insight into the barriers and challenges that working women face today. Specifically, it aims to examine both male and female employees' perspectives and investigate the differences in perceptions between the two genders regarding women in managerial positions.

Theory

Many qualities of a successful manager, such as ambition, objectivity and an authoritative manner, have been linked with masculinity (Guney et al., 2006). Women still face impenetrable and invisible barriers in their efforts to break the "glass ceiling" to attain managerial positions (Powell, 2012; Reinhold, 2005). In large organizations where women have reached high-level managerial positions, they are often trapped in "glass walls", for example being limited to areas less central or strategic to the organization (Wirth, 2004).

The barriers to attainment of top managerial positions are associated with gender stereotyping, gender and empowerment, lifestyle options and creation of networking (Wirth, 2004; Linstead et al., 2004). More specifically, negative stereotypes include perceptions of female managers being less self-confident, more emotional, less emotionally stable, less analytical, less reliable, lacking aggressiveness and having poorer leadership abilities compared to male managers (Guney et al., 2006; Wackman 1996; Heilman et al., 1989). In addition, women are perceived to place family worries above work and thus lose time for, and interest in, their jobs and be less able for holding managerial positions because of family-work conflicts (Hoobler et al., 2009).

Considering gender pay differences, there remains an important differential. Despite European Union (EU) legislation on equal pay, women earn around 16% less than men and this gap is decreasing at a slower pace than the gender employment gap. Its persistence results from direct discrimination against women as well as structural inequalities, such as segregation in sectors, occupations and work patterns, access to education and training, biased evaluation and pay systems and stereotypes (Commission of the European Communities, 2006). Regarding the managerial level, evidence confirms that female managers earn just a fraction of what their male counterparts earn on salaries (e.g., Jamali et al., 2006).

The Global Gender Gap Index was developed in 2006 and serves as a comprehensive measure for gender equality that can track a country's progress over time. No country in the world has fully closed it and the progress towards parity continues to be very slow. The highest ranked countries—Iceland, Norway, Sweden, Finland, Nicaragua and Rwanda —have closed over 80% of their gender gaps, while the lowest ranked country—Yemen—has closed only around 50% of its gap. Weighted by population, in 2018, the average progress on closing the global gender gap stands at a score of 0.680—which means that an average gap of 32% remains to be closed worldwide. Considering sub-indexes, the 149 countries of the 2018 Report have closed 95% of the gap in educational attainment. On the contrary, only 58% of the economic participation gap and 23% of the political gap have been closed (The Global Gender Gap report, 2018).

The focus of the current study is Cyprus. Legislative measures relating to sex equality were adopted in Cyprus prior to its EU accession in May 2004. They involve harmonization with the EU Directives on equal treatment of men and women as regards access to employment, vocational training and promotion, and working conditions, as well as equal pay for men and women for similar work or work of equal value (Katrougalos, 2009). Based on the Eurostat report of March 2016, women in Cyprus earn 15.4% less than men, which is less than the EU average. However, Cyprus ranks low in the Global Gender Gap Index (92 out of 149 in 2018). It has closed around 68% of the gender gap, only slightly higher than the global weighted average. It also ranks 70 in the gap in economic participation and opportunity in 2018 (closed 68% of the gap) (The Global Gender Gap report, 2018).

The Statistical Service of Cyprus explains part of the wage gap with differences in qualifications between the two genders, length of service, professional duties, the field of work and possible discrimination in certain professions (Soumeli & Trimikliniotis, 2004). There is a different focus of women in certain occupations and economic sectors and a continuous over-representation of women in low-paid and low-skilled jobs: women continue to prefer or to be preferred in positions of flexible employment, particularly part-time and temporary employment, which are schemes with unstable and low-paid employment (Kontolaimis et al., 2006). The share of Cypriot women in managerial positions is also still very low. Cypriot women employees, especially mothers, have been shown to face family-work conflicts (Tsangari & Stephanidi, 2012).

On the other hand, Cyprus ranks high in terms of educational attainment (rank 48 of 149, closed 99.8% of the educational attainment gap – note that 27 countries have fully closed this gap) (The Global Gender Gap report, 2018). Attaining education has been categorized as one of the most significant factors that have been used to break through the "glass ceiling" and increase women's participation in the labor force (McDonald, 2004). The aforementioned evidence from Cyprus implies that, although there are many educated women in the Cyprus labor market, they are still not paid as much as men with the same qualifications.

Therefore, further insight is deemed necessary, especially through the examination of the opinions of both genders regarding the under-representation of women in managerial positions and the perceived barriers.

Methods

A cross-sectional, quantitative study was performed on a sample of Cypriot employees. Participation was voluntary, ensuring anonymity and confidentiality. A structured questionnaire was developed. The first section obtained socio-demographic information of the respondents, the second section involved information about the organization of the employees and the number of women managers, the third section included general statements regarding the barriers and negative stereotypes that Cypriot women professionals face today and the fourth section obtained information about the opinions of respondents on different statements related to equal treatment of women and men managers in their organization as well as Cyprus in general. The statements were on a Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

Descriptive statistics were calculated and chi-square tests of independence were performed, to identify significant gender-based differences in perceptions. SPSS version 23 was used.

Findings

The final sample included 155 employees, 58% males and 42% females. The employees were of various age groups, education levels and work experience, thus creating a well-diversified sample. All the information regarding the socio-demographic characteristics of the sample appears in Table 1.

Table 1: Socio-demographic characteristics of respondents (N=155)

Characteristic		F	%
Gender	Males	90	58%
	Females	65	42%
Age	18-25 years	24	15.5%
	26-35 years	31	20.0%
	36-45 years	40	25.8%
	46-55 years	36	23.2%
	More than 55 years	24	15.5%
Education	High School	54	44.6%
	Diploma/Bachelor degree	60	38.8%
	Master degree	34	21.9%
	Doctorate	7	4.5%
Sector	Public	50	32.3%
	Private	37	23.9%
	Semi-government	47	30.3%
	Banking	21	13.5%
Monthly income	Less than €1000	23	14.8%
	€1001-€2000	94	60.6%
	€2001-€3000	30	19.4%
	More than €3000	8	5.2%
Job Title		14	9.1%
Manager/Director		24	15.5%
	Supervisor	50	32.3%
	Office Administrator	37	23.9%
	Officer	30	19.4%
	Worker (Messenger, Cleaner)		
Years of work experience	0-5 years	38	24.5%
	6-10 years	26	16.8%
	11-15 years	31	20.0%
	16-20 years	27	17.4%
	21-25 years	22	14.2%
	More than 25 years	11	7.1%
Size of organization	0-50 employees	22	14.2%
	51-100 employees	29	18.9%
	101-200 employees	49	31.6%
	more than 200 employees	55	35.5%

A chi-square test showed that there were significant differences among respondents in the number of women managers according to the size of the organization (p=0.001), where larger companies (e.g. 51-100 employees or more than 200 employees) had a more satisfactory percentage of women managers. Regarding the question "Was a woman promoted to a managerial executive position at your company in the last 3 years?" 53% of employees said that there was no such promotion.

The perceived barriers that women face in order to attain a managerial position were examined next. Results showed that both genders agreed that the main barrier of Cypriot women in obtaining a managerial position is home and family obligations, followed by social and cultural obstacles. Psychological barriers, such as lack of self-confidence or ambition were also reported, however male respondents tend to believe stronger than female respondents that these are barriers for women in obtaining a managerial position (p=0.062).

In terms of the barriers that female managers face in Cyprus, the opinions of both genders were similar. The first in rank barrier was work-family conflict (more than 50% of respondents identified this as an important barrier), followed by negative stereotypes about female managers. All the results about the perceived barriers appear in Table 2.

Table 2: Perceived barriers to attain managerial positions and negative attitudes towards female managers (in ranking order)

	f	%
a. What barriers do you believe that Cypriot women face in order to get a managerial position?		
1. Home and family obligations	101	65,6%
2. Social and cultural obstacles	86	55,8%
3. Psychological barriers such as lack of self-confidence or ambition*	66	42,9%
4. Being a minority in a mainly male environment	63	40,9%
5. Societal norms and moral values (people do not know their role)	39	25,3%
6. Men's negative attitude (sexism, disrespect, prejudices, jealousy)	32	20,8%
b. If the manager was a woman what obstacles would she possibly face?		
1. Work-family conflict	78	50,6%
2. Negative gender stereotypes in the workplace	68	44,2%
3. Social and cultural obstacles	66	42,9%
4. Psychological barriers such as lack of self-confidence or ambition	62	40,3%
5. Being a minority in a mainly male environment	53	34,4%
6. Men's negative attitude towards her (disrespect or jealousy)	39	25,3%

**Marginally significant gender differences in opinions (males agree more) (p=0.062)*

The last section of the questionnaire included general statements to examine opinions on Cypriot women managers and the barriers they face. The mean of the total sample, as well as separate means for male and female respondents were calculated, for identifying gender-based differences in perceptions. The two lowest and the two highest scale points were grouped together to ensure the validity of the chi-square tests and satisfy their assumptions, since the percentages in the two extreme scale points were very low. The findings appear in Table 3.

