

## **The “Big Data” opportunity for the retail industry Online desk research**

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### **Abstract**

Big Data is the next big step for the business world. The purpose of this desk research conducted with the help of online sources is to establish a general theoretical framework regarding Big Data in the economic environment and especially in the retail industry. The main conclusion that emerged is that Big Data provides competitive advantages for organizations integrating this technology to improve the knowledge of customers and also offer them the possibility to be able to anticipate their wants and needs in the retail industry which translates into offering the right product, at the right price and time.

**Keywords:** Big Data, retail, consumer, competitive advantage

## Introduction

The accelerating development of Internet and the explosion of data in the digital environment make massive amounts of information available to organizations undoubtedly higher than they can manage. To benefit from this phenomenon, organizations develop new skills, technologies and new management and marketing strategies.

Every two years, the Marketing Science Institute makes the research agenda public, which focuses the pragmatic academic world towards the issues of marketing individuals. For the period 2012 – 2014 the main themes are:

- Understanding people in their role as consumers;
- Rethinking how to achieve purchases;
- Creation of experiences, not products. Which of the experiences do customers remember and which are also interesting, repeated and appreciated?
- Mobile platforms and their impact on how people live their lives and the functioning of markets;
- Trust between people, institutions and social networks;
- Big Data;
- Organizations and marketing capabilities. (MSI a, 2012)

From the above, the concept of Big Data and its implications towards the retail industry will be detailed.

### 1. The concept of Big Data

The 21<sup>st</sup> society is experiencing a revolution of data or "data deluge", statistics show that only at the digital point of view the data available globally rose from 150 Exabyte in 2005 to 1200 Exabyte in 2010 and is expected to increase by 40 % annually, this growth rate is expected to double every 20 months. (UN Global Pulse, 2012)

In this context the term Big Data has become more used in the business world, but hard to explain by members of several organizations.

Big Data defines a structured and unstructured mass of data in order to obtain useful information for different areas, while this was not possible until now (Big Data Insight Group, 2012).

Using analysis techniques of a top broad spectrum of data, Big Data represents an opportunity to create greater differentiation between players of the same industries (Zikopoulos, 2013).

As Alex "Sandy" Pentland - Director of MIT Human Dynamics Laboratory captures the definition: "Big Data is about people: consumers, employees and potential customers. Whether the data was obtained using a cell phone about the location you are at, on various transaction data, whether data emerging from social networks, all of these are bits of data put together with the help of modern technology and they tell a story about our lives... Because people are involved in a social factory, if we can see some of the things they do, we can deduce the rest by comparing them with the people from their entourage" (MSI b, 2013).

Over time, marketing research has analyzed relatively small data samples, based on these estimating and testing the parameters of the researched models. "This has been a relatively slow process, and the results have not always been reliable in a turbulent business environment. Today, having a

steady stream of data, organizations want that their research methods which provide results also quickly respond to changes. They cannot tolerate pilots who regularly close their eyes to process the information, they want pilots to have their eyes open all the time - MSI Executive Director John Deighton" (MSI c, 2013).

Only by looking at a typical day in our lives, we can see how much data we offer about us through our activity on social networks, in sending more emails than we've ever sent or shop online, only by the fact that if we gather to all generated data the data which is left behind from the remaining 981 903 539 Facebook users globally (Checkfacebook, 2013) or more than one billion Youtube users (Youtube Statistics, 2013), the result will be a massive amount of data for the business area which transforms into opportunities in bringing added value.

The benefits Big Data can bring to an organization have the potential to transform a business by improving the efficiency of internal processes by forecasting trends, gaining valuable information on existing and potential customers, gaining an immediate and accurate overview of the market opportunity to find new revenue sources (Big Data Insight Group, 2012). Therefore, this concept sees the need for understanding the research on the one hand, and professionals on the other hand because once there are resources to be applied in practice, competitive advantages which lie in "Big Data" are endless.

According to the "1st Industry Trends Report" study produced by Big Data Insight Group, the reasons for which Big Data is integrated in an organizational level vary from sector to sector as follows:

- *Retail*: 64% of trial subjects would use Big Data for better understanding of consumers, 57% to better target the marketing campaigns, and 53% of respondents for better planning and decision making;
- *The Public sector*: better planning and decision making is a reason of integrating Big Data in the public organizations for 78% of the subjects, achieving higher values of the old data is one of the reasons for 76% from them and for 62% the understanding of customers is also important.
- For the *Financial and Professional Services sectors* the above mentioned reasons were discussed and the competitive advantage with a 51% - financial services, and 52% - professional services came as a conclusion (Big Data Insight Group, 2012).

