Big Data, the perfect instrument to study today's consumer behavior

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Consumer behavior study is a new, interdisciplinary and emerging science, developed in the 1960s. Its main sources of information come from economics, psychology, sociology, anthropology and artificial intelligence. If a century ago, most people were living in small towns, with limited possibilities to leave their community, and few ways to satisfy their needs, now, due to the accelerated evolution of technology and the radical change of life style, consumers begin to have increasingly diverse needs. At the same time the instruments used to study their behavior have evolved, and today databases are included in consumer behavior research. Throughout time many models were developed, first in order to analyze, and later in order to predict the consumer behavior. As a result, the concept of Big Data developed, and by applying it now, companies are trying to understand and predict the behavior of their consumers.

Keywords: *Big Data, consumer behavior, consumer experience, machine learning*

1 Introduction

During the last century there was an unprecedented change in the digital world that caused big shifts also in the economic and financial field. With a continuously growing middle class, more and more people actively using social networks, and new generations who grew up with technology around them, the personal and business environment has changed drastically.

According to Internet Live Stats which collects data from different international sources, around 40% of the world population has an internet connection today, while 20 years ago it was less than 1%. The number of internet users has increased tenfold from 1999 to 2013, the third billion being reached in 2014. Of it, today only one billion people are using social networks, but by 2020 this number will double, according to analysts.[16]

All these changes are transposed in day to day behavior. People want to do more activities at the same time, to improve their quality of life daily, to have a successful career and a balanced family life. In other words, people want to increase the productivity of their work by making less effort.

The consumer has changed in the same way. Decades ago, if somebody wanted to buy a book, whereof one likely learned about from his friends or relatives, first he had to go into more bookstores to see if that book exists and after that to make some price comparisons in order to decide from where to buy it from. These activities were time and money consuming.

The situation has changed radically. Now the person can learn about launching a book easily from social networks, and by simply accessing an online store such as Amazon.com, they can purchase the book by pressing a button, finally saving time and energy. So, the process of buying a product simplified in terms of time and money spent, but became more difficult in terms of decision making which has become more complex. The main reason is that people have today too many options to choose from in terms of product or service, price, quality and time. If in 20th century there were few providers for a product (most of the time it was only one provider, competition being inexistent), today competition between providers has increased significantly, each of them having more similar products to satisfy the same need for the consumer, each product having different price and different characteristics (different quality).

In conclusion, our daily life has changed. Today we are using the internet in every activity, from the most simple (like buying a book) to the most complex: when we check the weather on our phone, when we buy on-line tickets for a concert, when we check our personal or business e-mails, when we compare the offers for a holiday trip or when we organize an event. By using this services we leave behind traces of information that can be smart used by companies in taking important decisions. Today, this is the main way Big Data is created (besides data collected by enterprises that use ERP systems or paper surveys), because it is fast, real-time and easy to collect. Because today's market is mainly driven by consumers, companies all over the world understood the importance of studying the behavior of their clients in order to meet their needs increasingly more specific. They also understood that Big Data is the perfect tool, in order to achieve accurate results and increased profit. [21]

The term "Big Data" describes the accumulation and analysis of vast amounts of information. But Big Data is much more than a big amount of data. It is also the ability to extract meaning: to sort through big volumes of numbers and find the hidden patterns, unexpected correlations, and surprising connections that can be used in different industries like medical field, security and protection field or marketing field. In marketing field, companies that adopt "data-driven decision making" enjoy significantly greater productivity than those that do not. So, by using Big Data rapid deployment solutions they can lower the complexity of implementation projects, and hence project risks, while accelerating time to value.[23]

As a result, Big Data is an extraordinary knowledge revolution that is sweeping almost invisible through business, academia, government, healthcare, and everyday life. It already ensures safety and independence for older people, enables us to provide a healthier life for our children, conserves precious resources like water and energy, and peers into our own individual genetic makeup. Big Data is the perfect instrument to study today's consumer behavior. [26]

2 Evolution of consumer behavior. How do people take purchase decisions today?

The purchasing decision process began to be studied about 300 years ago by Nicholas Bernoulli (in 1783 he introduced the terms of expected utility and marginal utility in the economic theory), followed by John von Neumann and Oskar Morgenstern (they introduced the terms of risk and uncertainty, and in 1944 they published a fundamental article for microeconomics "Theory of Games and Economic Behavior"). They created a mathematical model in order to determine the utility gained after a consumer activity, people being considered pure rational beings (consumers tried only to satisfy self-interest).

