



## CORPORATE STRATEGY AND INDUSTRY 4.0: BIBLIOMETRIC ANALYSIS ON FACTORS OF MODERNIZATION

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### **Abstract**

*The fourth industrial revolution has produced several new fields of research, yet the areas of management and business are lagging behind. The aim of the present paper is to show connections and common thoughts within various literature areas, identify the main theoretical influxes into the field, and make informed suggestions for its future development. The analysis is conducted through the use of bibliometric methods, specifically co-citation analysis (Small, 1973) and bibliographic coupling (Kessler, 1963). Co-citation is defined as the frequency with which two units are cited together while bibliographic coupling uses the number of references shared by two documents as a measure of the similarity between them (Zupic & Čater, 2015). This enables us to identify relevant clusters that will show which scientific areas are most commonly connected with our chosen keywords. Furthermore, we will elaborate the advantages, disadvantages, effects and possible implications of the new robotization era processes on companies' business model transformation and changes in organizational structures, with an emphasis on the strategy of firms and the management behind it.*

**Keywords:** industry 4.0, bibliometrics, co-citation analysis, bibliographic coupling, robotization, corporate strategy

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### **1. INTRODUCTION**

Industry 4.0 or the so called fourth industrial revolution refers to the current and upcoming changes occurring in the industry development. Zhou et al (2015) noted that industry 4.0 includes future industry development trends to achieve more intelligent manufacturing processes. Radical changes have an impact on companies and their business models, and contemporary firms are faced with having to change their cor-

porate strategies and organizational structures in order to adapt to the changes and survive on the market. The extant research has to some extent touched upon trends in the field of corporate strategy and industry 4.0; studies foresee large-scale changes in societal and business model transformations (Loebbecke and Picot, 2015), virtualization and decentralization in the manufacturing landscape (Brettel et al., 2014) and in the field of cloud computing, big data and intelligent manufacturing (Zhou et al., 2015).

Nevertheless, due to the rapid occurrence of events, new fields for scientific discovery and analysis emerge on a regular basis which implies that there is still room for additional research of the fields that have not been covered yet. There has been plenty of research regarding the industry 4.0 trends within the field of informational technology, but much less has been done within the field of management, business and economics. We have found out that the analysis of explicitly showing the correlations between all relevant literature is lacking. In addition, the extant research has not yet examined the positive and negative potential consequences of robotization overall, especially within the field of strategic management.

The aim of this paper is to show connections and common thoughts within various literature areas, identify the main theoretical influxes into the field, and make informed suggestions for its future development. The analysis will be conducted through the use of bibliometric methods, specifically co-citation analysis (Small, 1973) and bibliographic coupling (Kessler, 1963). Co-citation is defined as the frequency with which two units are cited together while bibliographic coupling uses the number of references shared by two documents as a measure of the similarity between them (Zupic & Čater, 2015). This will enable us to identify relevant clusters that will show which scientific areas are most commonly connected with our chosen keywords. Furthermore, we will elaborate the advantages, disadvantages, effects and possible implications of the new robotization era processes on companies' business model transformation and changes in organizational structures, with an emphasis on the strategy of firms and the management behind it.

We will show the weights of common literature by using Web of Science and VOSviewer programme analytics to graphically show the trends and inclinations of robotization in near future. Easily accessible online databases with citation data – such as Web of Science - have attracted widespread attention of bibliometric methods, write Zupic and Čater (2015), and VOSviewer is a program that has been developed for constructing and viewing bibliometric maps (Van Eck and Waltman, 2009). Even though there are many speculations that exist

within our topic, we will also touch the impact of robotization on management, strategy, and labour area. This paper will try to deepen the view on the matter by summing up many different aspects and apply them on today's situation vis-a-vis a forecast impact.