Customer knowledge is a factor that can lead to competitive advantage and the data is the key to ensure visibility of organizations forming one business area. The acquiring of suitable data can build relevant customer experiences. Big Data has already demonstrated its importance and value in several areas. Organizations like the National Oceanic and Atmospheric Administration (NOAA), NASA, several pharmaceutical companies and many companies working in the energy sector have raised a huge amount of data and now use Big Data technology in their everyday actions to extract value from those data. NOAA uses Big Data in the research of climate, ecosystem and weather, while NASA uses it in its aeronautical research.

The pharmaceutical industries and the ones from the energy field use Big Data for tangible results such as medicine testing or geophysical analysis. The New York Times has realized with the help of this technology text analysis and Web mining, and the Walt Disney Company makes correlations in

order to understand the behavior of customers in stores, theme parks and web sites. (Ohlhorst, 2013, pp.2)

In order to better describe the Big Data concept we will report to its four dimensions, often met under the name of the four “V”-s:

- *Volume*: Big Data has only one “measure” and it is a big one. The companies already have a huge quantity of data containing terabytes or even petabytes of information;
- *Variety*: Big Data extends beyond to what structured data means, including also variable unstructured data: text, audio, video, clicks, files and a lot more;
- *Veracity*: the massive quantity of collected data in order to be interpreted through Big Data technology can lead to statistical errors and misinterpretations; therefore the purity of information is critical for valuable results.
- *Velocity*: being most of the times sensitive to the time component data have to be used when they reach the company, therefore they add to their value, but it is necessary to be available afterwards also in the archives. (Idem p. 3).

The same study conducted by Big Data Insight Group among the 300 persons having jobs in senior finance, marketing and IT departments, has revealed which the barriers faced by different sectors in the adoption of Big Data technologies are:

- *Retail*: lack of necessary skills in operating Big Data (49%), lack of necessary tools and technology (39%), high costs (36%);
- *Public Sector*: misunderstanding of the concept (56%), high costs (52%), lack of skills required in operating Big Data (51%);
- *Financial services*: lack of necessary skills in operating Big Data (42%), lack of necessary tools and technology (37%), not understanding the concept (40%);
- *Professional services*: high costs (35%), compliance (33%) and lack of understanding the concept (28%). (Big Data Insight Group, 2012)

In June 2011 the McKinsey Global Institute study released "Big Data: The next frontier for innovation, competition, and productivity" with the aim to facilitate understanding among leaders of organizations from different sectors of the concept of Big Data. One of the points achieved in the study relates to the points that should be considered in order for the full potential of Big Data to be exploited:

- *Data Policy*: the exponential growth of data which is made available to an organization requires a clear policy on data protection, security, intellectual property and responsibility of using this data. Privacy is becoming an important topic particularly for consumers, while the value provided by Big Data becomes obvious. Another aspect which should be considered is data security, in such a way that the sensible data from a competitive point of view are protected.
- *Technology and techniques*: in order to incorporate the value of Big Data, organizations must develop new technologies (e.g. data storage, hardware infrastructure and software analysis) and techniques (new types of data analysis). Furthermore, technical and

technological innovations are needed to help individuals and organizations to integrate, analyze, visualize and consume the 'torrent' of data.

- *Organizational change and talent*: the lack of understanding Big Data and the value this can offer an organization can become a vulnerable aspect especially in the activity sectors with high competition rate. Therefore, a change of perspective is needed and the winning of the competence in this domain.
- *Access to data*: besides the data they already have, the companies will need access towards information from various sources.
- *The structure of the activity sector*: the sectors with a lower intensity grade of competition and transparency of performance adopt Big Data in a slower rhythm than the sectors where competition is higher. The public sector is an example in this case, confronting with more barriers in integrating the potential value of Big Data. (McKinsey Global Institute, 2011)

Closing the barriers and building an adequate environment for the development of Big Data in the organization will lead towards creation of value such as:

- The growth of the potential of information by using these with a higher frequency;
- Realization of experiments via data and analysis of this data in order to make better managerial decisions in time;
- Big Data also makes a better client segmentation possible which leads to offers of goods and services adapted to their needs;
- The complex analysis improve the system of taking decisions;
- Big Data can be used in order to improve the development process of goods and services (for example incorporated sensors in products for after-sales services like maintenance) (Upstream Commerce, 2013).

Big Data can offer numerous advantages to organizations, can show the difference to enter a market before the competitors, but in order to value the advantages, any company must be ready before developing Big Data projects. It is recommended they start with pilot projects and work with experts in order to avoid major errors which occur most of the time because of lack of experience. (Hurwitz et. al, 2013)

## **2. Big Data in retail**

Since the early beginning of time until today, from the medieval stores until the modern mega-stores today, retail has always been a dynamic domain, characterized by hyper-competition. The phrase *do you know the customer* represented the challenge of retailers from all times. The retailers who know how to anticipate and know what the customers want, offering them the right product, in the perfect time and place will be the ones who remain on top.