Table 3: Gender-based differences in opinions about women in managerial positions (N=155)

	Strongly Disagree/ Disagree	Neutral	Agree/ Strongly Agree	Mean-Total n=155	Mean-Males n=90	Mean-Females n=65	Chi-square p-value
1. Women in Cyprus are easily trusted for managerial positions	45.8%	14.8%	39.3%	2.93	2.86	3.03	0.462
2. Women in my organization are easily trusted for managerial positions	34.8%	25.8%	39.4%	3.06	2.96	3.22	0.275
3. Women in my organization are productive	27.9%	27.9%	44.2%	3.19	3.06	3.38	0.238
4. Female managers have their work judged more critically compared to male managers.	33.6%	27.1%	39.3%	3.05	2.88	3.29	0.025*
5. Women managers have	32.9%	21.3%	45.8%	3.12	2.96	3.34	0.041*

to perform much better than male managers in order to succeed.							
6. Compared to male managers, female managers must continually prove themselves.	34.8%	23.2%	42.0%	3.09	2.97	3.26	0.074+
7. A man and a woman with the same qualifications have the same chances of getting employed in my organization	34.8%	24.5%	40.7%	3.13	3.02	3.28	0.174
8. A man and a woman with the same qualifications have the same salary in my organization	38.1%	22.6%	39.4%	3.07	3.06	3.09	0.965
9. Men and women are provided with equal career opportunities in my company.	32.2%	27.7%	40.0%	3.16	3.14	3.18	0.038*

** Significant differences between male and female respondents at 5% level of significance*
+ Significant differences between male and female respondents at 10% level of significance

The results showed that both genders similarly believed that women in Cyprus are not easily trusted for managerial positions, but considered their organizations to differentiate from this (39% believe that their organization does trust women for managerial positions, while 26% preferred to stay neutral). Both genders strongly considered women in their companies to be productive in their jobs. Although both genders agreed that negative attitudes, stereotypes and discrimination towards women managers exist, significant gender-based differences appeared in opinions. For example, women respondents tended to believe significantly stronger than men that female managers have their work judged more critically compared to male managers. Female respondents in the sample similarly believed significantly stronger than males that women managers must perform much better than men managers in order to succeed and must continually prove themselves.

In statements related to the gender pay gap no significant gender differences existed in terms of their opinions. Finally, in the question whether men and women are provided with equal career opportunities in their companies, overall respondents tended to agree with this (40% of total sample agreed). However, significant gender-based differences existed. More specifically, it was found that female respondents were more neutral (58% of those that were neutral were female respondents), while men agreed more with this statement (63% of those that agreed were men).

Discussion

The current study has shown that, despite their high levels of education and productivity, women in Cyprus face difficulties in obtaining managerial positions. The main career barrier of female managers appears to be the struggle between home and family obligations. A work environment supportive of family life has been shown in related literature to positively influence a woman's commitment to the workplace, while work-family conflicts have a

negative relationship with job satisfaction and organizational commitment (Tsangari & Stephanidi, 2012; Carlson et al., 2010; Carly et al., 2002). Employees who report more control over their schedules have less work-family conflict (Galinsky et al., 2011). In countries with lack of policies for child care, women are more involved in the house, while women with full time jobs and high salaries give more attention to their careers than their household (Makiko & Cohen, 2006).

In addition, the results of the present study show that gender stereotypes exist in Cyprus, similar to other countries (e.g. Hoobler et al., 2009; Guney et al., 2006; Makiko & Cohen, 2006). Many studies agree that maternity leave and family life are usually considered by employers and colleagues as an obstruction in the female employee's performance, and therefore act as an impediment for her career advancement. Female managers in fact have additional related work pressure: it has been evidenced that women with higher earnings return to the workplace earlier after a maternity leave, compared to women with lower earnings (Werbel, 1998). The current research findings indicate that negative stereotypes and attitudes towards Cypriot female managers oblige them to have to constantly prove themselves and work harder compared to men in order to move forward in hierarchy in their organization. Significant differences existed in the opinions between the two genders, where the aforementioned obstacles appeared to be perceived stronger by women respondents. Females stated at a higher percentage that women managers in Cyprus face negative attitudes and prejudices compared to their male counterparts.

Gender seems to be the most important determinant of differences in perceptions about women managers. For example, similar results were found in a study in Greece among Business students, where male students held relatively negative stereotypic attitudes compared to their female counterparts (Michail, 2006). Given the apparent influence of business students' stereotypes on future discriminatory behavior toward women in management, the results are alarming.
Gender differences in perceptions are not easy to eliminate and could be the key to the effectiveness of any proposed strategy for overcoming work-family conflicts and discrimination against female managers.

Conclusions and Implications

The magnitude of national gender gaps is the combined result of various socioeconomic, policy and cultural variables. Their closure is connected to the framework of national policies and thus Governments have a leading role to play (The Global Gender Gap report, 2018). In addition, organizations should be encouraged to provide family-responsive benefits and ensure that their cultures support work-family balance. Lower salaries and fewer promotions make female employees less fulfilled than their male counterparts, while equal opportunities enable women to engage in any career of their choice (Kottis, 1993; Fitsum & Luchien, 2007; Cornelius & Skinner, 2005). The present study on Cypriot women in management has provided more insight, making it obvious that equal opportunities in pay and promotion based on performance and not on gender, as well as support within organizations to overcome barriers and obstacles can help women succeed in any career of their choice and attain well-deserved top managerial positions.

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Brief biography of the author

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Dr. Haritini Tsangari is Professor at the School of Business, University of Nicosia, Cyprus. She has a Ph.D. in Statistics from the Pennsylvania State University, USA. She has published numerous articles in journals and Conference proceedings. Many of her articles have been awarded, selected as Editor's Choice and been widely cited. She has been the principal investigator in projects funded by local or European funds. Her research interests include Applied Statistics in Finance, Management and Healthcare, especially in modelling and forecasting, gender inequalities, job satisfaction and retention. She is also an Editorial Board member of several academic journals.

Innovation Performance in the Context of Foreign Direct Investment Flows

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Abstract

It is generally considered that foreign direct investments are effective channels of technology and knowledge transfer. However, existing empirical literature dealing with effects of FDI flows on innovation performance at different levels brings rather ambiguous results. The present paper investigates the relationship between innovation performance measured through innovation output variables and foreign direct investment inflows and outflows as well as some other variables in conditions of manufacturing industrial sectors in Slovakia. The results of the conducted panel data regression analysis revealed that domestic firms capable of investing abroad in a form of outward foreign direct investment can be considered as drivers of innovation performance of manufacturing sectors. On the other hand, presence of foreign direct investors in manufacturing sectors in Slovakia leads rather to deleterious consequences to these host country sectors.

Keywords: innovation performance, foreign direct investment inflows, foreign direct investment outflows

Introduction

Over the past decades, there is a huge debate within empirical literature regarding the role of foreign direct investment (hereinafter also "FDI") flows in enhancing innovation performance of the countries (e.g. Ramzi, Salah, 2018; Wu, Zhenzhong, Zhuo, 2017; Flippetti, Frenz, Ietto-Gillies, 2017; Chang, Chen, Mcaleer, 2013), however with contrasting results. One stream of literature highlights the positive effects of inward FDI to host country and its firms. Another line of research shows rather negative effect of FDI presence on innovation performance of the host country. Similar can be concluded also with regard to the outward FDI, however literature in this field is less developed.

At the same time, there is only a limited number of studies analyzing the impact of foreign direct investment flows, taking into account both inward and outward FDI on innovation performance in conditions of the Central European countries. The present study is aimed to enrich the existing empirical literature by analyzing the relationship between innovation performance and FDI flows as well as other variables in conditions of manufacturing industrial sectors in Slovakia for the period of 2010-2017. The selection of this sector is reasoned by the fact that the share of the manufacturing industry on the GDP of the Slovak Republic was on average about 20%, and about 24% of the workers in the Slovak economy were employed in this industry, in the observed period. Hence, the manufacturing industry represents important part of the Slovak economy.

The rest of the paper is organized as follows: part 2 presents previous empirical findings related to the outlined topic, part 3 introduces data and methodology, part 4 brings own empirical results and their discussion followed by conclusion.

Previous Empirical Findings

A number of studies confirm the positive effect of FDI inflows on innovation or R&D activities at the industrial or firm level. The literature often distinguishes effects of FDI on the innovation activities within the targeted firm (direct effect) and on the innovation activities of the local firms (indirect or spillover effect) in the same sector or through backward linkages (e.g. Falk, 2015). It means that there are positive knowledge externalities generated by FDI that spill over to domestic firms and help them to improve their performance.

The link between inward FDI and innovation activity in China was an object of analysis in the study by Girma, Gong and Görg (2008). The authors concluded that inward FDI at the sectoral level is positively associated with domestic innovative activity only among firms that engage in their own research and development or that have good access to domestic finance. Similarly, Lee, Yoo and Kwak (2011) in conditions of Korea concluded that foreign investment stimulates the firms' R&D expenditures. However, they also found a number of additional factors to play a role in promoting firms' R&D activities, namely: the external conditions of the firms' R&D activities, including the location, other firms' R&D activities in the same industry, support from the government and technical support from research institutes. Khachoo and Sharma (2016) in their study in conditions of manufacturing sector in India took into account both intra- and inter-industry effects. They revealed that FDI has a moderate impact on innovation performance of firms residing in identical sectors; however, impact on the innovation performance of firms in supplying sectors is statistically strong.