## 2. THEORETICAL BACKGROUND

Digitalization and big data analytics – or datafication - penetrate all areas of life and create new ways of working communicating and cooperating (Loebbecke and Picot 2015). Holotiuk and Beimborn (2017, 991) write that digitalization fundamentally impacts firm's strategy development. For example, one of the responses of organizations when it comes to digitalization, can be seen in the uprising of the industry 4.0 which “/ .../ focuses on the establishment of intelligent products and production processes (Brettel et al., 2014)”. Brettel et al. (2014) say that at the moment, “/ .../ industry 4.0 is a popular term to describe the imminent changes of the industry landscape, particularly in the production and manufacturing industry of the developed world.” Furthermore, Popescu (2011, 726) presents yet another aspect and claims that virtualization solves most of the problems that occur in organizations when it comes to management applications and continues that virtualization opens vast opportunities in the business continuity. Due to the uprise of the digitalized economy, new business models and strategies have arose (Peitz et al, 2006) - a significant portion of trade now takes place online, for example. Another paradigm that Lee et al (2017, 1) refer to as a novelty that is rapidly gaining ground in scenarios for factories of the future is called smart factory. “The concept of smart factories began to be established as a combination of information and communication technologies and digital automation solutions throughout the overall production process / .../ (Lee et al 2017, 1)” and can now be found in various areas of operations of a company. Last but not least, “/ .../ robots are stronger / .../” and “/ .../ the worry is that our market economy will not, on its own, be able to create new jobs with comparable pay for those who are losing their jobs” (Stiglitz, 2017).

Enlisted concepts show how vast are the areas, which are covered by the formation of new technologies and changes that have developed due to the technological advancement. There is a wide range of opportunities on one side and numerous drawbacks and dilemmas on the other. According to Zhou et al. (2015) there are scientific challenges, technological challenges, economic challenges, social problems and political issues. Organizations will have to respond to those challenges in order to survive and stay competitive actors on the market. Companies will need virtual and physical structures that allow for close cooperation and rapid adaption along the whole lifecycle from innovation to production and distribution (Schumacher et al. 2016). This calls for a changed strategy that takes the challenges and changes into account.

### 3. METHODS

Methods used in our analysis arise from the bibliometric field, meaning that it deals with a statistical analysis of scholarly communication through publications (Batistič, Černe & Vogel, 2017). Bibliometric analysis includes two techniques – co-citation analysis and bibliographical coupling.

#### 3.1 Keyword selection

After a close overview of the basic literature, we have selected several keywords covering topics that appear most frequently and are consistently cited throughout the literature and refer to keywords connected with the terms digitalization and strategy development. For the purpose of our analysis we have chosen the following keywords: Digitalization, big data, virtualization, datafication, industry 4.0, digitalized economy, smart factory and robotization. We have looked for these keywords along with the following keywords that refer to the field of strategies in organizations: Strategy, strategic management and organizational response.

#### 3.2 Co-citation

Co-citation analysis determines the key documents or core documents, which have had the

most influence on the chosen research area through the analysis of citation frequency of the documents by other literatures simultaneously (Yu & Xu, 2017). This method connects two documents that appear together in the references of the same papers into networks. It is an indication that the two papers have derived on common knowledge (Lazzeretti et al., 2017). It occurs when two documents without any direct relationship are cited simultaneously by other documents. These two papers are said to be co-cited.

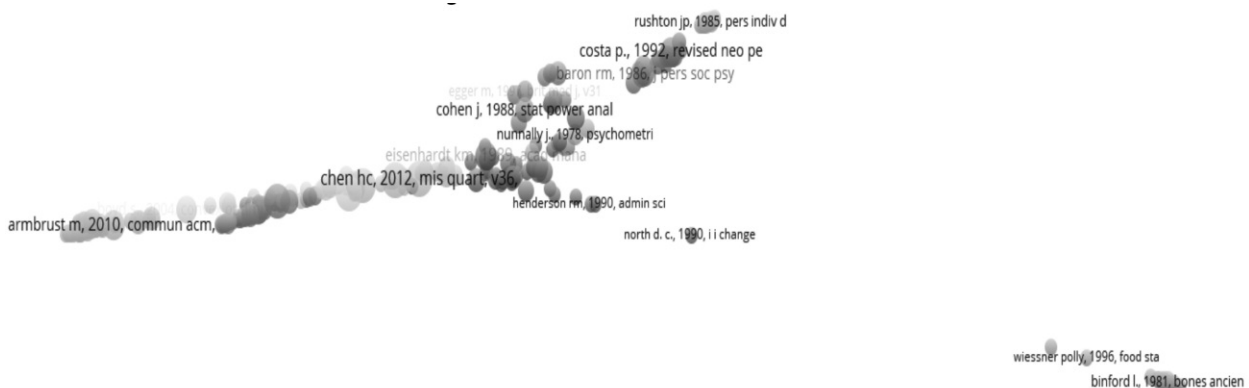
Web of Science, scientific citation indexing service, provided us with the list of scientific papers that included the following set of keywords:

*“(digitalization OR big data OR virtualization OR datafication OR industry 4.0. OR digitalized economy OR smart factory OR robotization) AND (strategy OR strategic management OR organizational response)”*

Out of Web Science’s database, 4390 primary papers were found and we have included the first 1000 documents (based on relevance, an indicator founded in citation frequency) in our analysis. The analysis was conducted in VOSviewer with the co-citation technique. Our counting method was full counting, our unit of analysis were documents. We have predetermined that the minimum number of citations of a document has to be 3 – out of the 1000 documents, 361 have met the threshold, and for all those documents, the total strength of the co-citation links with other documents will be calculated.