Today, Big Data offers a big and provocative dimension through which the customer is understood. Customers generate increasingly more information about their habits, behaviors and desires. With every move they make, especially in the virtual world, consumers create information; market position of retailers who ignore the importance of Big Data could suffer. In order to maintain leadership in the hyper-competitive markets, it can be at the same time the

best ally or worst enemy, it all depends on the speed and efficiency with which information is used for business so that the four "R-s" defining retail: right place - "right place", right time - "right time," right product - "right product" and the right price - "right price" to be satisfied at the same time. As noted by Anand Rajaraman from Walmart Labs to Reuters " it is a race where the winners will be those who will use the data in the best way possible... This will lead to changes in the retail industry and also in most other industries"(quoted in van Zanten et al, 2012).

Big Data is becoming a necessity in the modern retail world for its rapid capacity to process huge quantity of data and to make correlations between the weather and the client traffic in the stores, between merchandising and profitability, employees and productivity, politics and preferences for certain products, everything can be collected and understood. In short, retailers can transform the chaotic data in clear information which helps in taking decisions and planning of tactics in real time. (Stephens, 2013).

These data have the potential to give retailers insights which were not possible before, which helps to extract relevant conclusions on consumer behavior, thus avoiding premature and erroneous judgments on it. For example, 10 years ago if a company sold a product that had a high rate of returns, this could conclude that the product had been defective and therefore bring him out of range. Using Big Data, however, less obvious correlations can be made and it can be discovered for example that most returns occur when a certain team of employees works, which may suggest performance problems or inadequate preparation. In other words, Big Data allows companies to pass the threshold of superficial analysis and find hidden connections (Stephens, 2013).

When you think of Big Data, we do not have to relate only to technology, but we should take into account also the ability to make changes at the strategic level, which will lead to sustainable competitive advantages.

The report elaborated by the research institute of the McKinsey consulting company studied the effect of Big Data on the based conclusions of U.S. retail, which may be starting points for further research in the retail industry at a European level.

The amount of data available in the profile industry becomes increasingly higher, as retailers not only record customer transactions and operations but preserve the data obtained by radio frequency identification (RFID) - these are chips made to study the products' online behavior and the feelings of customers.

Retailers use increasingly complex methods to study the data they collect from customer interaction with multiple sales channels, catalogues, stores and virtual environment. Extending on a large scale in using granular customer data can help retailers to improve efficiency of marketing and sales campaigns. Applying Big Data at an operational level and to logistics chains will reduce costs and create competitive advantages and strategies to increase the retailers' revenue. The authors of the McKinsey report "Big Data: The next frontier for innovation, competition, and productivity" have identified 16 levers for which Big Data can be used in retail. These have been divided into five groups as follows:



- *Marketing*: crossed selling, marketing based on location, analysis of customer behavior in stores, micro segmentation, analysis of feelings, consolidating of multi-channel experience of customers;
- *Merchandising*: optimization of the selection, price, placing and design;
- *Operations*: transparency of performance and optimization of labor force implication;
- *Logistic chain*: management of stocks, optimization of distribution and logistics, informing about negotiating with manufacturers;
- *New business models*: services of comparing price and market based on web.

We will detail some of these aspects related to marketing:

- *Crossed selling*: all known information about the consumer is used (demographic data, history of the acquisitions, preferences etc.) meant to lead to the growth of the shopping basket;
- *Marketing based on location*: based on the growth of smartphone users and other mobile devices, the customers approaching the store being targeted or the ones who are in the store. For instance, a consumer approaching a clothing store can receive a message about a special offer on a pullover.
- *Analysis of behavior inside the store*: using this analysis, the store layout can be improved, the product variety and the positioning of the shelves. Recent innovations allow retailers to study how customers shop (such as time spent in different parts of the store), some retailers use complex analysis systems of images which are connected to the cameras in stores, therefore traffic and customer behavior can be monitored;
- *Micro segmentation*: while this concept is familiar in retail, Big Data has allowed the development of major innovations in this area. The amount of data available to achieve segmentation and sophisticated analysis tools allowed division into granular micro segmentations leading to campaigns and personalized offers;
- *Feeling analysis*: developing social networks offers the possibility to receive an answer from marketing campaigns in real time and also, via these, they change their buying decision based on the recommendations of consumers;
- *Strengthening of multi-channel customer experience*: it can be a powerful catalyst for sales growth, customer satisfaction and their loyalty. Retailers can use in this case Big Data to integrate the promotions and establish prices in all environments where consumers are present: online, in stores or at home flipping through a catalogue. (McKinsey Global Institute, 2011)

All of these levers used correctly will lead to changing the relationship with the customer through marketing campaigns and personalized offers.