On the other hand, Garcia, Jin and Salomon (2013) concluded that inward FDI has contrasting effects on the innovativeness of host country firms. Based on industry-level and firm-level data from Spanish manufacturing firms they found that FDI inflows into Spain are negatively associated with the ex post innovation of local firms. One of the few studies conducted in conditions of Central European countries by Čaplánová and Sivák (2012) identified positive as well as negative effect of foreign direct investment on innovation activity of domestic firms. They found non-linear spillover effect, where increase of foreign direct investment in particular region of a host country initially leads to decrease, and consequently to intensification of innovation activity of domestic firms. They suggested a dual effect of foreign direct investment on innovation activity – on one hand, spillover effect, and adverse effect, due to rising competition, on the other. The adverse effect dominates at the beginning, and then the positive effect prevails.

In addition to FDI inflow, there exists a very limited number of studies regarding FDI outflow. Boermans (2013) in his study of firm-level data from 10 transition economies examined the impact of internationalization on innovation, and stated that internationalization and innovation go hand in hand. First, he found that export increases R&D expenditures and raises the probability of acquiring international patents by a firm. Second, outward FDI increases the number of domestic and international patents. Third, international outsourcing is a key driver of the launch of new products and services. Hence, he concluded that exporting, FDI outflow, and international outsourcing show large and positive impacts on various innovation outcomes. Similar findings have been detected by a recent study by Piperopoulos, Wu and Wang (2018) conducted on a sample of Chinese firms. The panel data analysis showed that outward foreign direct investment has a positive effect on innovation

performance of Chinese subsidiaries measured by number of forward patent citations. This effect is even stronger when the outward investment is directed towards developed rather than emerging countries.

To sum up, the empirical evidence on the impact of FDI on the innovation performance at the industrial level is rather sparse and ambiguous. Moreover, there is a lack of research regarding effects of outward FDI on innovation performance of home country sectors. Hence, the ambition of the present study is to enrich the existing empirical literature by study of the effects of selected determinants including inward and outward FDI on the innovation performance within specific Slovakian manufacturing industrial sectors.

Data and Methodology

Within industrial level analysis the panel dataset of the manufacturing industry in the Slovak Republic, which includes the sectors from code 10 to code 32 based on NACE Rev. 2 classification in the period from 2010 to 2017 is used.

The innovation performance is measured through innovation output variable, namely number of enterprises, which introduced a process, products, marketing, or organizational innovation. This measurement expresses the successfully finished innovation process in the enterprises. Additionally, the share of these enterprises on the total number of enterprises in the particular industry as an output variable is also used. This variable helps to compare the industrial sectors, and identify the sectors with the highest percentage of successfully innovating enterprises. Similarly, Piekut (2013) stated that one of the variables, which describes a development level of a country is the number and the share of innovative business enterprises on the overall number of businesses.

The following models were constructed to study the impacts of selected determinants (independent variables) on the innovation output variables:

$$No.\,of\ IA = f(FDIin, FDIout, Sales, ROS, RDE, BERD) \quad (1)$$

$$Share\ of\ IA = f(FDIin, FDIout, Sales, ROS, RDE, BERD) \quad (2)$$

In the model (1), the number of enterprises with the innovation activity in a particular industrial sector (*No. of IA*) is regressed on: the FDI inflow *(FDI in)* and FDI outflow *(FDI out)*, which describes a change of the volume of inward/ outward foreign direct investments in/ from the particular industrial sector measured in thousand EUR; the volume of sales (*Sales*), which represents the average volume of sales achieved by one firm operating in the particular industrial sector measured in thousand EUR; the return on sales (*ROS*), which is computed as a sum of profits before depreciation, interest, and taxes as a ratio of sum of sales generated by all firms in the particular industrial sector; the R&D personnel (*RDE*), which expresses the average number of R&D employees in one firm operating in the particular industrial sector, and the expenditures on R&D activities spent by business enterprises (*BERD*), which represents the average expenditures on R&D activities spent by one enterprise in the particular industrial sector measured in thousand EUR.

Similarly, in the model (2), the share of enterprises with the innovation activity on the total number of enterprises in a particular industrial sector (*Share of IA*) is regressed on the same variables, namely FDI inflow and FDI outflow, the volume of sales (*Sales*), the return on sales

(*ROS*), the R&D personnel (*RDE*), and the expenditures on R&D activities spent by business enterprises (*BERD*).

The panel dataset contains the data on innovation output variables obtained from a combination of sources, namely the Industrial Property Office of the Slovak Republic, the European Patent Office and the Statistical Office of the Slovak republic, namely Yearbooks of Science and Technology. The data about the FDI flows and other independent variables are obtained from the portal of the National Bank of Slovakia, the Statistical Office of the Slovak Republic, namely Yearbooks of Industry and DATAcube database.

Table 1 shows descriptive statistics of the studied variables followed by the correlation matrix with Pearson and Spearman rank correlation coefficients to study the correlations between dependent as well as independent variables (Table 2).

Table 1: Descriptive statistics of studied variables

Variable	Mean	St. Dev.	Minimum	Maximum	Skewness	Kurtosis
No. of IA	65	58.80	6.00	322.00	1.675	3.267
RDE	0.60	0.84	0.00	3.38	1.943	3.052
BERD	723	1 043	16	6 747	3.546	17.244
FDIin	17 015	152 775	-683 315	814 996	1.315	13.203
FDIout	1 599	7 197	-10 388	26 369	1.294	2.145
Sales	8 297	17 771	74	104 012	3.506	12.603
ROS	0.0928	0.045	0.0780	0.0985	-1.323	1.773

Note: BERD, FDIin, FDIout, Sales are measured in thousand EUR; RDE and Number of innovation enterprises are measured in absolute numbers; ROS is ratio.
Source: own processing of the data

In the manufacturing sectors on average 65 firms perform innovation activities that in relative numbers means almost 10 % of all firms. Regarding the volume of FDI flows, in both cases, the average volumes in the observed period were positive, however the inward foreign direct investment significantly outweighed the volume of outward FDI.

Table 2: Correlation matrix

	ROS	***Sales***	***FDIout***	***FDIin***	***BERD***	***RDE***	***No. of IA***
No. of IA	-0.52*** (0.000)	-0.22* (0.084)	-0.15 (0.252)	-0.04 (0.771)	-0.36*** (0.006)	-0.41*** (0.001)	**1.00**
RDE	0.42*** (0.000)	0.42*** (0.000)	0.30** (0.018)	0.04 (0.747)	0.52*** (0.000)	**1.00**	-0,56*** (0,000)
BERD	0.40*** (0.002)	0.64*** (0.000)	0.20 (0.138)	0.27** (0.040)	**1.00**	0,65*** (0,000)	-0,15 (0,102)
FDIin	0.01 (0.919)	0.21 (0.107)	0.18 (0.161)	**1.00**	0,04 (0,668)	-0,09 (0,436)	0,28*** (0,004)
FDIout	0.19 (0.141)	0.13 (0.311)	**1.00**	0,15 (0,187)	0,10 (0,396)	0,21* (0,097)	-0,07 (0,520)
Sales	0.37*** (0.003)	**1.00**	0,08 (0,494)	-0,03 (0,791)	0,69*** (0,000)	0,72*** (0,000)	-0,11 (0,217)
ROS	**1.00**	0,54*** (0,000)	0,14 (0,216)	-0,12 (0,200)	0,37*** (0,000)	0,56*** (0,000)	-0,22** (0,015)

Note: the values in the parentheses are the p-values for the correlation coefficient, based on the p-values; the asterisks denote the statistical significance at the level of 1% (***), 5% (**), 10% (*). The Pearson's correlation coefficients are above the diagonal, and the Spearman's rank correlation coefficients are below the diagonal.
Source: own processing of the data

The correlation matrix shows some statistically significant correlations between dependent variable and some independent variables, namely Sales, ROS, BERD, RDE and in some cases also FDI variables. These relations were further more deeply analyzed through regression analysis. The following general model is used to analyze the panel dataset:

$$Y_{it} = \beta_0 + \sum_{k=1}^{K} X_{itk}\beta_{ik} + \varepsilon_{it}, t = 1, 2, \dots, T, i = 1, 2, \dots, N$$

where β_0 is a constant, X_{itk} represents the k^{th} explanatory variable of the t^{th} year in the sector i, ε_{it} is the error term. K is number of explanatory variables excluding the constant, N represents the number of cross-sectional individuals, T is time period.

The coefficients of the models were estimated with use of a pooled OLS method, or the panel data estimations – fixed-effect or random-effect estimation methods. The same methods use, for example, Brzozowski (2008) or Qu et al. (2013) in their researches. Several tests were performed to select the appropriate model estimation method, namely the F-test for testing, whether there exist panel effects in the model, the Breusch – Pagan Lagrange multiplier test (LM-test) for testing the significant difference across units and finally, the Hausman test for selection between the random- and fixed-effect methods.

Results and Discussion

In the model (1) the dependent variable, measured by number of enterprises with some innovation activity is regressed on the FDI inflow and outflow, the volume of sales, as the measure of size, the return on sales, as the measure of profitability, and the innovation input variables. First, the panel diagnostic tests are performed and their results reported in the table 3. Standardization of the variables is used, since the scales and units are different among all the variables.