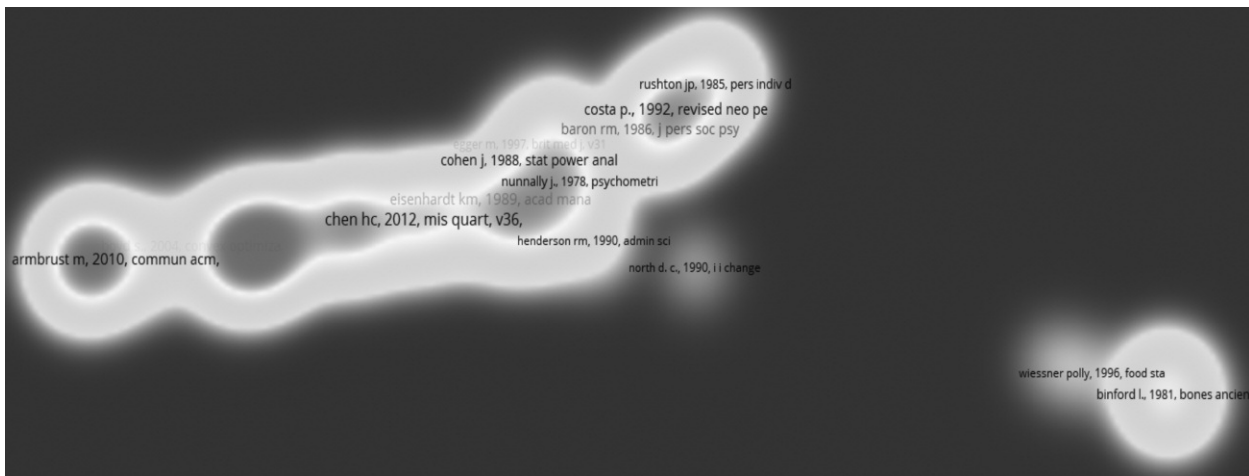
Figure 1 shows the network of clusters that were formed with the co-citation analysis and where they lie in relation to one another. Figure 2 shows the density of the clusters and we can see where the density is the strongest as well as the outliers. Table 1 shows the analysis of the biggest eight clusters that were formed following the co-citation analysis. Name of the cluster shows which topic is dominant in the cluster, number of items indicates how many items there are in each separate cluster and the brief description gives information on the content of the documents in the clusters.

Figure 1: Network visualization



Source: Own VOSviewer analysis.

Figure 2: Density visualization



Source: Own VOSviewer analysis.

### 3.3 Bibliographical coupling

Bibliographic coupling differs from co-citation in “/.../ describing similarities among groups of papers for information retrieval” (Youtie, Kay and Melkers, 2013, 147). Zupic and Čater (2015, 438) noted that “co-citation analysis and bibliographical coupling use citation practices to connect documents, authors or journals.” Youtie, Kay and Melkers (2013, 145) define bibliographic coupling as “/.../ the appearance of a reference work in the cited references of articles from two or more center researchers.”

The same set of keywords as in the co-citation analysis has again been applied for the extraction of

