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Interaction of the social media and big data in reaching marketing success in the era of the fourth industrial revolution

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Abstract: The contemporary economic environment is characterised by the economic megatrends that are (re)shaping economic practice in the 21st century. The most important megatrend is the digitalisation, which triggers a whole new economic revolution, so called 'fourth industrial revolution'. In the situation with the new data source, new technological means for harvesting and processing of data, digitalisation and fourth economic revolution is very relevant not only for the operation but the marketing function as well. Social media represent an excellent source of data and channel of communication with the customer. Marketing spending on digital media platform soon will be no. 1, and it will overtake TV as the dominant marketing channel. Introducing the big data analytical capabilities, adjustment of overall organisation scheme and hiring competent personnel, the company will be in a position to save money for marketing spending, but in same time overall marketing performances will increase. Introducing big data analytical capabilities and efficient use of available social media platform is a challenging task that lay ahead of senior executives. Support from the highest management instances is the critical preconditions in reaching desired outcomes in the possible synergy between big data (BD) and social media marketing (SMM).

Keywords: big data analytics; BDA; social media marketing; SMM; decision makers; customer service improvements; analytics; business intelligence; market intelligence.

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1 Introduction

The first two decades of the 21st century have been characterised by turbulent changes in the world economy, and we have reason to believe that this is going to continue in the future as well. A large number of researchers and scientific research institutes have made efforts to identify the most important global trends (we might as well call them megatrends) that would determine the future of the world economy and, closely related to it, the future of mankind (Larsen, 2006; Gregosz, 2012; Vielmetter and Sell, 2014; Hajkowicz, 2015; Bradley et al., 2015; Dobbs et al., 2015, etc.). These megatrends are the following (Rekettye and Rekettye, 2013): *global climate change*, *a shift in world power, demographic changes, the proliferation of products and communication tools, changes in consumer behaviour following the economic depression and the radical acceleration of technological development (digitalisation)*.

Although these trends are closely related, recently one of them, the technological development (digitalisation), has emerged as the one of utmost importance. This trend is so strong that references to the fourth industrial revolution have already appeared. The compound '*Fourth Industrial Revolution*' is actually the title of a book written in 2017 by Schwab, founder and current leader of the World Economy Forum. In his view, the world has now entered a stage of technological development, which can very well be called a revolution, and this is a change (development) which might overwrite former trends, determine our whole future life.

The Sogeti institution research group, named VINTlabs (vision – inspiration – navigation – trends) described in 2013, that the elements of a 'smarter world' – the SMACT (social media, smart phones, analytics, the cloud, internet of things – constitute such an interdependent and co-operating system) (Figure 1), that makes it is possible to create smarter things and make life easier. As discussed in the literature (Baur et al., 2015; Rüβman et al., 2015; Geissbauer et al., 2016) we live in the era of the fourth industrial revolution (called Industry 4.0). Its consequences are hard to foresee.

The main purposes of this explanatory paper are the following:

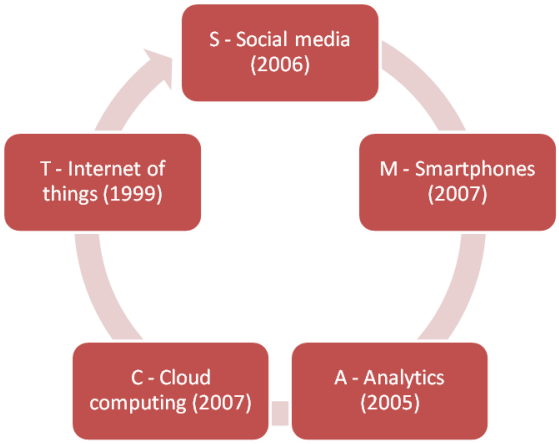
- To draw attention to the fact that the components of SMACT can and should be also used in the marketing activity of companies, and parallel with their influence on production if used properly, they can end up in a paradigm shift also in marketing.

From the perspective of marketing, *the analytics of the big data (BD) and social media* are of utmost importance.

- The literature review shows that BD and social media is discussed in details and there is a common understanding of their theoretical importance. Among the different writings, there is, however, a sensible uncertainty about their practical use. The main aim of the study is to help the understanding of the relation between the big data analytics (BDA) and the use of its results in social media marketing (SMM).
- The paper expresses its conviction that opposite to some organisations where BD means big burden the use of BD means big opportunity for improving their competitiveness.