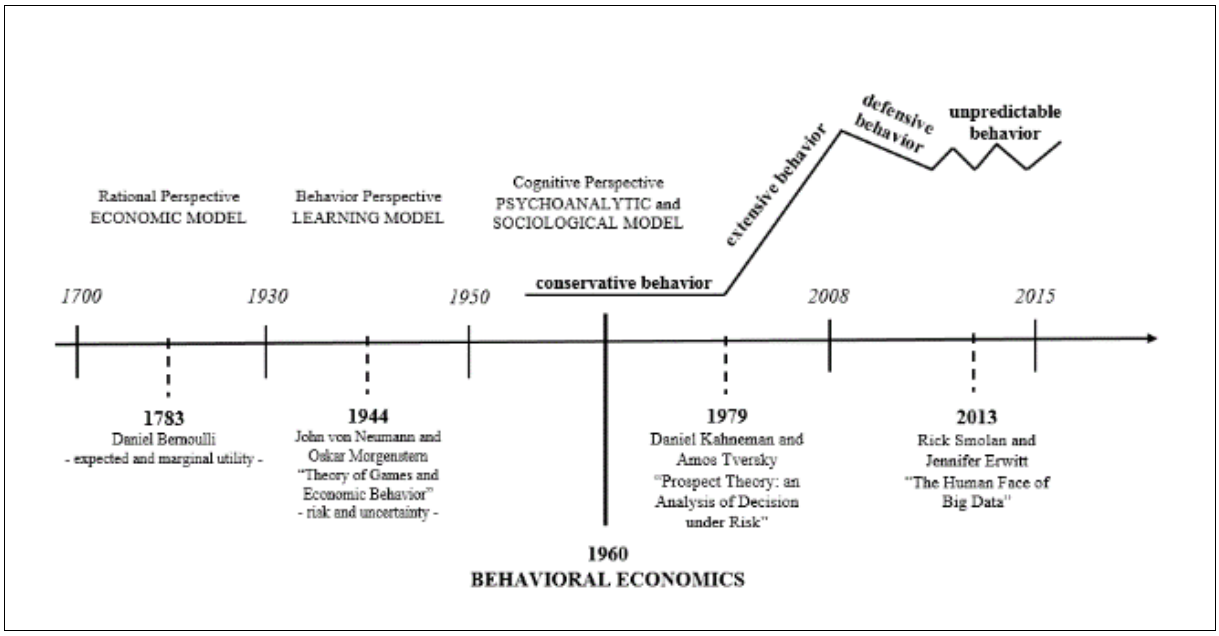


Fig. 1. Evolution of consumer behavior

Recent research shows that there are numerous factors that influence the purchase decision, besides the rational ones, like social, cognitive and emotional factors. By taking these factors into consideration when modelling the purchasing decision process, a new, interdisciplinary and emerging science appeared in 1960: the study of consumer behavior. It is a complex science that includes information from economics, psychology, sociology, anthropology and artificial intelligence.[6]

Until 1960, the economic perspective of consumer behavior and the models that described it relied on the assumption that all consumers are always rational in their purchases, so they will always buy the product that will bring the higher satisfaction. In this regard, three types of models were developed. Between 1700 and 1930, the Economic Model was used to describe consumer behavior which involved the rational perspective based on Neoclassical Economic Theory. In the next 20 years, the behavior perspective began to be applied which was based on the Learning Model, and after that the cognitive perspective which was based on the Psychoanalytic and Sociological Model.[18]