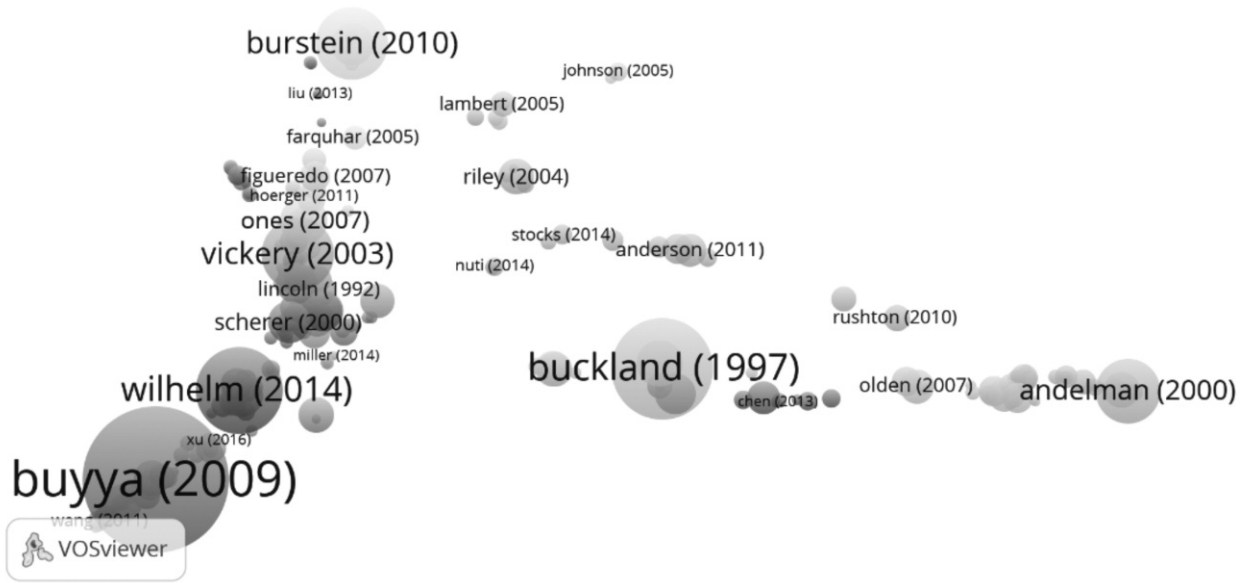
key literature. Out of Web Science’s database, 4390 primary papers were found and we have included the first 1000 documents in our analysis.

Analysis was done in VOSviewer with bibliographical coupling – it links papers that cite the same articles and represents the current state-of-the-art of the examined field. Our counting method was full counting, our unit of analysis were documents. We have predetermined that the minimum number of citations of a document has to be 10 – out of the 1000 documents, 598 have met the threshold and for all of those documents the total strength of the bibliographical coupling links with other documents will be calculated. The largest set of connected items consists of 312 items.