Summarising the objectives of the paper the main research question of the study can be coined as follows: to clarify the definition of the BDA and its relation to SMM and explore the way how integrated and coordinated use of BDA and SMM can contribute to the marketing success of companies in the era of digitalisation.

Figure 1 The elements of SMACT with the year of their creation (see online version for colours)



Source: Based on Sogeti – http://www.sogeti.com

2 BD definition

The BD is defined as a datasets that are so large (terabytes and exabyte), unstructured and complex (from genome analysis, political science, sensor, social media, or smartphones to internet-based gadgets data) that require advanced and unique technological means to store, manage and visualise (Chen et al., 2012). BD represents processes of making insight and getting knowledge from the vast amount of data that company produces and collects (Bradley et al., 2015). Also, BD represents the latest technological revolution of data management and using data to measure and therefore manage more precisely, to make a better prediction and smarter decision (MacAfee and Brynjolfsson, 2012). Before, the amount of data that was recorded and gathered was treated as assets only if the company understood what data could be used for business success. Companies were

facing big challenge what to do with the data and how to use those data for their success. There was a situation when the usability of data was decreasing with the amount. It has come out from the reason that until a certain quantity of data has reached, without proper technical capabilities and personnel under capacity, the usability of data decreased, and the time needed for processing those data has become longer and longer. To extract the valuable insights from the data has become harder, and data has become a – sometimes a dangerous – burden for the company. This dangerousness is coming from the fact that collected knowledge from that data sometimes was incorrect and that without knowing this has led to wrong or inadequate decision that could dramatically influence the overall business performance.

In the contemporary business environment, we are witnessing exponentially rise of the amount of data, sources, way, and means of gathering them, but also the development of methods and technics of processing it and extracting valuable knowledge from it. Today it is not imaginable to have large-scale business without using the data produced internally or gathered externally for reaching and fulfilling the business objectives.

For marketing managers and practitioners, but also for all other decision makers and BD users, it is useful to evaluate the data from the perspectives next.

2.1 The volume of the data

With the incremental advancement of technical means of gathering (hardware capabilities), data sources (social media, demographic data, historical data, behavioural data, outsourced data, etc.), the volume of data is exponentially increasing. According to Erevells et al. (2016) the size of the digital universe in 2013 estimated at 4.4. zettabytes (1 zettabyte is equivalent to 250 billion DVDs) and prediction for 2020 is that data volume will be 44 zettabytes. Also, some connected objects that produce a different kind of data (cars, toys appliance, etc.) are expected to be at the level of 32 billion by 2020.

2.2 Velocity of analysing the data

Marketing executives who can access the vibrant, insightful and fresh data quicker and can make better marketing decision, based on the evidence rather than on intuition or laboratory-based consumer research (Erevells et al., 2016).

2.3 Variety of the data sources

With the improvement of technological capabilities for extracting and analysing the used data source could be changed. So, the data source shifted from structured ones (like the balance sheets, the company reports, and the experimental results) to unstructured sources such as social media, behavioural data, blogs, text messages, videos, images, etc.

Majority of the literature takes this three V's as the main characteristics of the BD. More and more scientists and practitioners think however that an additional two V's should be added to them. These are the *veracity and the value*. *Veracity* is connected with the quality of the data because not all consumers of BD are qualitatively useful for the analyses because of their weak authenticity. A not accurate, authentic data is bad data, and it will produce false or not precise results which at the end will have no *value* for the company.