Table 3: Panel diagnostic - dependent variable No. of IA

	Testing statistic	*Null hypothesis*	*Recommendation*
F-test	8.66 *** (0.00)	No panel effects	FE is better than OLS
LM-test	32.30 *** (0.00)	No significant difference across units	RE is better than OLS
Hausman test	8.29 (0.22)	Errors not correlated with the regressors	RE is better than FE

Note: the values in the parenthesis are the p-values, and based on the p-values, the asterisks denote the statistical significance on a level of 10% (*), 5% (**), or 1% (***).
Source: own processing of the data

The F-test leads to rejection of the pooled OLS method in favor of fixed-effect, and the Lagrange multiplier Breusch-Pagan test of panel effects shows that the random-effect estimation is better than pooled OLS as well. Based on the Hausman test, the random-effect variant was selected. The results of the model estimated with use of random-effect method are presented in the table 4. Since the Pesaran test revealed the problem with cross-sectional dependence in the model, the coefficients were estimated with cross-sectional dependence-corrected estimator and only these corrected results are reported in the following table.

Table 4: Random-effect regression - dependent variable No. of IA

(standardized variables)	*Coefficient*		*Std. error*	*t-ratio*	*p-value*	*VIF*
Constant	0.311		0.30	1.04	0.30	-
Sales	0.044		0.13	0.34	0.73	1.22
ROS	-0.193		0.13	-1.47	0.15	1.20
BERD	-0.092		0.10	-0.89	0.38	1.23
RDE	-0.241	***	0.07	-3.69	0.00	1.23
FDIin	-0.044		0.05	-0.94	0.35	1.22
FDIout	0.051	**	0.02		0.01	1.17
R-squared	0.06			Adjusted R-squared		-0.05
F (6, 50)	0.52	H0: coefficients equal to zero			p-value	0.79
Breusch-Pagan	10.17	H0: no heteroscedasticity			p-value	0.12
Durbin-Watson	1.75	H0: no serial correlation in errors			p-value	0.13
Pesaran test	2.56	H0: no cross-sectional dependence			p-value	0.01
Shapiro-Wilk	0.83	H0: normality of residuals			p-value	0.00

Note: The asterisks denote the statistical significance of coefficients on a level of 10% (*), 5% (**), and 1% (***), based on p-values. VIF represents variance inflation factor, where values above 10.00 may indicate a collinearity problem. The reported (adjusted) R-squared and F-statistic are incorrect. The correct R-squared is 0.32.

Source: own processing of the data

Based on the results, the statistically significant impact on the innovation performance have only the R&D personnel and the FDI outflow, the first with negative, and the latter with positive effect. The interpretation of scaled variables is that one standard deviation increase (0.847) of R&D personnel causes decrease of 0.241 times standard deviation of innovation activity in the sector. Hence, the increase of about eight R&D employees causes the decrease of average number of enterprises with some innovation activity in the industrial sector of 142 enterprises. This surprising result can be attributed to the tendency of centralization of innovation activities into larger firms accompanied by relocation of some R&D employees from smaller companies there and hiring of some additional R&D employees.

On the other hand, the increase of the FDI outflow of one standard deviation (153 456 thousand EUR) leads to increase of the number of innovation enterprises of three enterprises, which means that, when the enterprises invest abroad, the innovation performance slightly increase in their home country. It can be explained by either the effort of the firms to be able to compete on the (usually) more developed foreign markets with innovative products or processes, or the motivation and new knowledge of these enterprises obtained abroad, which they try to implement in their parent firm. Hence, it can be agreed with Phene and Almeida (2008) that firms can improve their innovation performance by successfully accessing knowledge and technologies from abroad and by learning from host market environments. Similar results brought also Piperopoulos, Wu and Wang (2018) who outlined the innovation-enhancing effect of outward foreign direct investment.

However, examining the number of the innovation firms in the sector can be confusing, when there is not the comparison to the total number of firms in the sector. For this reason, the same model, with the main dependent variable the share of the innovation enterprises on the total number of enterprises in the industrial sector is constructed. The tests for selecting the appropriate estimation method are in the table 5.

Table 5: Panel diagnostic - dependent variable Share of IA

	Testing statistic	*Null hypothesis*	*Recommendation*
F-test	1.60 (0.14)	No panel effects	OLS is better than FE
LM-test	1.11 (0.29)	No significant difference across units	OLS is better than RE
Hausman test	11.42 (0.08) *	Errors not correlated with the regressors	FE is better than RE

Note: the values in the parenthesis are the p-values, and based on the p-values, the asterisks denote the statistical significance on a level of 10% (*), 5% (**), or 1% (***).
Source: own processing of the data

Based on the F-test as well as the Lagrange multiplier Breusch-Pagan test the pooled OLS was selected as an appropriate method for the coefficients estimations. The results of the pooled OLS panel regression are reported in the table 6.

Table 6: Pooled OLS - dependent variable Share of IA

(standardized variables)	*Coefficient*		*Std. error*	*t-ratio*	*p-value*	*VIF*
Constant	-0.016		0.12	-0.13	0.89	-
Sales	0.624	***	0.11		0.00	1.78
ROS	-0.038		0.05	-0.71	0.48	1.34
BERD	-0.152		0.26	-0.58	0.56	2.09
RDE	0.092		0.29	0.31	0.75	1.58
FDIin	-0.203	***	0.07	-2.80	0.01	1.15
FDIout	0.045		0.12	-0.38	0.71	1.14
R-squared	0.50		Adjusted R-squared			0.43
F (6, 50)	8.17	H0: coefficients equal to zero			p-value	0.00
Breusch-Pagan BP	20.71	H0: no heteroscedasticity			p-value	0.00
Durbin-Watson	1.57	H0: no serial correlation in errors			p-value	0.03
Pesaran test	6.77	H0: no cross-sectional dependence			p-value	0.00
Shapiro-Wilk	0.93	H0: normality of residuals			p-value	0.00

Note: The asterisks denote the statistical significance of coefficients on a level of 10% (*), 5% (**), and 1% (***), based on p-values. VIF represents variance inflation factor, where values above 10.00 may indicate a collinearity problem.
Source: own processing of the data

The pooled OLS was conducted with the use of Arellano estimator, which gives heteroscedasticity- and serial correlation-corrected results. The model can explain 50% of the dependent variable's variance. The model was also estimated with cross-sectional dependence-corrected estimator, and, after comparison of those results with the presented results, they are not reported, since they are very similar to the reported ones (the same for coefficients, similar for standard errors, t-ratios, and p-values, and same for statistical significance).

Based on the reported results, the sales have statistically significant and positive effect, while the FDI inflow has statistically significant and negative effect on the share of innovation enterprises on the total enterprises in the industrial sector. The increase of the average sales volume in the industrial sector of 17 389 thousand EUR (one standard deviation) causes the increase of the share of innovation enterprises by approximately 7% of the total number (one standard deviation of the dependent variable equals to 12.1%). The positive effect of the sales volume in the industrial sector can be explained by the fact that higher sales lead to higher

profits in the sector and with the higher profits more firms are willing to involve in innovation activities.

On the other hand, the increase of the FDI inflow of 153 456 thousand EUR leads to the decrease of the percentage of innovation enterprises by 2.5%. This negative statistically significant association between FDI inflow and the innovativeness of local firms is similar to the result achieved in the study by Garcia, Jin and Salomon (2013). The negative effect of the FDI inflow may be caused by relocation of the innovation activities into the parent firm, or other host countries, which is a common practice of the multinational firms. Hence, it seems that it is not a physical presence of foreign firms in the same industry that stimulates innovation performance of local firms, but rather their own intrinsic innovativeness that has already been pointed out by Falk (2005).

Conclusion

Several previous studies have investigated the innovation performance – FDI relationship with ambiguous findings. The present study was aimed to enrich the existing literature with industrial level study conducted in conditions of manufacturing industrial sectors in Slovakia.

The study proved the innovation-enhancing effect of outward foreign direct investment with regard to the number of enterprises with some innovation activity. Thus, the higher volume of outward FDI is placed abroad, the more domestic firms are engaging in innovation activities. It can be concluded that domestic firms capable of investing abroad in a form of outward foreign direct investment can be considered as drivers of innovation performance of manufacturing sectors in Slovakia.

On the other hand, presence of foreign direct investors in manufacturing sectors in Slovakia leads rather to deleterious consequences to these host country sectors with regard to the share of the innovation firms on the total number of firms in the particular industrial sector. It seems that after acquiring local firms the foreign investors have tendency to centralize innovation activities elsewhere, hence the increase of inward FDI into particular sector is accompanied by the decrease of the share of local innovation firms.

However, outward as well as inward FDI do not form a unified category and in the future research it is recommended to distinguish their forms, namely mergers and acquisitions, joint ventures, or greenfield and brownfield investments. It is assumed that different forms of FDI in connection with their different motives may have diverse impacts on innovation performance.

Regarding the other potential determinants of innovation performance, negative effect of R&D personnel and positive effect of sales on particular innovation output variable was detected. The other considered independent variables seem not to have statically significant impact on the innovation performance. More detailed analysis of these factors using firm-level data is on the agenda of the future research.

Acknowledgments

The paper presents partial results of the research project VEGA No. 1/0842/17 “The causality links between foreign direct investments and firms´ performance” in the frame of the granting program of the Scientific Grant Agency of Ministry of Education, Science, Research and Sport of the Slovak Republic and Slovak Academy of Sciences.

