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BIG DATA DRIVEN E-COMMERCE MARKETING

Arnoldina Pabedinskaitė[1], Vida Davidavičienė[2], Paulius Milišauskas[3]

[1,2,3]*Vilnius Gediminas Technical University, Faculty of Business Management, Saulėtekio al. 11, LT-10223 Vilnius, Lithuania*
Email: arna.pabedinskaite@vgtu.lt; vida.davidaviciene@vgtu.lt; milisauskas@gmail.com

Abstract. The development of information technology and growing amount of information led businesses and scientists rethink the models and strategies of communication as well as information management and usage possibilities. Businesses compete in the fulfilled markets and need to increase efficiency of business performance as well as market share, atract more customers and minimize operating costs by implementing new digital and business technologies. Modern technologies providing digital marketing tools, which could help automate marketing processes, extract data for analysis etc. One of new trend is use of big data in marketing. This paper begins with an analysis of big data analytics theories and its connection with marketing. The emphasis is being brought on e-commerce as a priority mean of business. A rich link between e-commerce and online marketing allows big data analytics to bring additional value to the process and its participants. Based on literature analysis a theoretical online marketing model is being presented. The aim of the article is to analyse and present use of big data analytics for marketing purposes in electronic commerce. Following methods are employed: the comparative analysis of the scientific literature, the systems analysis, data analysis.

Keywords: big data, e-commerce, marketing.

JEL classification: M31, C80.

1. Introduction

In year 2010 there was more than five billion mobile phones in the world, which means almost every person had one. Also, 30 billion data units are being transferred through Facebook daily with a predicted yearly growth of 40% (Manyika *et al.* 2011). Unstructured data itself this year will account for 90% of all created data, thus its analysis will become more and more important for businesses (Courtney 2013).

According to IBM technologies trends report informational technologies experts from 93 countries and 25 different industries stated that business analytics (or working with big data) is one of four major technologies trends (IBM 2011). Almost the same is being stated in queries results, gathered by Bloomberg: big data is being used in 97 percent of companies with annual revenue exceeding 100 million US dollars, approximately 53 percent of respondent's use this for company's marketing solutions with business analytics, forecasting and data acquiring being the main areas of big data usage (Bloomberg 2010).

The importance of big data analytics is being supported by 91% of top executives from Fortune 1000 list as they have stated to be using big data analysis or at least planning to do so in the nearest future. Moreover, approximately 88 % of respondents are hoping to invest more than 1 million US dollars in inhouse development of this area (NewVantage Partners 2013).

Though today big data analysis is still more of a rarity than casuality, it is increasingly perceived as a value added activity for both personalization of goods and services and creating additional values for the client.

Companies often do not know enough about their customers to properly personalize products and services. On the other hand, sometimes a company has a posibility of gathering huge numbers of data, but is unable or does not see a reason to give them a structure and use it in most sensible way.

The development of information technology and growing amount of information led businesses and scientists rethink the models and strategies of communication as well as information management and usage possibilities. The problem of lack of marketing models oriented or at least adapted to work with big data still exists. This is vitaly important for business because acting in fullfilled markets (not just by products, but by huge amounts of information) is challenging and some-

times crucial. This article oriented to analize one of business activitie fields – e-commerce.

Aim of the article is to analyse and present use of big data analytics for marketing purposes in electronic commerce.

Following methods are employed: the comparative analysis of the scientific literature, the systems analysis, data analysis.

2. Big data and new opportunities

Modern technologies providing digital marketing tools, which could help automate marketing processes, extract data for analysis etc. One of new trend is use of big data in marketing. However, this are is not so deeaply analysed as the effectiveness of online marketing field (Hague, Hague, Harrison 2006; Jansen, Resnick 2006; Lee 2007; Chaffey, Smith 2008; Davidavičienė 2012; Wang *et al*. 2009). Most of the scientific studies are dealing with the evaluation of the effectiveness of the online marketing or advertising campaigns and the quality, or the effectiveness, of the web sites (Cao, Zhang, Seydel 2005; Davidavičienė, Tolvaišas 2011; Pabedinskaitė, Davidavičius 2012); however, little attention has been paid to the identification and description of the target e-spaces and the challenges related to it (Pabedinskaitė, Davidavičius 2012; Davidavičienė *et al.* 2014) The majority of the researches in this area are focused on the identification of the models of the behaviour of online users (Wright 2006; Sinclair 2007; Li, Li 2008; Kawase, Herder 2011; Zeb, Fasli 2011; Pabedinskaitė, Šliažaitė 2012); however, numerous factors determining the behavioural motives of the users (e.g., the appearance of the tools of new online marketing; the variety of browsing skills and habits of the different generations of the users; and etc.) are also important, and it is a part of big data.