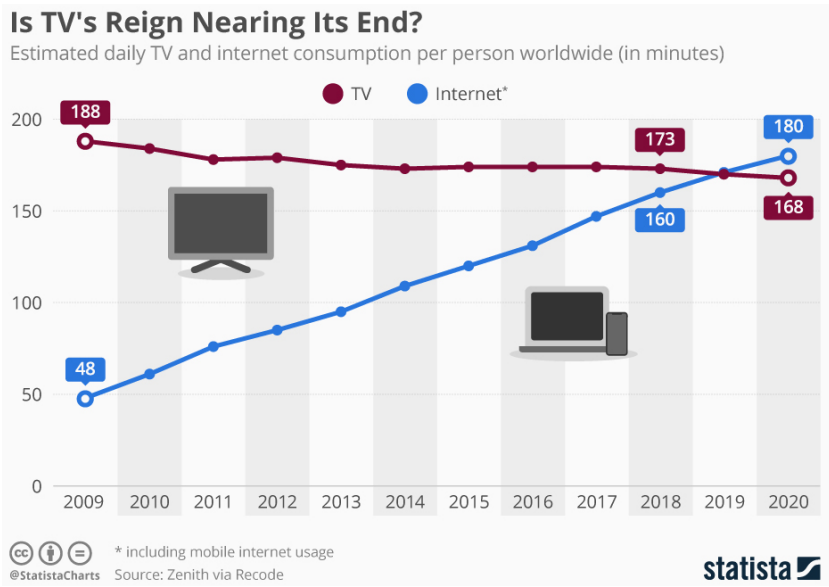
3 Social media marketing

SMM uses social media websites and social networks to market the company's products and services. SMM provides companies with a way to reach new customers and engage with existing ones (Investopedia, n.d.). Similarly, SMM is a form of internet marketing that utilises social networking websites as marketing tools. The goal of SMM is to produce content that users will share with their social network to help a company increase brand exposure and broaden customer reach (Rouse, 2011).

"Advertising spending expenditure in 2017 in the United States is estimated to amount to 206.77 billion US dollars, up from 183 billion recorded in 2015. Looking at specific media spend, in 2016 TV ad expenditures were to account for the lion's share of total advertising spending in the country, followed closely by investments in digital advertising including social media" (Statista, 2017).

On the other hand, the use of SMM is also supported by the changing habits of TV and internet consumption of people around the world. According to the estimates of Statista the minutes spent to use the Internet is growing very fast and next year (2019) it will reach the time spent to TV watching (Figure 2).

Figure 2 The estimated daily TV and internet consumption per person (in minutes) (see online version for colours)



Having in mind the money spent on advertising, if marketers succeed, to save few percents on advertisement cost by using BDA tools than, this will represent in savings of hundreds of million US dollars. This benefit will justify investments and activities related to BDA, and it will increase the time of return of investments (ROI) in BDA, it will generate income growth, consumer loyalty, just to name a few. All this will lead to easier and faster-reaching business objective of the company as a whole.

4 (Social) marketing mix and BD

SMM objectives include specific actions (Misirlis and Vlachopoulou, 2017): brand awareness, engagement, marketing and especially customer research, behavioural targeting, e-WOM[1] and promotion policy, relationship management & social costumer relation management (social CRM) and social capital value including ROI questions/assessment.

Table 1 A marketing mix framework for BD management

	People	*Product*	*Promotion*	*Price*	*Place*
Data	Demographics	Product characteristics	Promotional data	Transactional Data	Location-based social networks
	Social networks	Product categories	Survey data	Survey data	Survey data
	Customer reviews	Customer reviews			
	Click streams	Survey data			
	Survey data				
Method	Clustering	Association	Regression	Regression	Regression
	Classification	Clustering	Association	Association	Classification
		Topic modelling	Collaborate filtering		
Application	Customer segmentation	Product ontology	Promotional marketing analysis	Pricing strategy analysis	Location-based advertising
	Customer profiling	Product reputation	Recommender system	Competitor analysis	Community dynamic analysis

Source: Fan et al. (2015)

Table 1 shows an important addition to the basic and well-known framework for taking marketing decision. For a long time, it was based on 4P – product, promotion, pricing, and place. With the new technological improvements and new software capabilities in this framework should add another critical dimension and this is people. It is a breakthrough in marketing that marketing researchers can gather data from people's behavioural characteristic through their activities on social media. People-customer interaction on the internet, their social media engagement, customer review that they are leaving after the purchase of the product, their clickstream and data survey are indispensable in the marketing intelligence analytics process helping the good decision-making. So far, with original 4P there was certain arguing that this mix is product-centric. With the addition of people-costumer dimension, the new marketing mix is complete and ready to give necessary inputs to marketing decision makers. Traditional approach (4P-product-centric), moving to contemporary and future approach, which consist of 5P and represent a customer-centric philosophy.

In Table 1 we can see three phases to achieve valuable and usable market intelligence. First, the marketing intelligence retrieves the multiple data sources. In the second phase, on data, which now represent raw BD, different analytical methods are applied to convert big raw data into useful and actionable marketing intelligence. Finally,

both data and methods are combined to support a marketing application concerning each perspective of the marketing mix (Fan et al., 2015).

BDA can provide an answer on 'what' question but, for a comprehensive understanding of the problem, the decision-makers have to find an answer on 'why' question, as well. That means that besides quantitative analysis that BDA can provide, the qualitative analysis should be undertaken. The BDA can provide answers on what causes the certain situation and uncover hidden patterns that would not be visible without BD capabilities. Conducting specific, small scale analysis, interviews and randomise testing, can give answers on 'why' something occurs (Shapiro, 2018). Both aspects are unavoidable ingredients of a right business/marketing decision, and successful interaction of the BDA and SMM.