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The Financing and Efficiency of Automatic Brine Spraying Systems in the Czech Republic

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Abstract

A significant risk factor on the protection of drivers and vehicles, particularly with regard to highways - due to the speed limit, is the climatic conditions. The risk increases exponentially when the roads freeze. The greatest danger is on highway bridges due to the absence of land beneath the structure. Therefore it is highly desirable to prevent such accidents by using adequate technologies and thus eliminate risks of road accidents. The aim of this work is to compare the financing of the automatic brine spraying systems already in use on highway bridges in the Czech Republic and determine their effectiveness. Data from 3 installed automatic brine spraying systems are used for the analysis.

Keywords: financing, effectiveness, traffic safety, automatic brine spraying system (ABSS)

Introduction

The automatic brine spraying system (hereinafter ABSS) is deployed on highway bridges to increase traffic safety and traffic flow. The primary function of ABSS is to ensure early spraying of the road depending on road conditions detected by meteorological sensors. ABSS consists of a technological container housing a pumping station filled with tanks with de-icing mixture, a road weather station (hereinafter RWS), valve cabinets and road nozzles on the treated bridge, pressure pipes for distribution of de-icing mixture, power and communication cabling. The road weather station uses roadway sensors to anticipate freezing conditions and activates ABSS in time.

An ABSS is installed on highway bridges based on current requirements by the Road and Motorway Directorate of the Czech Republic (hereinafter ŘSD ČR).

The installation costs of these systems are very high, so it is necessary to allocate the places of each installation correctly, depending on its need and effectiveness. Several systems have already been installed on motorway bridges in the Czech Republic and these systems are now fully functional. It is also necessary to ask whether the use of these intelligent systems is that much more efficient than the use of standard salt spraying methods.

Selected ABSS installed in the Czech Republic

Firstly, we will look at the installation of the automatic brine spraying system located at a highway bridge near the city of Olomouc in the Olomouc Region. The length of the treated section is 130m across all 4 (2+2) highway lanes. The official site name is “Highway D-35 Příkazy” and this site has these parameters:

- 1x ABSS technological container (standard)

- 1x road weather station (RWS)
- 90m LV connection cable

Installation costs are given in Table 1.

Table 1: Installation costs

Item	Cost
ABSS technological container	900.000 CZK
Automatic brine spraying system technology (ABSS), road weather station	11.800.000 CZK
LV connection cable	200.000 CZK
Transport and other	1.200.000 CZK
Total	**14.100.000 CZK**

Secondly, we will look at the installation of the automatic brine spraying system located at a highway bridge near the city of Sokolov in the Karlovy Vary Region. The length of the treated section is 370+90m across all 4 (2+2) highway lanes. The official site name is "Highway D-6 Stare Sedlo Transmotel" and this site has these parameters:

- 1x ABSS technological container (enlarged)
- 2x road weather station (RWS)
- 50m LV connection cable

Installation costs are given in Table 2.

Table 2: Installation costs

Item	Cost
ABSS technological container	1.650.000 CZK
Automatic brine spraying system technology (ABSS), road weather station	21.100.000 CZK
LV connection cable	150.000 CZK
Transport and other	1.200.000 CZK
Total	**24.100.000 CZK**

Finally, we will look at the installation of the automatic brine spraying system located at a highway bridge near the city of Sokolov in the Karlovy Vary Region. The length of the treated section is 460+360+240m across all 4 (2+2) highway lanes. The official site name is "Highway D-6 Tisova Zlata" and this site has these parameters:

- 1x ABSS technological container (enlarged)
- 2x road weather station (RWS)
- 400m LV connection cable

Installation costs are given in Table 3.

Table 3: Installation costs

Item	Cost
ABSS technological container	1.650.000 CZK
Automatic brine spraying system technology (ABSS), road weather station	33.700.000 CZK
LV connection cable	500.000 CZK
Transport and other	2.300.000 CZK
Total	**38.100.000 CZK**

Results

Currently, ABSS technology is used on several highway bridges in the Czech Republic. The first systems were installed only a few years ago, so there is not a lot of relevant data available for expert evaluation of the efficiency of ABSS installation. In the near future it will be possible to analyze the efficiency (financial savings, decrease in accidents and damage to vehicles) and decide on the future use of this technology.

Presently installed ABSS are given in Table 4.

Table 4: Existing already installed ABSS

Location	Length of treated section	System price (without VAT)	Year of installation
Tisová Zlatá - 3x bridge on D6	1060 m	38,1 mil. CZK	2018
Staré Sedlo - 2x bridge on D6	460 m	24,1 mil. CZK	2019
Příkazy - 1x bridge on D35	130 m	14,1 mil. CZK	2019

The price for installing the system does not increase linearly with respect to the length of the treated section of the highway. This model is shown in Figure 1.

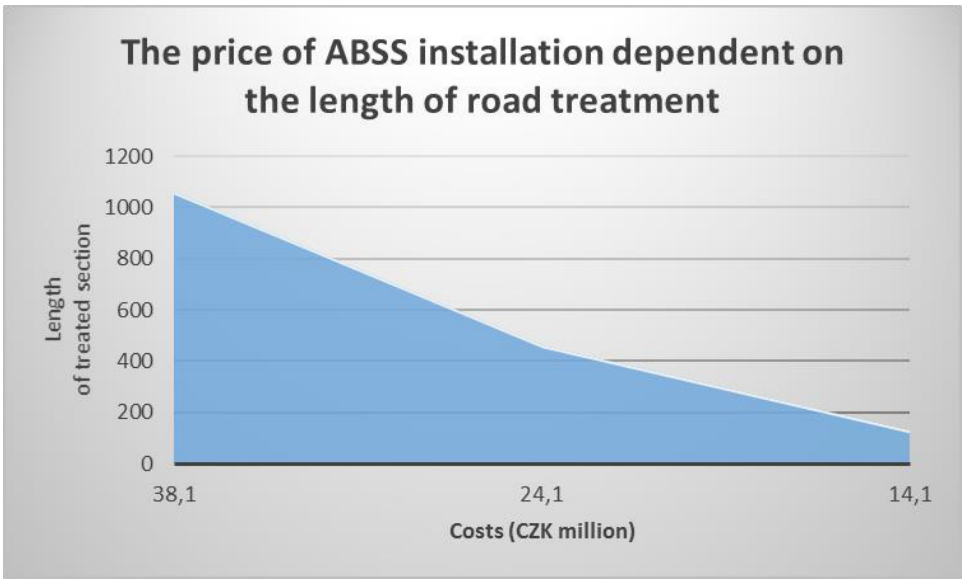

Figure 1: The price of ABSS installation dependent on the length of road treatment

The average price for 1 meter of treated surface of the highway is approximately 11.500 CZK, see below.

1650 m = 76 mil. CZK, ie. 1 m = approx. 46.000 CZK (4 lanes of highway)
= approx. 11.500 CZK per 1 aine of highway

Conclusion

Unfortunately, there is no sophisticated expert method that professionally selects the most suitable locations for installing new ABSSs based on current requirements and real historical data. Currently, we are working on a sophisticated likelihood method, i.e. creating an expert map. The result will be effective planning of new ABSS systems.

The cost of installing these intelligent anti-icing systems is very high and its subsequent effectiveness is difficult to measure. Therefore, we cannot take into account only the cost of the technology, but it is also necessary to take into account savings with regard to human life and damage to property.

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Sponsorship Research Over Three Decades: A Bibliometric Citation Analysis

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Abstract

Corporate sponsorships have been an established marketing tool for more than three decades. Starting from 1981 interest in sponsorship research increased steadily until 2016. The current article examines how sponsorship research has evolved in these past three decades by conducting a bibliometric citation meta-analysis of 949 documents by 1681 authors in 349 journals. The paper presents the most influential literature in sponsorship research using HistCite software. Results show the dominance of sports in sponsorship research as well as the importance of effect measurement topics in recent years. However, sponsorship and its strategic application become more important in sponsorship research. In addition a new topic emerged: Sponsorship in the context of corporate social responsibility gains increased attention in recent years.

Keywords: sponsorship, bibliography, meta-analysis, co-citation analysis

Introduction

Sponsorship is an established marketing communication tool. In 2014, the worldwide sponsorship investment was $55.3 billion, in 2017 expenditure rose to $62.7 billion, and the projected figure for 2018 is $65.8 billion; a major part of the 2017 worldwide budgets was spent in North America ($23.1 billion). In this key sponsorship market, sports is by far the most relevant sponsorship category ($16.2 billion), followed by entertainment sponsorships ($2.3 billion) and cause sponsorships with an expenditure of $2.1 billion (IEG 2017). These figures highlight the overall commercial relevance of sponsorship as a marketing subject and the dominating position of sports in this area.

In addition, sponsorship is germane to academic research. The growth of sponsorship is accompanied by a large number of studies examining different aspects of sponsorship. The variety of articles indicates the wealth of knowledge in this research field. A literature review helps to structure this knowledge and considers the thematic area from a holistic perspective. The period when this type of article needs updating can differ significantly in different research fields. Regarding sponsorship research, systematic (Cornwell, & Maignan 1998; Walliser, 2003; Kim et al., 2015; Johnston, & Spais, 2015). and narrative (Walraven et al., 2012; Jin, 2017) reviews have been carried out to date. However, no bibliometric citation analysis was conducted.