Table 1: Clusters from co-citation analysis

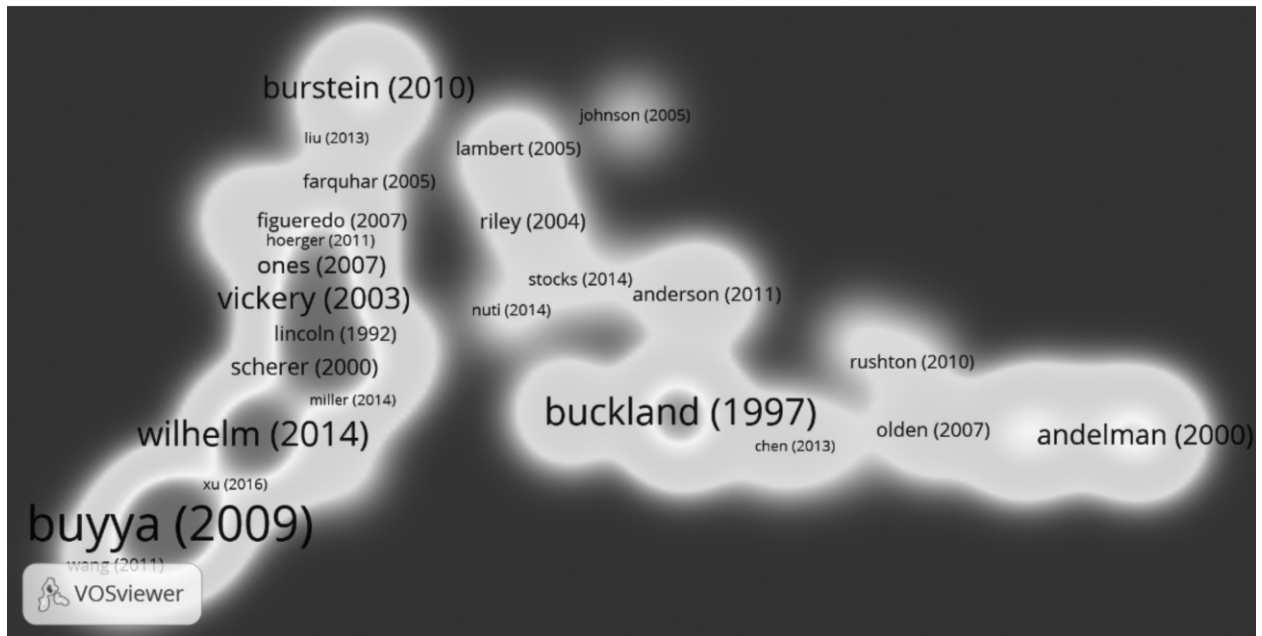
	Cluster	N° of items	Brief description
1	Bioinformatics	46	The area in the red cluster contains literature on Bioinformatics, which is an interdisciplinary application of IT on biological data for a better understanding on available information. There is some emphasis on knowledge management and new formalized approaches on the matter as well. Collins and Varmus (2015) write “ / .../The initiative will encourage and support the next generation of scientists to develop creative new approaches for detecting, measuring, and analyzing a wide range of biomedical information”.
2	Computer science	45	The computer science cluster includes papers that describe principles, usage, theory, design, development and application of computer and software systems. It is notable, that few papers are done on the topic of cloud computing, “ / .../a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction” (Baliga et al. 2011, 150). Cloud computing systems fundamentally provide access to large pools of data and computational resources through a variety of interfaces similar in spirit to exist- ing grid and HPC resource management and programming systems. (Nurmi et al., 2009)
3	Knowledge-based view	41	The common line of the articles within KVB cluster are explaining, elaborating or proving various concepts about a specified topic. The information can help an organization, government or individuuum to adopt or improve a strategy in order to obtain a needed competitive advantage. It is a learning approach which can serve for instance, as a basis for human capital involvement in an organization. As Cohen and Levinthal (1990) write “ / .../ Outside sources of knowledge are often critical to the innovation process, whatever the organizational level at which the innovating unit is defined” .
4	No general topic	36	Because there cannot be find any relevant common line between the literatures, the cluster is unnamed, hence irrelevant for our paper.
5	Psychology	28	The cluster consists psychology articles that are focused on different strategic, conceptual and statistical factors as well as measures that influence the personalities of human beings. For instance, aggregation is one of “ / .../ the most expected form personality measures, is a procedure that has been implicitly practiced almost since the dawn of scientific psychology” (Digman, 1990).
6	Big data, digital data	22	In this cluster, we can find articles weighting and considering the increasing impact of big data usage for different purposes. “ / .../ because of big data, managers can measure, and hence know, radically more about their businesses, and directly translate that knowledge into improved decision making and performance” (McAfee and Brynjolfsoon, 2012).
7	History, anthropology	20	An outlier of all cluster with literature exploring miscellaneous anthropological scope of surface. One “ / .../paper presents research on the conditions under which progressive levels of burning may occur to archaeological bone” (Stiner and Kuhn, 1994).
8	Personality factors	16	The final memorable cluster has factors that influence personality, where (Ashton et al., 2009) found them “ / .../as measures of broad personality factors do not necessarily imply the existence of higher-order factors”. Another paper tells us “ / .../that almost all of the common variance between factors can be attributed to a single general factor related to social desirability” (Bäckström et al., 2009).

Figure 3: Network Visualization



Source: Own VOSviewer analysis.

Figure 4: Density Visualization



Source: Own VOSviewer analysis.

Figure 3 shows the network of clusters that were formed with the bibliographic coupling analysis and where they lie in relation to one another. Figure 4 shows the density of the clusters and we can see where the density is the strongest as well as the outliers.

Out of 312 items, 23 clusters in total have been formed with 814 links and 1406 link strength. Common topics within the articles of each cluster are the following (listed in the order from the biggest to the smallest cluster): Cloud computing, biodiversity, bioinformatics, psychology/behavior/personality, big

data/data analysis, research on bats, socioeconomics, medicine, virtual networks, operations management, human resources/public health, human behavior, cloud computing/big data, archeology, big data, biology, industry 4.0, medicine, breast cancer research, psychology, health sciences, tubal flushing for subfertility and marketing. We have closely examined the biggest seven clusters and the tenth one that is related to operations management.

Table 2 shows the analysis of the biggest eight clusters that were formed after the bibliographic coupling analysis. Name of the cluster shows which topic is dominant in the cluster, number of items shows how many items in in each separate cluster and the brief description gives information on the content of the documents in the clusters.