In the elaborated report prepared by Cisco "Surfing the Data Deluge How Retailers Can Turn Big Data into Big Profits" there was a matrix made showing the interaction between retail and Big Data, based on the four dimensions of retail and Big Data, and from this combination numerous benefits rose, such as: loyalty towards the product, new experiences

for consumers, saving time while shopping, improved services, financial benefits for the retailer, customer loyalty towards the retailer (van Zanten et al, 2012).

According to the “Harnessing the power of Big Data. Big Opportunity for Retailers to Win Customers” report, published by the IT Infosys consultancy and services company, adopting a new strategy for Big Data involves 5 steps:

- *Strategy*: creating a clear strategy for adopting Big Data in the company;
- *Pilot study*: the retailers must identify a small business unit or a department which conducts a pilot study. In this phase, the managerial team should identify the objectives and performance indicators regarding Big Data implementation;
- *Adopting Big Data on a large scale*: once the pilot study demonstrates positive results, the company can take the next step and that is extension of the project towards the whole organization;
- *Administration of growth*: at this step it is important that a procedure is made which assures the proper functioning of the implemented Big Data;
- *Entrepreneur based on data*: at this step, the company needs to observe the first positive effects of Big Data. (Infosys, 2012)

Current consumer retail market has a better growing negotiating force and controlling of the retailer-consumer relationship. In these circumstances the complex consumer knowledge becomes an imperative, and Big Data can address this need for retailers.

### **3. Big Data – proper retail practices**

Examples of implementing Big Data in retail are not numerous at the moment, as I mentioned in the first part of the study, the barriers which stay against adopting Big Data: lack of skills needed in operating Big Data (49%), lack of tools and technology required (39%), high costs (36%) could be a reason for the small number of examples of good practice, on the one hand, and the novelty of the subject in the field of economic research on the other hand.

Macy's uses Big Data technology to determine the life value of customers. By analyzing online marketing campaigns, the company measures the period in which customers remain loyal. According to company estimates, using this analysis saves \$ 500 000 per year. The London Branch of the Debenhams retailer has developed a survey in order to get quality feedback from customers in order to build an auditing program of the store. The survey was conducted in the virtual environment and there were 380 000 answers obtained, based on which the company has improved service points and availability of goods and also the quality of dressing rooms. As a result of these changes, they increased customer satisfaction by 9 percent in one year.

Williams-Sonoma has a database of 60 million households containing variables as income, number of children and house value. The contents of emails are personalized when they are opened, age, gender, online activity and inventory data are analyzed in real time with the help of a software. Through the implementation of this program, the conversion rate of e-Marketing campaign responses was 30% (van Zanten et al, 2012).



One relevant example of using Big Data in retail is Walmart. Many of the tools used by the Big Data retailer were developed by the Walmart Labs, some of these are the "Social Genome" and "Shoppycat".

Through the "Social Genome" Walmart informs its customers and friends of customers who have been online informed about them, about a certain product and the discount offered for it. In order for this to happen, data is combined from the data being the property of the company – data referring to acquisition and contact data, with a database which is always updated, Walmart has access to valuable information enabling it to understand the context in which customers communicate online and therefore, they deliver the exact products they need.

The Shoppycat application has been developed by Walmart to recommend suitable products for Facebook users based on their hobbies and their friends' interests. An interesting aspect of the application is that if there is no product in the nearest store, you will be directed to another one where you can find it.

Walmart takes advantage also of the opportunity offered by the modern platforms, developing applications for smartphones meant to offer the best shopping experience while shopping.

The efforts of Walmart to incorporate Big Data in the company's activities show numerous possibilities which this offers from optimizing the basic assortment with the product the neighbors talk about on social networks, up to mobile phone applications for smartphones which lead the customer to the places where the mentioned products in the online environment are. Altogether, this has led to the growth of revenue of the biggest retailer at a global level (Big Data Startups, 2013), which according to the latest top of most profitable companies by Forbes has exceeded Exxon Mobil, Google or Apple, reaching the first place with a 17.mld Dollar profit (Incont, 2013).

#### **4. General discussions**

In the modern retail it is not only necessary to recognize that technology has changed and the players in this market need to adapt, they have to admit that the consumer procedure has changed and together with it, also technology. Future retailers need to anticipate and respond in a personalized way and consistently, online and offline, to the needs of consumers.

Based on secondary sources obtained from the online environment, the research has shown radiography of what Big Data means and how it can lead to competitive advantages in retail. The study made with the help of "office study" shows that Big Data contributes to the transformation of retail, if retailers today know what customers want, with the help of Big Data they can foresee this, and will be able to offer personalized experiences, which will lead to the consolidation of the consumer –retailer relationship and on a long term, it will lead to loyalty.

Because the area of research of the subject in the economic domain and especially in marketing is restrained, authors wish the creation of a future study in order to contribute to the theoretical basis of what Big Data means for the organization in general and for marketing in particular.

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