Therefore, the current article presents an objective analysis of the academic literature by examining key authors and articles over a period of 36 years (1980-2016). Additionally,

important journals in sponsorship research are determined. Consequently the contributions of this article to the literature are twofold. First, the article shows the most influential literature in sponsorship research. Second, this article contributes to the literature by examining the evolution of sponsorship research, highlighting emerging areas and hot topics and thus may serve as reference guidance for future sponsorship research projects.

Methodological approach

Bibliometric citation analysis is an entrenched tool for meta-analytical research (Cote, Leong, & Cote, 1991; Harsanyi, 1993) and was originally applied in different disciplines in science and the humanities (White, & McCain, 1989; Wiberley, 2003). Over time, bibliometric citation analysis was also conducted in the field of social sciences, including marketing (Arnott, 2007), advertising (Kim, & McMillan, 2008), and communications (Pasadeos, Renfro, & Hanily, 1999). Bibliometric citation meta-analysis reveals crucial articles in an objective way. Data from this analysis are useful to measure not only popularity but also the impact of specific authors, publications, and journals. Moreover, bibliometric analysis allows assessing the development of a given research topic from a meta-analytical perspective that treats a citation as a substantial unit of analysis (Kim, & McMillan, 2008). Therefore citation meta-analysis is more than simple counting of publications (Fetscherin, & Usunier, 2012).

The paper shows key journals, articles, and authors using HistCite software. The program HistCite creates a citation index for a set of documents retrieved from the academic database Web of Science (ISI Web of Knowledge). Citation frequencies using specific indices reveal the most significant works in the set. To ensure a comprehensive literature pool, a three-step approach is applied. In a first step, the publication time frame is set from 1980 (start of the database) to 2016. In a second step, *sponsorship* is used as the *topic* keyword in the Web of Science Core Collection. This results in 4555 articles regarding sponsorship. In a third step, the results are narrowed down to those of the research areas *business economics* and *social sciences other topics*. According to Web of Science, research areas represent a subject classification scheme that is shared by all Web of Science databases. This facilitates the identification and analysis from multiple databases that pertain to the same field (Web of Science, 2017). Finally, 949 sources are identified with articles (711) and proceedings papers (122) as dominant document type. These publications form the data basis for following analyses.

Results

This section presents the results of the bibliometric citation meta-analysis, including a time series analysis and insights into the global distribution of the most influential journals in sponsorship research. Further the most influential articles in the community and trending papers are examined.

Time series analysis

Starting from 1981 (Yogev, & Kfir, 1981) interest in sponsorship increased steadily until 2016. The continuous growth is reflected by a positive gradient of the trend line in figure 1. From 1981 to 2007 the number of publication per year ranges between 1 and 31 (average number = 12). From 2008 to 2016, the mean value of publications is 70 (almost six times higher than the average number of publications between 1981 and 2007) with a minimum of 50 publications in 2008 and maximum of 99 publications in 2015. Therefore the illustration of the number of publications per year shows a boosting interest in sponsorship research especially from 2008 onward.

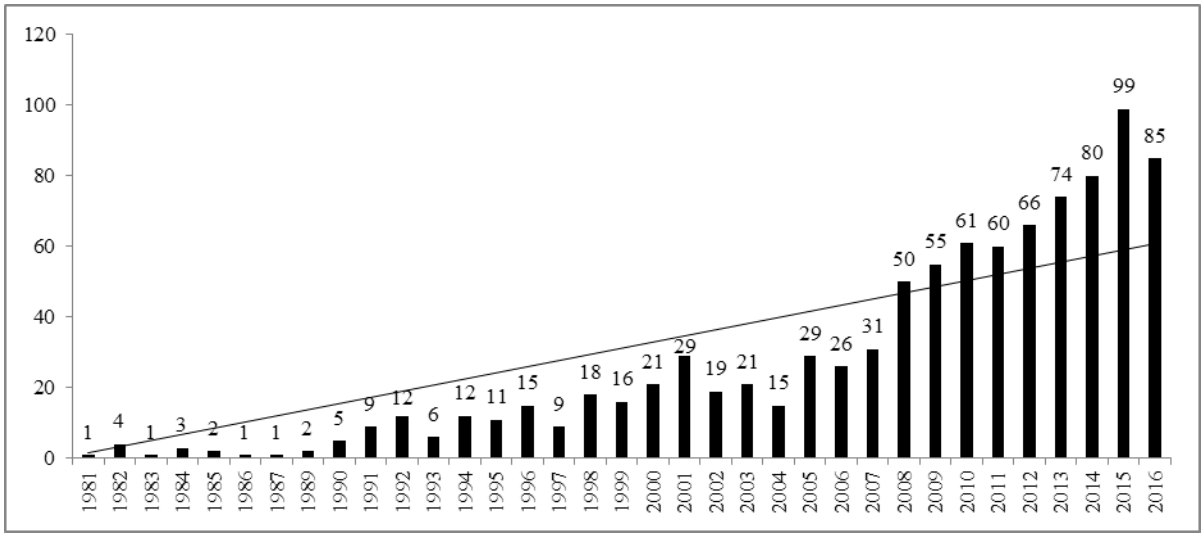

Figure 1: Number of publications per year, including trend line

Most influential journals

The bibliometric citation analysis identifies 349 outlets in total. However, following the approach of Baumgartner and Pieters (2003), the current article aims to identify which journals are the most influential in the field of sponsorship research. Therefore, Table 1 summarizes the top ten journals in terms of the total number of published articles related to sponsorship (R_s). The impact of journals is also measured in terms of citations received. Therefore, two scores for citations are provided: (1) the total global citation score (TGCS), representing the total number of times a publication has been cited in the Web of Science Core Collection, and (2) the total local citation score (TLCS), representing the number of times an article has been cited by other articles in the defined collection (i.e., 949 documents). In addition to the ranked journals (Table 1), other journals contribute to the field of sponsorship research, but the focus of the bibliometric citation meta-analysis is to assess the most influential journals and not to identify every journal dealing with research on sponsorship. In general, journals with a focus on sports and/or advertising dominate the list of the most influential journals, next to a few other top journals, including *European Journal of Marketing*, *Journal of Business Research* and *Psychology & Marketing*.

Table 1: Ranking of top ten journals: Sorted by Rs

Rank	Journal	**R_s**	TLCS	TGCS
1	International Journal of Sports Marketing & Sponsorship	**68**	100	225
2	Journal of Sport Management	**53**	185	539
3	Psychology & Marketing	**39**	535	1100
4	Journal of Advertising Research	**35**	626	1151
5	Journal of Advertising	**33**	1027	2181
6	International Journal of Advertising	**30**	84	222
7	European Journal of Marketing	**25**	87	294
8	Journal of Business Research	**22**	120	368
9	Sport Management Review	**19**	17	97
10	European Sport Management Quarterly	**14**	3	30

If the journals are sorted by TLCS (see Appendix A) sport outlets no longer dominate the list: *Sport Management Review* and *European Sport Management Quarterly* are replaced by

Journal of the Academy of Marketing Science and *Journal of Marketing Research*. Consequently top tier marketing journals and more specifically advertising journals (e.g. Journal of Advertising, Journal of Advertising Research, International Journal of Advertising) shape the body of the most influential journals (sorted by TLCS).

Most influential articles in the community and trending papers

Bibliometric citation meta-analysis enables the identification of the most cited and consequently influential articles in sponsorship research. Table 2 reports the results of this examination. The table contains the ten most influential articles sorted by local citation score LCS, representing the number of citations of a source in the local database (i.e. 949 documents). Moreover, Table 2 includes the local citation score per year (LCS/t), the total number of citations of a paper in Web of Science (GCS) and the corresponding yearly average (GCS/t). All articles in the list can be considered highly important in shaping the research area of sponsorship, though the work of Cornwell and Maignan (1998) provides a comprehensive literature review and therefore has a special position among these ten articles.

Table 2: Ranking of top ten articles: Sorted by LCS

Rank	Authors (year)	Title	**LCS**	LCS/t	GCS	GCS/t
1	Speed, Thompson (2000)	Determinants of Sports Sponsorship Response	**151**	8.88	251	14.76
2	Gwinner, Eaton (1999)	Building Brand Image through Event Sponsorship: The Role of Image Transfer	**148**	8.22	265	14.72
3	Cornwell, Weeks, Roy (2005)	Sponsorship-Linked Marketing: Opening the Black Box	**109**	9.08	176	14.67
4	Cornwell, Maignan (1998)	An International Review of Sponsorship Research	**108**	5.68	214	11.26
5	Crimmins, Horn (1996)	Sponsorship: From Management Ego Trip to Marketing Success	**98**	4.67	137	6.52
5	Meenaghan (2001)	Understanding Sponsorship Effects	**98**	6.13	157	9.81
7	Rifon, Choi, Trimble, Li (2004)	Congruence Effects in Sponsorship - The Mediating Role of Sponsor Credibility and Consumer Attributions of Sponsor Motive	**97**	7.46	221	17.00
8	Johar, Pham (1999)	Relatedness, Prominence, and Constructive Sponsor Identification	**89**	4.94	138	7.67
9	Javalgi, Traylor, Gross, Lampman (1994)	Awareness of Sponsorship and Corporate Image – An Empirical Investigation	**77**	3.35	124	5.39
10	Simmons, Becker-Olsen (2006)	Achieving Marketing Objectives through Social Sponsorships	**76**	6.91	180	16.36

Topics related to sponsorship effect measurement dominate the list of the ten most influential articles in sponsorship research, with the study by Speed and Thompson (2000) at the top, analyzing several determinants of sport sponsorship response.