For the past few years (2011-2013) big data is one of the major topics in digital business ant it's literature with more and more scientist publishing their works on this topic (Boyd, Crawford 2011; Manyika *et al.* 2011; Lopez 2012; McAfee, Brynjolfsson 2012; Mahrt, Scharkow 2013).

Big data is sometimes explained as pieces of information, which may be collected, recorded, communicated, aggregated, and analysed (Manyika *et al.* 2011).

Also big data is being defined as a continuous and very fast growing stream of data from a variety of sources, including the internet, biological and industrial sensors, visual materials, e-mail and social networking communication (Lohr 2012).

It is important to note that big data is not just a client's, users and other persons's delibaretly and purposely created stream of content, but also everything that particular user or client has done over the internet or systems, connected by it.

The data aggregation and processing simplicity is largely dependent on data structuring. If the data is structured (there is a clear structure, for example: a user-filled form, questionnaire or other form, which prevents free spelling), then this type of data processing is easy and quite simple. It is much more difficult to handle the data that is not structured and needs to be put under a certain logic structure before starting processing work. Due to this reason a very complex techniques are being implemented in even more complex systems like Apache Hadoop, Graph Lab, Kognitio and Twitter Storm and similar. Unfortunatelly, neither of these systems can give a 100% perfect outcome and may not always be ideal for a certain case.

With regard to the data and its structure, there is a problem with the data format. The data formats differences do not usually let to compare, analyze, and apply the same evaluation criteria comfortably and easily. The images are difficult to render as a text, sounds to render as images and alike. This is why different formats of information, having different types of data structures, have to be dealt with in a different manner. Eventually the result has to be the same: differently formatted and structured data has to be restructured and therefore the analytical results achieved. Also, as McKensey Institute study showed different market sectors are able to get data in different formats (as cit. Manyika *et al.* 2011).

Despite the many challenges that might occur through big data analysis based marketing this type of marketing can bring a significant number of positive changes. Various authors see a number of major positive aspects of the big data based marketing and present it as a posibility to gain competitive advantage: the organization that effectively exploit big data analysis takes a very strong competitive advantage (Greengard 2012).

The focus, of course, has to mostly fall on performance - the organization that uses big data based digital marketing has to do it properly, because the only good planning, preparation and wise use of resources will gain a competitive advantage. By saying that tomorrow's competitive advantage will emerge from the ability to use, develop and manage integrated information both inside the company and outside it, Johnson agrees that the big data analytics can create a competitive advantage (Johnson 2012). One can also stumble upon an opinion that it is already required to do big data based marketing, and now it would be too late to try to assess the benefits, big data has already reached all sectors in the global economy.

The modern economy could not survive without big data analysis, just like without any other necessary factors like materials or human resources (Manyika *et al.* 2011).

Finally, there is an opinion that big data analysis is important not only for business and academics but also for consumers. This approach allows a much wider assessment of the overall big data analysis potential: although the data is already being stored in databases for about a century, big data is no longer only the domain of scientists. New technologies allow the wide range of people to reach, share and access big data (Boyd, Crawford 2011).

Another point, allowing to assessing the big data analysis benefits for marketing, arrises here. Although a consumer might not be happy with the use of his or her data for reasons of analysis, with a correct use of analysis results the same consumer can receive not only more precise offers from a seller, but also a more individual communication, less unnecessary flow of advertising and more attention for consumer's personal needs. If a company manages to guarantee anonymity and safety of consumer data, does not identify the exact person throughout the process of data analysis or in best case scenario does not even gather the data that allows identifying an exact person, the company wins along.

Organizations use large data should also help to create common business prosperity (all benefits the company can get: economic prosperity, well-being of employees, management, welfare of providers, etc.). Successful plan of work with big data focuses on three main elements (Biesdorf *et al.* 2013) and is expressed with a formula:

$$DI + AM + DMT = \text{business prosperity}, \quad (1)$$

where DI – data input, AM – analysis models, DMT – decision making tools. These three components are already identified as the main working parts with big data. Data input to allow for aggregation of data from different sources. Analysis models to allow process and analyze data in different formats, with different characteristics. Decision-making tools to create a proper use of the analytical results, and ultimately create business prosperity.