5 Examples of the interaction of BD and SMM

Before BD marketing intelligence paradigm has been introduced, getting knowledge about costumer needs was based on post hoc analysis; the BD can serve as the foundations of the new marketing research based on up-to-date data and real-time analysis.

In the traditional marketing research, the information gathering was based mostly on surveys, historical data, structured data, etc., where extraction of the knowledge about future development regarding customer behaviour and product success was limited and not accurate. In the fourth industrial revolution smart technology, smart sensor and accessibility to the Internet empowered companies but also individuals. The companies whit the BD technology have the possibility in real-time to make SMM, adjust pricing strategy, improve and track performances of the sails personnel, influence supply chain management, etc. Individuals are in a position to buy products on line, compare prices of complementary products, comment, share experience, etc. Skilful BDA and social media marketers are in a position to collect costumer's comments, suggestions, and opinions on social media, to track movements, activities, preferences and recognise costumer's behavioural patterns on social media. This empowerment is beneficial for both sides, and it can be a significant factor in securing a competitive advantage.

The today's methods in BDA have the opportunity to change perspective in the scope, time and granularity of available data. It is coming out from new data sources, such as wearable technologies, social media or ambient networks, and new software capabilities, which allows that BDA could be performed in real or near real-time. Data granularity implies changing the paradigm in the measurement of a characteristic of observed phenomena, from distal to direct, such as measurement in real-time of heartbeat as biometric parameters and emotions through facial recognition in employee stress study, instead of surveys or interview (George et al., 2016). New research questions that combine own data with 'open sources' data, and dynamically use of the multidimensional approach to the event, will be able to 'uncover' hidden relations between distant and, on the first sight unconnected, activities. For example, combining customer purchase decision and social feedback with digital payment and transaction data, to find out its influence on innovation and product adoption and to connect with behavioural dynamics of specific customer segment (George et al., 2016).

Social media analytics tools gather information from user conversations and actions across social media channels and the rest of the web. It offers the marketing department insight into the behaviour and sometimes even the thought-processes of customers. The field can be subdivided into two primary categories (https://www.betterbuys.com, 2017):

- Web analytics, which examines page browsing statistics and offers "marketers a comprehensive vision of who is visiting their site, how they are getting there, and what they are most interested."
- Social media analytics mines information from posts, link shares, comments, and other engagements on Facebook, Twitter, blogs, comments sections and more. This can improve consumer engagement, as companies learn more about who their target audience is and what they want.

Discovering hidden connection and on the first sight, unrelated relations between some occurrences is the primary benefit that the BDA process can deliver. It is giving the companies the opportunity to carry out the proactive and preemptive action in changing the environment to gain better results in launching a new product. For instance, Netflix used BDA to create hit movies and TV shows (e.g., House of Cards) by analysing and predicting preferences of its 33 million viewers instead of relying on a creative director's instinct (Carr, 2013).

Southwest airlines, using speech-analytics tools, record a conversation between service personnel and consumer to extract precise insights. These insights are continuously sent to service personnel to improve their performance. With insights from BDA, Southwest airline facilitate its adaptive dynamic capability by meeting unrecognised customer needs hitherto (Erevells et al., 2016).

The company target utilises consumer insights from BD to predict consumer behaviour proactively. The target can estimate whether a female shopper is pregnant and knows her due date weeks before competitors (Duhingg, 2012).

Another excellent example of using BD to improve the customer experience and its overall service level is the information that Google corporation sends to its user 'Google privacy policy' where customers have to agree to continue with using of Google services. Google (2017) in this reminder informs all customers about what kind of data is processed when somebody uses Google. As an example, they stated when we watch YouTube or search in Google search engine they process information about that activity – including information like the video you watched, device IDs, IP addresses, cookie data, and location.

The purposes why Google process these data are:

- to deliver more useful, customised content such as more relevant search results
- to improve the quality of its services and to develop new ones
- to deliver ads based on personal interests
- to improve security by protecting against fraud and abuse
- to conduct analytics and measurement to understand how customers use their services.

6 Benefits of the interaction of BDA and SMM

Engagement of marketing professional into the social media arena is one of the future milestones of the marketing process. New tools have been developed to structure new ways of marketing targeting. Earlier targeting was based on old data and past events. The results of that kind of campaign could not be interpreted with significant precision, and with that, the corrective action could not be taken with considerable certainty.