#### 4. DISCUSSION

Co-citation analysis and bibliographic coupling analysis have shown that the biggest amount of literature that was found in Web of Science database and included relevant keywords of our choice can be found in the scientific fields of computer science, informatics, biology and medicine. On the other hand, we have found out that the amount of literature, connected with the scientific field of economics, business and management is lacking in comparison to natural sciences research since there was less clusters connected with economics, business and management than natural sciences. This finding opens avenues to future research on the intersection of business studies and computer sci-

*Table 2: Clusters from bibliographical coupling analysis*

Cluster	N°of items	Brief description
1 Cloud computing	30	The biggest cluster includes articles that refer to cloud computing. Choon Lee and Zomaya (2012, 269) write how “/c/loud computing has become a very promising paradigm for both consumers and providers in various fields of endeavor, such as science, engineering and business.” Sood (2012) foresees cloud computing as a forthcoming revolution in information technology industry due to its performance, accessibility, low cost and many other luxuries.
2 Biodiversity	25	Cluster covers a broad range of articles that are connected with biodiversity such as topics that are connected with research on animals, plants and ecosystems.
3 Bioinformatics	24	Cluster covers areas that include articles such as Mass-spectrometry-based draft of the human proteome (Wilhelm et al., 2014), Unveiling the role of network and systems biology in drug discovery (Puyol et al., 2010) and PerM: efficient mapping of short sequencing reads with periodic full sensitive spaced seeds (Yangho et al., 2012).
4 Psychology, behaviour, personality	23	Personality constructs have been demonstrated to be useful for explaining and predicting attitudes, behaviors, performance, and outcomes in organizational settings (Onez et al. 2007). This cluster includes articles that cover areas such as climate change and personal motivation, personality, individual differences, individual differences in social media use, et cetera.
5 Big data, data analysis	22	Fosso Wamba et al. (2015) write that “/.../ big data has the potential to transform the entire business process /.../” and that big data “/.../ has recently become the focus of academic and corporate investigation.” This cluster incorporates articles that cover the topics that research big data and data analysis topics.
6 Research on bats	21	This cluster includes articles that cover areas of biology, zoology, biometrics, wildlife management et cetera that is connected with an animal species bats.
7 Socioeconomics	20	This cluster includes articles that discuss topics such as cooperatives, social isolation and labor market insulation, social and environmental practices as a marketing tool, eco-innovations and corporate social responsibility.
8 Operations management	15	Vickery et al. (2003) write that integrated business processes – and not individual functions or systems - create value for the firm’s customers and continue that these processes reach beyond the boundaries of the firm by drawing suppliers and customers into the value creation process.

ence. Some steps have already been made to this direction. For example, Holotiuk and Beimborn (2017) describe “Digital Business Strategy (DBS) as an emerging concept at the intersection of information systems and strategic management, which calls for contributions from academic research,” and confirm that “/.../ guidelines for the development of DBS along with effective implications for the design of digital business models are still scarce in the academic literature.”

With the opportunity to process and store the amount of data available on a massive scale at low cost, digitization has the capacity to make major changes and will influence almost any field of human labor that is somehow associated (directly or indirectly) with big data and cognitive non-routine operations (Rifkin, 2014). We want to point to three mechanisms: (1) centralized production, (2) increased harmonization of demand, and (3) erosion of property rights.

**Centralized Production** happens when companies exercise robotization and digitalization; consequently, companies can exercise centralism and economies of scale easier. However this can result into what has been known as a ‘winner-takes-it-all’ (Frank and Cook, 1995) or ‘superstar’ economy (Rosen, 1981).

**Increased Harmonization of Demand** this has high correlation with the trend of centralized production. Even though local preferences are still important, globalization is uniting tastes, habits and expectations. We can see that »/ .../ Internet and harmonized global demand requires less production and transport and hence less labor« (Loebbecke and Picot, 2015). While local preferences clearly still matter, global offerings are increasingly in demand. In the world of industry 4.0 the supply is approaching more accurately the demand, therefore organizations are more cost-efficient.

**Erosion of Property Rights** is occurring due to free flow of digital goods, many organizations argue about erosion of property right. Their argument is that the free flow of digital goods, whether it is authorized or unauthorized often leads to unwanted cheap or even free products (Loebbecke and Picot, 2015). A good example for the understanding the underlying problem is known as Tragedy of the commons (Hardin, 1968).

In what follows, we make informed predictions about future developments of this field of research based on our bibliometric analyses and describe them.