During this time, people had a conservative behavior because they were buying the same products, consumer behavior being an emergent phenomenon that has evolved along with human development. In prehistoric times this behavior was shown in a very limited way, people being organized in small family groups and having a single concern: survival. Much later, the social skills began to develop that finally led to the emergence of money, social status, wealth and ultimately shaped the consumer behavior.[17]

The main cause that determined the researchers to study the consumer behavior is the diversification of needs. In the same time, looking back a century ago, a strong connection can be observed between the moment when the population began recording a strong upward trend and the science of studying consumers behavior appeared (1960, correlation between figures 1 and 2).

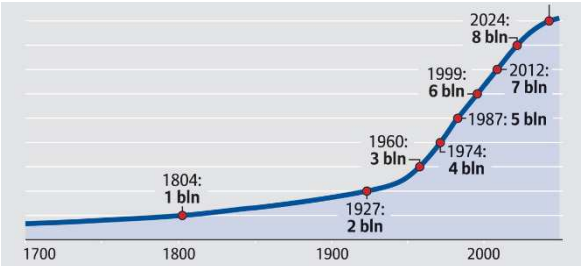


Fig. 2. Population growth on Earth

This correlation can be explained by the fact that a growing population means more needs, more products and more suppliers. Also, the life expectancy has doubled in the last century (at the beginning of 20th century the life expectancy was about 30-40 years, while in 2008 it changed to 70 years), with the same result in the change of consumer behavior: more needs to be satisfied and a consumer behavior more complex.

Also, the middle of 20th century is the moment when travel started to become accessible to all, due to the large-scale production of machinery and commercial aircraft. By travel, people had the opportunity to discover other cultures and habits and as a result their needs started to diversify. Whereas in the past most people lived in small towns, with limited possibilities to leave their community and few variations in needs, now, due to technical improvements, consumers began to have increasingly more diverse needs.

For half a century, people developed an extensive behavior, buying increasingly more products and increasingly more diverse. One of the most important paper written during this period is "Prospect Theory: an analysis of decision under risk", written by Daniel Kahneman and Amos Tversky, which proposes a new model for studying consumer behavior. In this paper, the decision making is viewed as a choice between prospects or gambles. The authors developed the new theory from the assumption that the Theory of Expected Utility (which was not challenged for over 250 years), had some flaws regarding the moment when the choice is made by the consumer. They thought that the utility is not only dependent on the actual value of a persons wealth, but also on the evolution of his or her wealth.[19]

The Prospect Theory is the most important model used at the end of the 20th century, but there were also other models created in that period of time: Nicosia model (1966), Engel, Blackwell and Miniard model (1968), Howard Sheth model (1969), Webster and Wind model (1972), Hobbes model (1984) and Veblen model (1994). [17]

The year 2008 represents another important moment in world's history that influenced the consumer behavior. The economic and financial crisis that spread all over the world led consumers to think twice before buying a product. Because consumers were buying fewer products, their behavior began to be a defensive one.

People began to use the internet on a larger scale in order to search products and to compare their price and characteristics. Online marketing began to have a decisive role in the buying process, so new techniques were developed in order to predict the consumer behavior, one of them being Big Data.[27]

Today consumers face an offer too diverse, being assaulted by marketing messages. Because of that, the opportunity cost for a product has significantly increased, making the decision process more and more complicated. According to studies, consumers may ignore the opportunity cost when they don't have to choose from more than 8 products. When the number of choices increases, the consumers become indecisive, and sometimes even give up to the buying process.