Social media creates new opportunities for companies that want to engage better with customers. Real engagement, which binds customers to companies, can drive revenue gains and reduce the costs associated with customer churn. However, participation in social media requires new ways to manage and understand customer interactions.

With the BDA tools and SMM, now marketing professionals can target costumers on an individual basis, can read real-time results from those targeting and can have corrective actions almost in real-time. This personalised approach results in higher customer satisfaction, customer retention, and customer loyalty.

The research conducted by the McKinsey (Bughin, 2016) investigates BD ROI on 714 companies around the world, shows that investments in the data analytics will increase profitability and productivity. The returns are similar to those that occurred on investment in the early days of IT revolution. Analysing impact across three primary business domains-operations, marketing, and management shows that investment in BD can produce significant benefits. The benefits can be found in the area of acquiring competitive intelligence insights on current and future market movements, more successful customers targeting, and optimisation of the operations and supply chains. All these benefits contribute up to 6% in operations profit rise. Also, results show that 'democratisation' in the using of BD, will yield in overall and broad performance improvements. Furthermore, some researches (Hattula et al., 2015) imply that disseminating marketing intelligence improves efficiency and effectiveness of the decision-making process at various organisational boundaries such as marketing – finance, or marketing-R&D. The insights that can be drawn from SMM is advertisement campaign monitoring. Social media analytics can discover the factors that impact performance, determining which outreach methods are working, or how and which the messaging need to be (re)adjusted so that the company's product should be more relevant and easier noticeable than the competing ones.

7 Evidence about using BDA

According to the IDC results from worldwide semiannual BD and analytics spending guide, worldwide revenues for BDA will reach $150.8 billion in 2017, an increase of 12.4% over 2016 (Goepfert, 2017). When compared with the 28 billion USD of worldwide spending in 2012 on BDA, the growth is remarkable (Ross et al., 2013). Prediction is that at 2020 total revenue will be around 210 billion USD, with the cumulative annual growth rate of approximately 12%. In 2017 the biggest investors in the BDA were the banking sector, the government and professional services.

According to IDC potential for BDA revenue in 2019 will come out from discrete manufacturing $22.8, banking $22.1 billion and process manufacturing $16.4 billion. In

the future biggest perspective for BDA, investments will come from financial industries – like banking, insurance and security investments (Goepfert, 2017).

According to research conducted by Dresner Advisory Service in 2017 BDA study results showed that 53% of companies surveyed used BDA, which represented 17% increase compared to 2015. Four main industries are telecom, financial services, technology, and healthcare. Looking from a geographic perspective, North America with the 55% has the most significant level of BDA adoption followed by EMEA 53% and Asia-Pacific region with 44% (Columbus, 2017).

From the side of the company perspective huge companies, those with more than 1,000 employees have 60% of total BDA spending and IDC forecast that total expenditures of those companies in 2018 will pass a magical number of 100 billion USD. Small and medium enterprises – SME with fewer than 500 employees contribute with around 25% of worldwide spending on BDA (Goepfert, 2017). The IT and data intensive companies which are using BDA can increase productivity by 7%, those companies that are not data intensive with the application of BDA can increase productivity only by 4%, shows research conducted IT University of Copenhagen and the University of Liechtenstein by on 800 major companies (Müller et al., 2018). The results from the same research show that BDA can contribute an increase of productivity between 5%–20% in oil and gas industry, insurance industry between 2%–19%, banking, finance, and real estate 2%–14% and wholesale and retail: 2%–11%.

8 Experiences in using BD in SMM

Harvard Business Review Analytic Services (Business Wire, 2010), in partnership with SAS, conducted a survey in 2010, in a sample of 2,100 companies, with the goal to enlighten whether they are using SMM channels and if yes, how they do it. The study found that nearly two-third of the participating organisations said that they are either currently using SMM channels, or have plans to do it in the future. However, only 12% of the companies surveyed said they felt they were active users of social media, 75% of them did not know what their most valuable customers were talking about them. Nearly one-third does not measure the effectiveness of SMM, and 23% are using SMM analytics. What is very disappointed is the results which suggest that only 7% can integrate social media into their marketing activities.