It is also noticeable that the data is often the product of the natural and everyday consumerism (Mehl, Gill 2010). This means that incoming data not only allows you to customize specific marketing solutions to certain users, but also to analyse the common people's habits and behavior. Such an analysis should, of course, not be organized by one organization but on a scale of whole market and the insights of that market could be used for purposes of a certain organization. Such a precise way of identification of consumer's behaviour would bring much more information for organization as the data would not be affected by the third parties or affected in the least way possible (Jankowski, Selm 2005; Vogt *et al.* 2012).

Another positive aspect of big data is that the data and the generators of it already exist somewhere in virtual space (Herring 2010). Everything that needs to be done now is to write, save and interpret everything in a correct way. In other words, the material that needs to be worked on is already here and the stream of it is constantly growing. On the other hand it creates a big challenge: big data analysis starts to seem available to everyone. On the bright side, it lowers the barriers to enter the market as it becomes necessary only to be able to aggregate and analyze rather than to create.

Finally, big data analysis allows accessing and analysing very strongly globally scattered users with specific needs (Mahrt, Scharkow 2013). Joint data aggregation and analysis would allow to segmenting such consumers and apply marketing decisions more precisely.

3. Big data and its problems

The problem with big data is that the companies, despite having the theoretical capability to gather information, fail to do so effectively, and in many cases fail to do so completely (Manyika *et al.,* 2011 McAfee, Brynjolfsson 2012). After a comparative analysis of literature (Manyika *et al*., 2011, McAfee, Brynjolfsson, 2012; Mahrt, Scharkow, 2013; Nunan, Domenico 2013; Bond 2013) main problematic areas of applying big data based marketing could be identified:

- legal restricions;
- infrastructural and technological constraints;
- social responsibility issues;
- human resource constraints;
- financial constraints.

Legal restrictions is an especially sensitive issue for internationally operating companies, which should ensure the security of user data and not break the laws of the country that they are operating in. According to the Republic of Lithuania Legal Protection Act, personal information is any information relating to a natural person - the data subject whose identity is known or can be directly or indirectly refferenced to such data as a personal code, one or more factors specific to his physical, physiological, economic, cultural or social identity (LRS 2008).

The data flow involves four main subjects: the recipient (natural or legal person, which utilizes the present data), the data provider (physical or legal person who provides the data), the data controller (the natural or legal person authorized by the data controller the processing of personal data) and the controller (legal or natural person who alone or jointly with others determines the purposes and the measures).

Infrastructure and technological issues are probably the most extensive area of concern, seen by these day's scientists and entrepreneurs. The set of problems is also very diverse:

1. *Speed* – how quickly the information changes. Slowly changing information or its stream may not provide sufficient moment, which may be required for certain decisions. Too fast changing information leads to the processing and proper use issues – process remain unanswered, the results are often outdated.

2. *Data novelty* - how new is the available data and how reliably can the conclusions be drawn from it. In part, this is related to the speed of data retrieval. Not always the most relevant information about the generator of data is needed - in some cases, in order to assess the changes in consumer behavior it is very important to have older data that can be compared with the most recent one.

3. *Variety of sources* – information, obtained from different sources can be in different formats, making it difficult to both treat it and use it.

4. *Data format* – yet another technological limitation. Users can create and transmit a wide variety of data that can be encoded in different formats: video, audio, text, images, tables, indirectly generate information ("like" clicks and similar interests' signs in Internet).

5. *Too mechanical data processing* – working with big data requires empowering information systems, as it is too complex for a human to process and compute such high volumes of data. This does not mean that there is no need for human intrusion and control.

6. *Improper selection of technical analysis* - the bad decisions of the planning may be very costly. Inadequate analysis techniques not only will not bring the expected result, but will consume a considerable amount of resources. Lopez identifies this as the most important aspect (Lopez 2012). This is particularly true for small-scale businesses, because they do not have sufficient resources and experts to properly execute analysis, make predictions and to evaluate and monitor the strategic processes (Stoner 2009).

7. *Change management* - the company should be innovative and constantly evolving. These principles should be applied to leadership, talent management, technological, decision-making and overall company culture.