The changes in consumer behavior have had strong influences on all enterprises throughout time, a decisive moment being the mid-1970s when a significant macroeconomic change on the law of supply and demand had happened: if by that time the markets were driven by vendors, their control was taken over by buyers both in terms of influence and

bargaining power.
Companies understood that the consumer behavior is an emergent phenomenon that has evolved with human development and they became more interested in studying the behavior of their daily consumer. As a result, today's companies are empowered by the final consumer who wants instant value, mobile functionality and user-friendly services. Today, people are more informed (57% of the buying process is completed before a first interaction with sales), socially networked (53% of customers abandoned an in-store purchase due to negative online sentiment) and less loyal (59% of customers are willing to try a new brand to get better customer service). [21]
As a conclusion, the main factors that shaped consumer behavior are:

- demographic changes (the growth of population and life expectancy, had the same result in consumer behavior: more needs to be satisfied);
- evolution of technology (because people now have more ways to travel, they discovered other cultures and life styles, so their needs became more diverse);
- multiplicity (because more and more variables are integrated in every day activities – for example the movie industry has evolved from a one-dimensional to a multi-dimensional experience – also the buying act needs to become a complex experience);
- hyper efficiency (the space-time efficiency is also a daily problem, so people need faster and cheaper ways to satisfy their needs);
- risk and stress (people have too many options to choose from in order to satisfy their needs).

3 Evolution of marketing research. Big Data, the newest instrument for predicting consumer behavior

According to AMA (American Marketing Association) marketing research is "the process or set of processes that links the consumers, customers and end users to the marketer through information — information used to identify and define marketing opportunities and problems, to generate, refine, and evaluate marketing actions, to monitor marketing performance and improve understanding of marketing as a process. Marketing research specifies the information required to address these issues, designs the method for collecting information, manages and implements the data collection process, analyzes the results, and communicates the findings and their implications."
Due to the evolution of consumer behavior, the marketing research discipline has evolved in the same way, trying to adapt to the competitive economic environment. The papers regarding this discipline emphasizes its current state as being in "flux".
At the beginning of 20th century, political polling and advertising studies were the only marketing research techniques used to study the consumer behavior. Their main purpose was to find if a new solution to gain consumers was successfully or not. As people had more needs, more products were demanded, so more suppliers appeared. Due to this environmental changes, the competition became fierce, so marketing research had to adapt. As a consequence, qualitative and quantitative approaches separated into two different methods. The main qualitative methods were focus groups, in-depth discussions and observational research, while the main quantitative methods were linear models, descriptive statistics and multivariate analysis.[11]
Two of the most successfully methods of marketing research in the last years, used by international companies all over the world are: TORA (Theory of Reasoned Action) and NPS (Net Promoter Score).
The Theory of Reasoned Action was developed by Martin Fishbein and Icek Ajzen in 1975-1980, and is a model for the prediction of behavioral intention,

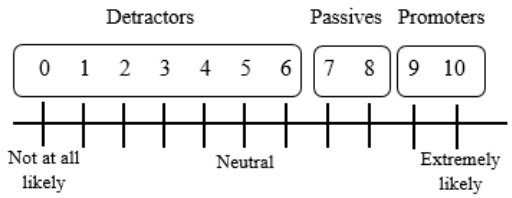
spanning predictions of attitude and predictions of behavior. In its simplest form, the TORA can be expressed with the following equation:

$$BI = (AB)W_1 + (SN)W_2$$ *Source: Hale, 2002*

where:

BI = behavioral intension
(AB) = one's attitude toward performing the behavior
W = empirically derived weights
SN = one's subjective norm related to performing the behavior

Net Promoter Score is a customer loyalty metric developed by Fred Reichheld, Bain & Company and Satmetrix, and introduced by Reichheld in 2003 in a Harvard Business Review article, "One Number you need to grow". It serves as an alternative to traditional customer satisfaction research and claims to be correlated with revenue growth. It can be calculated using the answer to a single question, using a 0-10 scale: How likely is it that you would recommend [brand X] to a friend or colleague? and the respondents are grouped using the following formula [4]:



NPS = % of Promoters - % of Detractors
Source: Bergevin , 2010

As higher this indicator, as satisfied are the consumers of a company.