#### **4.1 Digitization and big data analytics: the re-shaping of business models**

A “/ .../ business model describes the rationale of how an organization creates, delivers and captures value” (Osterwalder and Pigneur, 2010). The business model captures the core of the company’s business logic. The industry 4.0 is challenging business models in many industries, hence established firms have frequently issues with embracing opportunities that digitization and big data bring with them. These companies struggle to adjust their business models to accept and integrate underlying mechanisms and other economic features (Westerman et al., 2014). With digitalization and big data science traditional hierarchical work structures fall apart and give opportunity to new increasingly flexible, in-house and networked structures (Zammuto et al., 2007).

Gradual improvements of already established business models based on big data science and digitalization target to optimize existing operations to augment overall efficiency and quality of produced goods and services. Digitalization and big data science have already disrupted traditional business models (Weil and Woerner, 2015). Low barriers to entry even mature markets and with that disrupting the business models of incumbent firms (e.g., Kodak and Snapchat for sharing photography, Lucas and Goh, 2009). They seize existing markets or try out unexplored entrepreneurial opportunities with new business models driven by big data science and digitization. They exploit digital social media channels, creating and serving new demands, introducing new forms of customer’s involvement and relationships (Lucas et al., 2013).

#### **4.2 Employment in Industry 4.0**

A paramount industry, which we have to pay attention to, is robotization, since it presents a potential cause of unemployment (Guest, 1983, 510). The latter was written more than 30 years ago. The fact



is, that robots can execute almost all of our everyday tasks, but definitely cheaper (Appleyard, 2014). Nonetheless “/.../ it became clear that recent technological advances are such that they will disrupt the present market and offer new opportunities.” (Micevičienė et al. 2013, 868). On one hand, in the last century or two, automation and robotization have taken many jobs, especially in farming, but on the other hand, have given many jobs in new fields. Some sort of robots or artificial intelligence will replace more than 70 percent of today’s jobs. Robots make almost no mistakes, are more cost-efficient and are beyond doubt, faster than humans (Kelly, 2016). Furthermore, it is unquestionably that in the near future, the white-collar jobs can be automated to a certain level as well.

According to Acemoglu and Restrepo (2017), a range of low-skill and medium-skill occupations exposed to automation have suffered employment declines and sluggish or even negative wage growth (Michaels et al., 2014). It is estimated that the percentage of various US classified occupations that are threatened by robotization is 47% in the next 20 years (McKinsey 2016). Back in 2007 we had almost 400 percent more robots in the US and EU than in 1993 (Acemoglu and Restrepo, 2017). The latter is implying a negative impact on certain low and middle-skilled job wages. It is a possible fearful future eruption of inequality, which can be managed by accurate policy actions. Companies are reluctant to invest in educating and training the workforce and simultaneously incapable of recruiting the skilled ones (Holzer, 2015). Meanwhile, automation has re-allocated or displaced some tasks and positions, but not necessary took jobs, rather created new ones due to spillover effects (IFR, 2017). Research from the Centre for European Economic Research discovered that the demand for labor has gone up by 11.6 million jobs from 1999 to 2010, which is predominantly due to digitalization (Gregory et al., 2016). Another research found that due to robotization, wages went up without having a significant impact on total worked hours. The more a country invests in robotization, the less it loses manufacturing jobs (Muro and Andes, 2015). Robotization obviously replaces labor, but at the same time complements it and augments the demand, the development of labor, and finally yet importantly, increases earnings (Autor 2015).

However, robotization effects on productivity, employment or other areas may vary within sectors, positions, skills or demographic elements. When robotization, “/.../ automation or computerization makes some steps in a work process more reliable, cheaper or faster, this increases the value of the remaining human links in the production chain.” (Autor, 2015). All things considered, both BSG and McKinsey recommend that “/.../ businesses should review their organizations’ activities to assess where potential value from automation is highest and create a strategic plan that includes both capital investment and reskilling workers.” (IFR, 2017). Deloitte and McKinsey argue that organizations should also focus on STEM (science, technology, engineering and mathematics) skills and human competences, that cannot be substituted (creativity, empathy, etc.) (IFR, 2017). This paper presented arguments in favor of robotization: creating jobs and emphasizing a need for high skilled workers, while still recognizing the fear of unemployment and a decrease in wages. In other words, automation raises the working quality. The countries that invested in robotization for the last 14 years had a 10 percent growth of total GDP and benevolent forecasts for the future (IFR, 2017). We can conclude that automation is not the only factor for decline in specific jobs and the potential inequality this creates.