8. *Improper planning or abcence of it* - this is a common problem that can occur regardless of whether it is big data analysis based marketing or any other marketing areas. At the start of process it is required to perform the standard planning and organizing steps that ensure clear steps and responsibilities control and distribution.

The main issue in *social responsibility area* are personal data security and privacy. Remembering the user's fear of buying online and transfering their bank details over the internet, the question remains important with the acquisition of other personal data (Boyd Marwick 2011). Users are often reluctant to hand over their personal data (specific or non-specific) because there is no guarantee what they are transferred to them, or what will be done later on, how long it will be used and for what purposes. Although the data are publicly available and might not be sensitive (any personal information that might harm a particular person), but users often do not agree that it would be used without their permission.

This is confirmed by a few year old study, during which data from social network was aggregated but later anonymised (in multiple formats). The data has been used for scientific purposes, but, even at very high volumes of data, it was possible to identify certain logical sequence that led to decoding and identification of individuals (Boyd 2008). This confirms that privacy is a privilege to be protected socially and structurally, for it to exist (Boyd, Ellison 2007; Boyd Marwick 2011).

Every organization should act responsibly while collecting the data and learn how to save only what they really find necessary (Jackson 2013). Unnecessary data collection is not only a waste of resources and infrastructure, but also the high-risk consumer data security question. Unnecessary data creates additional risks that are not necessary for any organization. That is why the organization, which has decided to work with big data, it is appropriate to establish a policy of non-required data removal, while protecting the privacy of users and organizations, and reducing risks.

Human resource shortage occurs mostly in analytical field. Big data analysis contains three main components: the technical infrastructure, software, and people, which makes human resources as one of the most important aspects of the analysis process. For now the system is not able to replicate the human analytical abilities, because they are working in accordance with pre-defined logic. In the real world, this logic can vary, which means that a gap between the analysis results and the real situation is appearing. Of course, a human can also

have the information asymmetry, but has the ability to react quickly.

The human resource shortage is particularly noticeable in the most important place: currently there is a lack of market analysts and experts with data analysis systems knowledge (Manyika *et al.* 2011). This creates another problem - the financial cost growth.

Financial resources topic faces two main challenges: the lack of resources, infrastructure and human resources (as well as a possible reorganization) and a complex cost-benefit measurement.

Often organizations may incorrectly assess the resources required for such an analysis applications. It can also give the impression that for work with big data very large fianancial resources are needed. It is important to note that this is not always the case. As with any other digital technologies field, there always exist an alternatives, which may require additional human resources or time, but save substantial financial resources. All of the big data analysis is based on the logic that the work with very large amounts of data is highly automated. This means that all the work until the decision-making can be transferred to third parties, which would reduce the cost of the procedure.

In the absence of suitable tools, the economic benefits of this decision can be very difficult to evaluate**.** In the process of decision making big data analysis act as a starting point, so it's not exactly related with the outcome. Decisions made accordingly to outcome of big data but made at the wrong time can bring a negative result, but it will not be the error of big data *per se*.

This list of problematic areas could be in the future both to shortened or lengthened, but makes it easy to see that each organization has to draw attention to the social (consumer data collection and approach to, the supply of professionals), economic (financial opportunities, competitive financial opportunities) political - legal (privacy and data protection issues and public policy flexibility), infrastructure - technology (data format differences, their treatment options, computer capacity and opportunity to collect data) factors.

4. Big data based marketing model for e-commerce

Marketing models for e-environment are closely related to clasical marketing models, which are adopted according the specific of virtual space. In order to form the big data marketing model the marketing models analysis were performed. As result several models where chosen due few main reasons: their popularity in practical use, their variety, the coverage of almost all decission making process and ability to help identify the possibilities to work with specific marketing techniques. Sampling, carried out by the authors, raised the criteria - application digital marketing.

PESTLE (Aguilar 1967) is the first model in this paper that is oriented to the analysis of the environment. During the preparation of a marketing plan it is appropriate to assess the environment in which it will be executed. This anaysis is divided into six components: political factors (including legal factors), economic, social, technological set and environmental factors**.**

Porter's five forces model helps to draw attention to the competition, the capacity of suppliers and threat of substitutes, purchasing power and market entry barriers (Porter 1979).