A closer examination of the sponsorship fields reveals that sports remains the most dominant area: Seven of nine articles – Cornwell and Maignan (1998) was excluded from the analysis because of its exceptional position in the review – deal with sport sponsorship topics. Four articles can be assigned uniquely to the sports area, while three articles at least partly investigate sport sponsorships (two articles examine culture sponsorships in addition to sport sponsorship, while one discusses sport, culture, and cause sponsorships). Other sponsorship areas receive less attention in the literature. However, two articles examine exclusively cause sponsorship.

In order to comprehensively answer the question of which publications are the most influential in the field of sponsorship, the analysis includes another index (LCS_e), the ratio of local citations at the end of the period covered. This indicator shows whether an article receives more citations at the end of the time frame (i.e. year 2016) studied. Table 3 provides trending publications, ranked in descending values of LCS_e.

Table 3: Ranking of top ten trending articles: Sorted by LCSe

Rank	Author(s) (year)	Title	**LCS_e**	LCS/t	GCS/t
1	Speed, Thompson (2000)	Determinants of Sports Sponsorship Response	**59**	8.88	14.76
2	Gwinner, Eaton (1999)	Building Brand Image through Event Sponsorship: The Role of Image Transfer	**51**	8.22	14.72
3	Cornwell, Weeks, Roy (2005)	Sponsorship-Linked Marketing: Opening the Black Box	**49**	9.08	14.67
4	Rifon, Choi, Trimble, Li (2004)	Congruence Effects in Sponsorship - The Mediating Role of Sponsor Credibility and Consumer Attributions of Sponsor Motive	**37**	7.46	17.00
5	Meenaghan (2001)	Understanding Sponsorship Effects	**31**	6.13	9.81
5	Simmons, Becker-Olsen (2006)	Achieving Marketing Objectives through Social Sponsorships	**31**	6.91	16.36
7	Cornwell, Humphreys, Maguire, Weeks, Tellegen (2006)	Sponsorship-Linked Marketing: The Role of Articulation in Memory	**29**	5.27	8.18
8	Cornwell, Maignan (1998)	An International Review of Sponsorship Research	**27**	5.68	11.26
9	Madrigal (2001)	Social Identity Effects in a Belief-Attitude-Attentions Hierarchy: Implications for Corporate Sponsorship	**24**	3.69	8.44
10	Olson (2010)	Does Sponsorship Work in the Same Way in Different Sponsorship Contexts?	**23**	4.43	7.43

The content of the top ten list of trending articles differs from Table 2 (most influential articles) in three articles. Crimmins and Horn (1996), Johar and Pham (1999), and Javalgi, Traylor, Gross, and Lampman (1994) are replaced by Cornwell, Humphreys, Maguire, Weeks, and Tellegen (2006), Madrigal (2001), and Olson (2010). However, the focus on sponsorship effect measurement remains unchanged. Further, the order of the articles is

different. In particular, the integration of social aspects into sponsorships gains in importance, for example Simmons and Becker-Olsen (2006) jumps from position ten to six.

A closer examination of the sponsorship fields among these nine trending articles (Cornwell, & Maignan, 1998—was again excluded from the analysis) reveals that sports remains the most dominant area, which again is in line with previous findings. However, only three articles examine exclusively sport sponsorship. Three other articles explore sport sponsorship in addition to culture and/or cause sponsorship. Furthermore, two articles investigate only cause sponsorship, while one article assesses culture sponsorship.

Consequently, these results confirm the dominance of sport sponsorship as well as the importance of effect measurement topics. Additionally, emerging topics are identified, especially sponsorship in the context of corporate social responsibility gained increased attention in recent years.

Conclusion

Sponsorship is a mainstream marketing activity. This communication tool not only ranks high in the interest of practitioners but also gains growing popularity in academic research. The aim of this article is to present an objective analysis of the existing academic literature by conducting a retrospective empirical analysis on the basis of a bibliometric citation meta-analysis with data from the ISI Web of Science database. In total, 949 documents by 1681 authors in 349 journals are examined. In doing so, the paper shows key journals, articles, and authors using HistCite.

Although the starting point of sponsorship research can be defined in the early 1980s, the communication tool has experienced the peak of attention in academic literature in recent years. HistCite analysis reveals insights into the global distribution of the most influential journals in the sponsorship research area. Thereby the dominance of sport sponsorship became obvious. Consequently journals with a focus on sport and / or advertising dominate the list of the most influential journals. This result is in line with sponsorship practice. For companies sport sponsorship is by far the most relevant sponsorship category (IEG, 2017). Further, highly cited and therefore highly relevant articles within the sponsorship research community as well as the corresponding authors are identified. The findings show that the measurement of sponsorship effects dominates the field of sponsorship research, as the majority of articles develops measurement tools and examines aspects of associated sponsorship effects. Moreover, the list of the most influential articles reveals that sport is the most dominant area in sponsorship. In order to comprehensively answer the question of which publications are the most influential in the field of sponsorship, the analysis includes the identification of trending papers. The results confirm the dominance of sport sponsorship as well as the importance of effect measurement topics. Additionally, emerging topics are identified. Especially sponsorship and its strategic application and sponsorship in the context of corporate social responsibility gained increased attention in recent years.

Based on the results of this article as well as the comparison to other fields, further areas for future research could be identified. For example, the rise of social media (Conick, 2017) and its potential as a sponsorship activation tool, could define a new research era (Johnston, & Spais, 2016). Thereby the change in the type of social media content, for example well-produced films will be replaced by short films due to the immediacy of short-form content, could be one subject of analysis (IEG, 2016). In this context, social influencers take on

increased importance because of their authenticity in combination with remarkable numbers of followers and open another field of research.

Further, digitization could play a decisive role in future sponsorship (research) projects. Due to this phenomenon new and popular sponsorship fields emerge, for example esports (Nielsen, 2017). Moreover, striking technology (e.g., augmented and virtual reality) will take center stage in order to deepen and intensify the individual experience of sponsorship activation (IEG, 2016).

Finally, this study also has some limitations. While the data set from the Web of Science database is comprehensive, the analysis is not exhaustive. Although the top-tier marketing journals are present in the study, the analysis did not include all journals available or all conference proceeding worldwide. These articles were considered in the global citation analysis but were not included as possible key articles (local citation analysis). Therefore, the results are only valid within this certain scope. Further, despite the high degree of objectivity, the bibliometric citation analysis has subjective facets (e.g., choices were made on search terms used).

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Florian Riedmueller is Vice Dean and Lecturer at the Business Faculty of the Technische Hochschule in Nuernberg (Germany). He researches leisure marketing management, specifically how common marketing strategies can be transferred into the leisure management market. Current studies explore the evaluation of service quality, sponsorships and event management. He is the editor of the German "Management handbook sports marketing" and has published in several Marketing Journals.

Bjoern Ivens is chair professor of sales and marketing at Otto-Friedrich-University Bamberg, Germany. His research interests lie in the fields of customer management, price management, and marketing organization. He is also a member of the board of directors of the competence center for the digitalization of business models. His research has been published in journals such as Journal of Business research, Psychology & Marketing or Industrial Marketing Management.

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The Degree of Digitalization

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Abstract

This article deals with the topic of digitalization and it will inform the different sides of it. It contains also the possibilities, the risks and problems concerning this topic. The author focuses mainly on a possible solution approach. This solution approach can be deeper analyzed and connected to similar approaches. The goal of this article is to show in which direction the topic of digitalization is situated for the author. Further discussion points will be taken and analyzed in further articles.

Keywords: digitalization, digital transformation, degree of digitalization

Introduction

In times of globalization and the constant competition, it is essential for companies to develop new product innovations or find strategies for binding current customers. To enable innovation human capital is essential. To find the best personnel is thinking without borders very helpful and it could spread the scope of potential employees. Digitalization is a helpful instrument and for that reason, companies prepare more and more the requirements for the digital working place. Machines are interconnected to each other, they get a digital interface and communicate with the ERP System, Service technicians use tablets to register the work, etc.

In these various situations of digitalization there are no limits for science and the different topics build up a chain of cross-cutting issues. Chances, risks, challenges or problems in the context of industrial revolution 4.0 or digitalization triggers a large number of discussions. The desire to become more profitable, improving a process, being more efficient faster and better than the competitor to conquer the remaining market shares is in the nature of each concern's philosophy. Digitalization is one modern tool for companies to reach these goals.

But of all chances and advantages through the digitalization are arguments upcoming not to underestimate the risks. Employees who are working in mechanized work fields could lose their job with the arrival and implementation of digitalization. Digitalization will create also new jobs but, will the new jobs compensate for the jobs which have been lost?

In the scale of digital transformation most diverse areas are addressed. It affects the working conditions, leadership, organizational structures, business models value chains and processes. Every team leader has to self-determine, which areas are affected and how to react to digital transformation. Some are more, some are less and some are not affected by the change. Those who are affected have to pull their conclusions and preferably achieve a better position for the company.