### 4.3 Robots as managers

Examining the main responsibilities of today’s managers, such as using data to assess duties, executing better resolutions than the employees, supervising the employees etc., technology is capable of tackling these core management responsibilities the same way as managers. Therefore, it is already playing important role in providing tools necessary for completing these problems more effectively (Chamoro-Premuzic & Ahmetoglu, 2016).

The perception of employees is that, as academic estimates indicate, 1 out of 2 managers performs poorly and insufficient (Robert et. al., 2015). The fact is that in the world of managerial performance, the robots or AI would not need much to outperform average managers. AI represents major threats for executives and managers. They are being forced to revise their own roles. Given the value that organizations are increasingly placing on experimen-

tation and collaboration, creative and social intelligence will undoubtedly grow in importance as AI will undoubtedly take on more rules-based responsibilities, due to increasing experimentation with creative and social intelligence (Williams, 2016).

People tend to personally attach to robots that they work closely with as if they were living beings and usually attach them emotions and personalities (Forlizzi, 2014). For manager to play an authority figure is to have the ability to dole out duties and a team to perform them. Nonetheless, if an AI or robot would be placed in managerial position would it have any authority over employees under it? Cormier et al. (2013) describe an experiment where they have tested how would employees obey robot managers versus human managers and the results were quite astonishing. Even though the person clearly had more authority with 86 percent of participants obeying all the way through to the 80-minute mark, 46 percent of participants did obey the robot until the end. The most unanticipated part of experiment was that people perceived a robot as if it was a person. They have also tried to argue, sway its opinion and proposed compromises. After the test, some participants have reported that they thought the robot might have malfunctioned. Surprisingly, they have still followed a potentially malfunctioned robot, even though they would rather not. The study is implying that robot managers may take at first at least a portion of simpler tasks (Young & Cormier, 2014). "Robotization, like past technological changes, can be a very good thing, relieving the workload of humans while helping overcome the many challenges the world faces. But it could also affect humans disastrously, dividing societies between the owners of

the robots on one side, and the workers who compete with the robots on the other." (Freeman, 2016).

## 5. CONCLUSION

Robotization, automation, digitalization and the advancement and implementation of artificial intelligence will absolutely shape the strategic management we know today. Organizations will be spending its capital in a more lucrative fashion towards intangible assets, such as innovations and patent rights, knowledge, research and development due to the savings on labor. The avant-garde companies within the new technology area could seriously gain a competitive advantage over the competitors by applying idiosyncratic algorithms, evaluations and tasks internally on the workforce, as well as on organizations in the market. Having said that, the future strategic management will be more accurate, because of information liquidity and transparency, thus, make better decisions regarding business opportunities, potential threats and economic changes. Furthermore, middle or high-skilled positions could climb up the hierarchical ladder and refine the upper-management, which has a lack of incentives and understanding of the role of organizational structure and execution. The flip-negative side of the mentioned above could present image of strategic apathy and myopia inside an organization. Robots cannot provide an equanimity for humans, firms in downward and stressful times. Cannot be genuinely creative or compassionate and cannot give the benefit of the doubt, which in many cases empowers spontaneity, faith, hope and ambition.

### EXTENDED SUMMARY / IZVLEČEK

Četrta industrijska revolucija je privedla do številnih novih področij raziskovanja, pri čemer področja managementa in poslovnih ved zaostajajo. Cilj pričujočega članka je prikazati povezave in skupne točke med področji v literaturi, identificirati glavne teoretične vnose v področje ter zasnovati informirane predloge za nadaljnji razvoj raziskovanja. Analizo izvedemo s pomočjo bibliometričnih metod: analize sosklicevanja (Small, 1973) in bibliografičnega parčenja (Kessler, 1963). Sosklic je opredeljen s frekvenco, v kateri sta dve enoti literaturi navedeni skupaj, medtem ko bibliografično parčenje temelji na številu navedkov, ki jih delita dva dokumenta, z namenom ugotavljanja podobnosti med

njima (Zupic & Čater, 2015). To nam omogoča identifikacijo najpomembnejših skupkov literature, kar prikaže, katera področja znanosti so najmočnejše povezana z našimi izbranimi ključnimi besedami. Poleg tega bomo opisali prednosti, slabosti, vplive in potencialne implikacije procesov nove dobe robotizacije na spreminjanje poslovnih modelov ter organizacijskih struktur združb s posebnim poudarkom na strategijo podjetij in management v ozadju omenjenih procesov.

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