7P marketing mix (Booms, Bitner 1982) is based on the famous 4P marketing mix by McCarthy (McCarthy 1960). In this paper we use the broder approach for its larger scale. The main focus of this model is given to the product, price, place, promotion, people, processes and physical-obviousness.

Customer lifetime value model (Shaw, Stone 1988**)** is oriented to the segmentation of the customer base, based on their level of involvement in the procurement process. This model is focused on e-services, thus is appropriate for e-commerce. Model's authors recommend that users should be segmented by whether they have visited the shop, registered or bought. After the segmentation of the consumers one can prepare different proposals and execute different types of communication for different types of customers. It is offered to segment the customers according to their attendance, registration and purchase frequency.

Loyalty ladder model (Adcock *et al.* 2001) followed a similar logic, as well as customer lifetime value model. Though this model is not focused on online sales, but notes that some customers may become advocates of the brand. While the customer lifetime value model says that the best customer is the one who buys very often, the loyalty ladder model states that the best is the one who not only often buys, but not forced and on his own provides positive feedback and recommendations to other potential customers.

Preparation processes for work with big data analysis in the marketing requires having a complex planning process, during which exact tools are being identified for problematic avoidance of problematic areas. In addition, knowing that big data analysis based marketing in most cases requires internal organizational changes it is appropriate to assess any potential problem areas and eliminate potential interference.

The model of big data based marketing (Fig. 1) is composed on cyclic basis, which means that it is not a finite process, and it may have a different volume cycle, depending on the particular situation.

Solid lines in the visualization of the model show the direct link between the model elements. The dotted lines indicate a possible, but non-binding sequence. Spot dotted line indicates the ability of this process to become cyclic, depending on the results obtained. Dotted bar indicates potential problem areas after removal. General idea of the proposed sequence in the model is to support the concept that the one is being addressed by a single type of problems: first, the identification of the general environment, in which will be operated on, later the organization needs and opportunities are clarified and finally, actions, depending on the environment given the opportunity of internal organization options and its goals.

Digital marketing is a part of common marketing plan, so it can not be planned in isolation from the overall strategy. The proposed model consists of three parts, which are closely related. Each of these components is related to big data analysis problematic and procedural parts:

– analysis of the external environment;
– internal organization analysis;
– big data based marketing.

1. The importance of the first part, i.e. *external environment analysis,* is quite obvious: it is appropriate for the organization to evaluate all of the political, economic, social and technological capabilities and limitations before apsiimdama concrete action. The external environmental analysis is recommended as a priority for one very clear reason: the online shop owners must consider in what environment it is going to operating, what are the rules of the market and the opportunities of it, the foreseeable risks and threats. Only a general assessment of the capabilities and limitations can be measured, at what level and at what cost is to meet its objectives. While assessing the *political external environment capabilities* we can answer few of the legal internal environment questions. This is one of the reasons that is proposed to have external environment analysis prior to internal environment analysis. Depending on political and legal restrictions in a certain country it might be hard to proceed with big data driven marketing. Strict laws on privacy might shorten a list of data that can be obtained by businesses. This is a very important aspect considering going global.