The introduction at the beginning shows that this research deals around the topic of digitalization. The topic is very diverse and complex. Studies and statistics have proven that

most of the companies know that digitalization has many advantages but they hesitate and delay the implementation. The advantages are undisputed but often remain unused. The reasons for this behavior are, digitalization is too complex, multifarious, time-consuming, not enough capacity and shortfall of knowledge. One goal for the output of this research should be that companies can easily deal with this topic and for this purpose is the degree of digitalization essential. Because of the reasons for complexity, multifarious, time-consuming and not enough capacity could help the optimal degree of digitalization to focus on the core experiences from companies and bring them forward. With an optimal degree of digitalization will enable to bundle the capacities to one method or area within the company and uses the advantages. Therefore the following research questions are essential. What is the optimal degree of digitalization? How define the optimal degree? What is the benefit of this optimal degree for the companies? The output of this research is to create a model that shows how much digitalization for each company is needed. For that reason, one possible solution approach will be further explained.

Research Objectives and Questions

The purpose of the investigation from the author is to find the optimal degree for industrial companies. Therefore the question is, is there an optimal degree for those companies? If yes, how can it be defined? Each company is an individual. Core competencies, strategy, intern process, and procedure are different. But in some cases it could also resemble one another, therefore the optimal degree could also be just a small nuance. With an aimed questionnaire are companies able to decide for themselves to what extend the optimal degree is crucial. To reach this goal for this research it is essential to figure out what is the degree of digitalization.

Novelty

Digital Transformation and the term digitalization become very famous. In the past analog data were transferred into digital, so that it allows that machines can use these data and developed further. In addition to that also digitalization of the company process was strongly discussed. Over time the technology has been improved and creates new opportunities for companies. In literature and articles are many different fields which are researched but the question of what is the optimal degree of digitalization for different companies is still open. So the question arises, how precisely should be the optimal degree of digitalization for companies, how the balance between costs and benefits are in proportion. What will be the result if the degree of digitalization is too low or too high? How make the decision of the degree of digitalization and on which basis? This goal of this research is to show companies the way to find the optimal degree for their individual company.

Existing Researches / Theoretical background

With digitalization are new forms of structural work possible. The operating process organization, the work organization as well as new managing criteria. (Jeschke et al., 2015) If it is the speech about new forms of organizational work the intention can be the changes in working place. If it is the speech about the digitalization of a working place it can be differently interpreted, depending on the point of view. For example, the digitalization workplace can be a paperless office or machine with a digital interface that communicates with the ERP System. There are many other different examples this example just should illustrate the extreme diversity. For that reason, there exists an endless choice of interpretation.

The fact is that the digital degree of digitalization for companies represents a crucial success of competitive factors. This degree of digitalization is important in order to exist in the long term and to be able to develop further (Berghaus et al., 2018). In 2016 Federal Ministry described that the digitalization of the business process is essential to be competitive and successful in dynamic and customer orientated markets. The pressures to be more profitable and cost orientate increases constantly (BMWi (Hg), 2013).

In fact the digitalization process is important and advantages outweigh, companies hesitate to implement the process. Berghaus confirmed that the digital transformation of the business process faces different challenges and problems (Berghaus et al., 2018). Barriers for companies are the complexity, financial resources, legal uncertainty, and missing infrastructure (Leyh and Bley, 2016) other barriers like missing capacity, missing know-how support the restrained behavior.
In addition to the above mentioned barriers, another challenge for the implementation of digitalization is to combine the existing IT infrastructure and not replace immediately everything until the previous investments are depreciated. It is necessary not to affect functioning production processes. It is about to figure out the missing functionalities in the existing system and compensate them by implementing new methods, with increasing the degree of digitalization and finally create an added value for the company as well as strengthen the market position. (Bauernhansl et al., 2014) For all these barriers and challenges there are many opportunities to improve the business in growth, profitability, cost reduction, etc. Federal Ministry for economic and energy wrote that, analysts forecast the economic performance in Germany could be increased to 82 billion Euros by 2020 if the technologies and ability to use them constantly driven by German companies. (BMWi (Hg), 2016)

In order to achieve the desired added value for the companies, the optimal degree of digitalization must be determined. For this purpose, the individual processes must be analyzed because there is a connection between the actual degree of digitalization and the company processes. The processes exist in all areas of the company's activities. They consist of sequences of tasks to be performed that transform an input into a multi added value output. Thus, processes form the center of any company, as they serve to achieve organizational and company goals. Trough a sustainable optimization of the processes is an increase in the quality expected. Quality is understood as an efficiency increase of the entirety. (Koch, 2015)
Will the implementation of each activity supported by an IT system it is a matter of a digitized process. Does the IT system perform individual activities independently; a digitized automated process is created. (Appelfeller and Feldmann, 2018)
The goal is to increase the quality of processes through digitalization and so increase the efficiency. However, in order to achieve an efficiency increase through digitalization, it has to be analyzed which elements are concerns. The question is which elements can be digitized in a company. These elements are customer, supplier, employee, digital products, digital machines, etc. and will be described briefly to gain a better understanding of it.

Customer:
Primarily, is to connect the customer with the own company IT structure. For the digitally connected customer, it has the customer's digital access to the system so that the exchange for data is ensured. The aim is to gain advantages for the customer and themselves. The advantages for the customer are to get data or information very fast and through automotive processes every time on time. From the customer perspective, the customer is able trough the digital access to use it for their own company´s advantage.

One of these Advantages for the company is an efficiency increase in handling the company-wide processes. In the end, to connect the customer to their own IT structure is an instrument to bind the business relationship with the customer. (Appelfeller and Feldmann, 2018)

Supplier:
The procedure is the same as the previous mentioned with the customer. This is the view of the procurement side and the supplier is connected to company IT structure. The systems are connected so that the data can be exchanged directly. The objective is to ensure like the customer side increases efficiency in the process. (Appelfeller and Feldmann, 2018)

Employee:
The employees of the company will be equipped besides of classic computers with smart devices, smartphones, tablets or other modern devices. The goal is trough those digitalization with help from these tools to increase the efficiency of the employees. (Appelfeller and Feldmann, 2018) Handling the daily work should be much easier, faster and with fewer error rates. Also, the new forms of working organization as previous mentioned, setting up a digital working place or working environment contributes to an efficiency increase.

Digital products:
Products will be continuously developed. They can be equipped with chips so that they are able to send or receive data and communicate with machines. Through the digitalization hybrid products are possible. The existing physical product can be extending with a service. (Appelfeller and Feldmann, 2018)

Digital machines:
With the installation and thus resulting expansion with memory chips, processors, etc., the machines are digitized. The task is that the machines are configured so that they are able to rule, control and monitor. As digital products, the machines are also able to pass information to other systems. The data can be further processed. In the context with digital machines in a production area is the goal to install a self-controlling production process that allows producing in an economical way small or huge quantities. (Appelfeller and Feldmann, 2018) Another goal that is not related to the production area but also when using machines is to reduce error rates and time.

These and many other areas of the business can be digitized. The question remains unanswered, how can the optimal degree of digitalization be found.
Appelfeller and Feldmann (2018) found an approach which goes in the right direction. They developed and use in the context of the digitalization maturity model. This maturity model allows dedicating the status of digital transformation by a company and how it should develop the company in the future.

Appelfeller and Feldmann (2018) investigate ten different elements for each element is a matrix set up with four maturity levels. The lowest level stands for analog digitalization and the highest level stands for full digitalization of the elements. For example for the element supplier is the lowest level, translated into an analog supplier and the highest level is translated into a digital full connected supplier and integrated on both sides. To get the information about the degree of maturity is for each of these ten elements to determine the level. Each element is set up several criterions and these criterions are allocated different characteristics and requirements. This is a qualitative evaluation method. Though the below given characteristics and requirements can the classification is done by the experts. By

proceeding this way and is the classification done for each element it will create a profile line. The current state is of the company is described and weakness can be shown. With the formulation of goals for each of these elements that can be compared the target state with the current state and future development pathways can turn out. This model can be extended through quantitative validation. The qualitative estimation of the respective criteria is translated into quantifiable values and will be transferred to the respective level. The criteria can be weighted differently if necessary and the sum of the criteria must be one. For each element, the weights of the criteria will be multiplied by the value of the achieved level and the result of it is summed up. The total will then show the scoring value of the element. The scoring value can vary between 1 and 4.

Appelfeller and Feldmann (2018) pointed out a critical reflection. It should not be given the appearance that through the maturity model as more as the companies reach the highest digital level, as better. There are situations in which it does not make sense to develop further in the digital area. It means when a company using this maturity model they need critical questioning for which element is the highest level doable. The maximum level 4 does not necessarily have to be aimed for every company. The companies need to systematically and factually justify deciding how digitalization should look concrete in the company under consideration of this model. Further critical point is that the model is neutral to branches but if the scale is the same it allows adjusting the criteria and the characteristics. (Appelfeller and Feldmann, 2018)

Conclusion

With this article, the introduction in the digital world was further strengthened. The potential and opportunities are enormous for companies. The solution for this is to bring companies closer to the optimal degree of digitalization. The first possible model was presented. In the next articles it will be further analyzed which other model forms come into question. The strengths and weaknesses of these models will be compared and improvements made. The final goal is to show the optimal degree of digitalization so that they earn the benefits for their company.

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Brief biography of the author

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ISSN 2694-7897
VOLUME 1 - NUMBER 1