There are a few common mistakes that marketers make with social media, taking into account that 90% of medium and large companies use SMM in the last five years, but the majority cannot see the real impact (Quesenberry, 2018). First, social media connection as the only marketing channel and isolated from wider company marketing objective. Second, limitation of the company presence only to the most popular social media sites. Both mistakes are coming from uninformed marketing decisions. As a way forward suggested the following steps should be taken to succeed in social media and marketing.

As a first step, marketing decision makers have to ask themselves following questions: what numbers must you hit? How will you know you are successful? How does your boss judge success? What has changed recently that challenging you and what do stakeholders care about most? After proposing these questions and defining the answers, marketing decision makers have to define social media platform where they should be or where they should not be. Merely intensifying activities on the wrong social media platforms will not bring result and fulfilment of marketing and business objectives.

After choosing the right social media channel, the content should be carefully designed to create the most prominent impact on target audience. After these steps, the right tools have to be put in place to manage social media messages across all organisation. Implementing analytical tools such as BD tools for measuring how successful messaging are, is the critical step which gives insight to marketing decision makers what is going on with the actions, which channel is working and which is not, which action produce biggest ROI, what should be improved, rejected and better formulated.

"Tracking the right metrics will allow you to see how efficiently you are meeting your business objectives. If your goal is to raise brand awareness, measuring reach versus the volume of engagement will tell you how successful your efforts are" (Buryan, 2017).

In the global research named 'Insight 2020' (Kantar Vermeer, 2016) that was conducted in 2016 on the 10,000 big sample of business around world, it was concluded that among the factors that were found to drive consumer-centric growth, none mattered more than strong 'insight engine' function in the organisation (van Den Driest et al., 2016). Strong and successful 'insight engine' is consisted of ten characteristics divided into two groups, first seven operational characteristics and in second group three people characteristic.

Moreover, sharing marketing intelligence and insights getting out from social media analytics is something that there should not be alternative in organisational culture. If marketing intelligence is not shared among organisational units can decrease essential interactions across departments and thereby hinder overall company performance. There are many reasons why managers withhold market intelligence from other departments. For instance, departments compete for scarce resources such as budget and influence on corporate decisions; they can have different views about the organisation's strategic orientation, and they strive to affect corporate decisions in their desired direction (Erevells et al., 2016).

Many factors can negatively influence successful BD project and the level of accuracy of the BDA products. Some of the challenges coming out from the organisational culture, and its ability of digital adjustment such as securing data integrity, availability, and quality and establishing proper and efficient data management.

Others challenges are connected with the technical abilities to manage BD such as scalability, data heterogeneity, availability of right BD tools for processing of the data, and BD tools integrating data from different sources and with the different formats.

Another important challenge of successful implementation and interaction of BDA and SMM is respecting of legal requirements for collecting, processing and using personal data. In Europe, this is covered by the general data protection regulation (GDPR), and everybody, including non-European entities, who intends to use personal data for the BDA and SMM proposes should carefully take care of this regulation.

9 Conclusions

There is no doubt that by the implementation of BD capabilities in the company could result in enormous potential benefits. Neglecting the potentials of this new technological capability will decrease marketing competitiveness. Many examples in this respect can be detected all around us. Ignoring the fact that marketing department resources can produce a tailored approach to every specific customer, can have fresh, real-time data, that can

make a real-time adjustment of the marketing activities, and that can predict with high accuracy, will lead ultimately to underperforming of the overall company.

In the same time implementation and everyday operationalisation of this projects is very challenging. It should be treated carefully knowing that almost half of all BD project fails to yield expected results. There are many reasons behind the failure, ranging from misunderstanding, lack of support from senior management, organisational culture, change resistance or lack of adequate financing. As most significant obstacles, many researchers and marketing professionals point out, are the lack of sufficient human capital to carry out this demanding process and the absence of the senior management support. So, in the planning of BDA project focus should be on hiring professionals who can successfully implement the project and secure, on time, adequate support from the highest managerial positions in the company.

Further research should be directed in the area on finding new ways how to secure proper support and sponsorship from the highest company's instances for embracing BD by the decision makers in all levels. To achieve success in using and extracting BD benefits, it is important to detect and understand the obstacles and challenges that BD users (*managers and decision makers in all levels*) are facing. Interaction of domain and expert knowledge should be investigated in more detailed ways because without symbiosis between those two elements, the expected and projected results will not be achieved.

Furthermore, implementation of artificial intelligence (AI) in this area has strategic importance, since promises that AI could bring to this field represents a game changer element. The AI platforms, opportunities, challenges, and company culture requirements and limitations are the areas where further researches should be conducted.

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Notes

1 E-word of mouth.