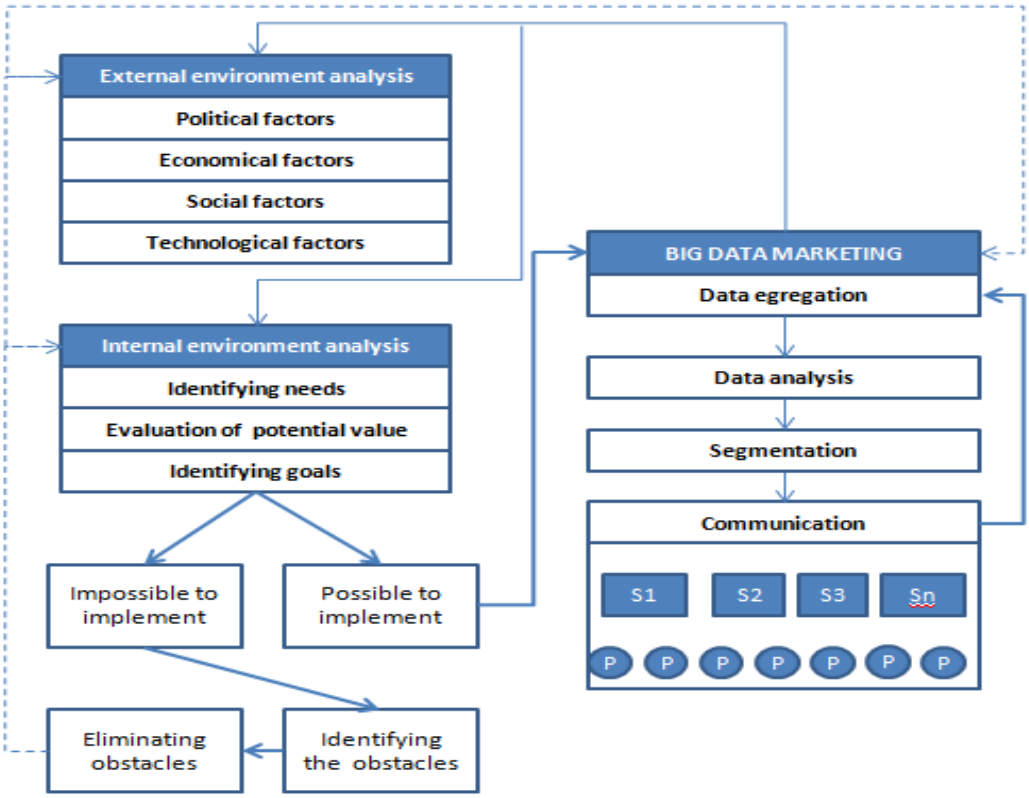

Fig. 1. Big data based marketing model

The same situation happens with the *economical environment*, which can have an impact on financial possibilities of a business.

Depending on the online shop as an organization of physical space, low cost of living and the country can both help and hurt so much: it will be possible to get good professionals at lower cost, but buyers will not be willing to pay as much as economically advanced countries. Economic and environmental analysis is equally important for both new market players, as well as old-timers.

Social factors allow the identification of both the total number of members of the market as potential buyers, as well as to identify potential number of professionals who work in the local market. Depending on the nature of the organization while going into new markets it may be necessary to have the local labor force. Social factors in this case are important because, although the process is largely automated, some analytical insights, decision-making and administration of the system cannot be done without people. This makes the need for such specialists as systems administrators, programmers, analysts and such. Great demand for these professionals can influence economic factors of the business too.

Technological opportunities in the external environment has a slightly lower value on the internal company environment – in a global market required equipment and technology is readily available and can be used regardless of geographic location or environment. External environment analysis in terms of technological aspects is important due to the need to assess the potential competitive advantage, or at least a general technological level of the market. Electronics store should answer the questions related to infrastructure (computers, servers), analytical systems, and a steady stream of high-capacity Internet issue, and the like.

It is important to not only on the enterprise level but the market level as well. This refers to the fact that the company's financial capacity is not sufficient to guarantee that this type of marketing to be effective. Its effectiveness and efficiency much more influenced by other factors.

External environment analysis should provide clarity to the organization evaluating overall market readiness to work with big data. This is an important step both starting to work in a new market, and for the first time taking big data based marketing in a certain country, even if simple digital marketing has been carried out before that.

2. The *second step* is the internal environment analysis. A business in this step must know in what the market it will perform operations, what is the political, economic, social and technological options, what challenges and constraints these areas might be facing in the nearest future. It is currently in authority can take to assess their needs and potentially achievable benefits. It is easier, as is already known to the environment in which the actions will be carried out, and of course, what are the limits of overall possibilities. Internal analysis of the organization consists of three main components: identification of needs, possible benefit assessment and definition of goals.

2.1. It is appropriate for organization to assess what is the *specific need* for data analysis by means of the big data based marketing. Organizations need may be the tracking current consumer buying habits or tracking statistical data aggregation and analysis, and corresponding segmentation. Needs identification is the process of being identified, the data from any sender, in what format, and how often will be aggregated and analyzed. Depending on the organization's needs technical infrastructure and human resource requirements levels might change accordingly.

2.2. *The possible benefit assessment* is appropriate, because it helps to know what the cost might be offered for this new type of marketing. This is an economic question and thus is not widelly duscussed in this article, although is seen to be very important. Of course, in the beginning the evaluation of all costs is almost impossible, because the future market situation can vary greatly. However, at this point external environment analysis, which allows identifying the current situation and future prospects, should help. Possible benefit assessment is appropriate; otherwise the organization can spend significant financial and time resources, which alternatively could bring much greater benefits.

2.3. *The definition of goals* is a very important point. After the main set of needs has been identified, a business can identify the goals, which should be acheived through an appearance of big data driven marketing in a certain company. The major objectives of the organization of data in marketing can be very different: it can be eithercompetitive advantage and acquisition, or more accurate bidding, cost reduction and time, and more innovative rinkodarinių solutions and so on.

After the internal analysis of the organization using environmental criteria can access two types of conclusions: there exists the access to big data analysis based marketing, there is no access to the large data analysis based marketing.

In order *all the opportunities to engage in the big data driven marketing are present*, organization can go directly to the execution step. This

move is only possible if the electronic store do not see any interference or interference is tolerable and can be eliminated during the process.

Organization, which considered all the factors and *do not see the possibility of using this type of marketing*, is available to move to the next step - identifying interference. Worked out areas that do not allow the organization to move to a big database marketing, the organization should take the blockages. Immediately after that, depending on the level of interference and the removal of the time limit for such action, the case may be to switch to the organizational analysis, external environment analysis of large data or marketing.

3. *Big data analysis driven marketing in e-commerce* basically is different in a way where all information about the user or consumer is in digital format, all of the data is aggregated automatically an neither the consumer, nor the company has to do anything additionally in order to create ir acquire the data (the same stream of data was present previously too: process of purchase, browsing, newsletter marketing and other digital marketing tools provided data).

All marketing proces, depending on results of the previous literature analysis can be divided into four main stages: aggregation of data; data analysis; consumer segmentation; communication using 7P marketing mix.

3.1. *Data aggregation* is performed in specially prepared systems. A common possibility is that a different type (browsing data, purchasing data) data can be aggregated in different systems. In data aggregation requires an extremely strong technical preparation, both through the large amount of data, as well as on security issues. According to some authors, even simple data such as the user's browsing history and demographic data can significantly improve the segmentation (Chen *et al.* 2009, Joshi *et al.* 2011). During the data aggregation step organization already has to know the basic data related concerns: incoming data sources, data types, used for data strips.

3.2. Next step – the *analysis* of the available data. Current simplified systems on the market are already available to provide insights, but the experts - analysts, will only provide the fullest and best outcome throughout personalized insights. Depending on the goals set for them analysts can provide a differently cut conclusions and recommendations.

3.3. Immediately thereafter, users segmentations can be performed according to the certain assigned attributes (duration of browsing, frequency of browsing, size of the shopping cart, purchasing frequency and similar). The research shows that internet users are very different and form many separate types. In addition to gender, geographical differences or purchase habits it is advised to perform a psychographic segmentation, following their habits on different platforms (Vinerean *et al.* 2013).

Customers' segmentation can help not only better target advertisements, but also to reduce the distance between themselves and the consumer individualization offers and to personalize communications. To identify consumer segments, marketers can use consumers such as cognitive style characteristics (Hauser *et al.* 2009), browsing behavior (Agarwal *et al.* 2009), the former procurement information (Malthouse, Eisner 2006). Cognitive style is difficult to predictable and measurable, but both browsing behavior and purchasing history are very easily fixed and are the part of data falling into the big data analysis.

3.4. *Communication* is the last step in the process. After transmission of the message the reaction is expected, which returns in the form of data and encourages the process to start again. Constant repetition of the process should be ensured from the organization side.

The proposed model visualizes all of the process that a new or already existing company should go through in order to start working with big data for marketing reasons. The most ideal way is to use digital marketing for both the communication with the customer and the aggregation of needed data.

5. Conclusions

Literature shows that digital marketing, being similar to the traditional and have distinctive rules may be used together as a personal and non-personal communication channel not only allows to transfer data or information, but also to get feedback. After marketing analysis models were selected as key marketing models Pestle, Porter's five forces model, 7P Marketing Mix, loyalty ladder, and the customer lifetime value, although indirect influence as well has had product life cycles and unique sales proposal models.

The use of big data analysis has five main problem groups: legal, financial, human resources, infrastructural – technological and social. All of them have a very similar impact thus cannot be ignored. On the other hand, social problems seem to be the only ones conserning both the business and the customer. Nevertheless, the company benefits achieved by big data analysis based marketing can be very diverse, but its main purpose is to provide a competitive advantage over the other in the same market and allow reaching the business or organization wellbeing.

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