In conclusion, if a century ago the change of market research techniques was linear and primarily associated with methods and data collection techniques, the current patterns indicate a shift base on a qualitative evolution. Although, the classic measurement systems were analyzing behavioral intention, not actual behavior, mainly because it has been the easiest information to collect. Until now, collecting data on actual consumer behavior has been impractical, due to the emergence of the Internet, social media and e-commerce, which have radically altered the landscape of consumer behavior data. Point-of-Sale (POS) and cash registers systems are being replaced by e-commerce sites that record every move consumers make. Casual telephone conversations with friends about recent purchases are being replaced by tweets that can be analyzed by anyone who follows those Twitter feeds.

In fact, everything that is build these days (phones, computers, cars, refrigerators) are producing terabytes and petabytes of data. Information is being extracted from everywhere, out of parking spaces, out of toll booths, out of Internet searches, out of Facebook, out of our phones, so every action that people make these days leaves a digital trace that can be recorded, stored, and after that analyzed.[23]

So while customers can tell what they think, data scientists can tell what those customers actually do, because data on actual consumer behavior and experiences is now available to be measured and analyzed. In order to do that, a new tool was developed: Big Data.

Big Data is commonly defined as the combination of volume (a large quantity of data), variety (multiple types of data) and velocity (the speed at which data is created). With traditional techniques, users can be provided with volume and variety of data, but is difficult to include velocity. Even by regularly feeding new data, this are static data and not coherent with the decisions that must be made.[21]

Table 1. The Advantages and Disadvantages of using Big Data

ADVANTAGES	DISADVANTAGES
Volume: we are recording a huge amount of data	
Big Data improves the quality of life and the customer experience by giving extra senses (today every medical aspect of a human being can be captured: the metrics can be captured by sensors, the anatomy can be captured by imaging, while the biology can be captured by using the sequence of DNA, and by having a complete view be can improve our health; by recording all consumers activities a complete view about them can be created, and in this way the buying experience can be improved)	The more data are registered, the larger the problems will be that analysts need to solve (can we find in the huge amount of data the information that we need and can it influence positive our life and/or the consumer experience)
Variety: we are recording data from different sources	
Big Data can identify hidden pattern and unexpected correlations to propose new and innovative solutions	People don't have a personal life anymore; their lives have become more transparent
Velocity: we are recording real time data	
By doing this real-time actions can be made that can solve real-time problems	At this moment it is not known who owns the data and how are they used
Veracity: we are recording inaccurate data	
Once the "dirty data" is removed, the useful and accurate data can be use to extract new information	This data can lead very easy to an avalanche of errors and incorrect results, affecting the whole business

Some papers include a fourth dimension for Big Data: veracity. Veracity is the hardest thing to achieve with big data, because due to the volume of information and the variety of its type is hard to identify the useful and accurate data from the "dirty data". The biggest problem is that the "dirty data" can lead very easily to an avalanche of errors, incorrect results and can affect the velocity dimension of Big Data. The main purpose of the Big Data can be corrupted and all the information can lead to a useless and very expensive Big Data environment, if there is not a good cleaning team.[27]

Like all technologies, using Big Data in ERP systems has advantages and disadvantages at the same time that are displayed in Table 1.

Today, there are a lot of industries that use Big Data: healthcare (treatments are becoming personalized and patient centric and predictive analysis are used to prevent diseases; for example Angelina Jolie underwent a preventive double mastectomy after learning she had 87% risk to developing breast cancer), sports (by using sensors data are collected from players during a game in order to improve their playing schemes), weather (more than 60 years of global weather analysis are used to predict the risk of future extreme events), logistics (smart trucks and smart spaces; an example is the High Bay deposit of Coca-Cola from Ploiesti, Romania), agriculture (monitoring weather and soil conditions for optimum point of harvesting), manufacturing (industry 4.0) and energy and telecommunication (smart grid and virtual plants).[23]

Hamburg Port is the largest port in Germany and the second largest in Europe. The current turnover is about 9 million containers/year but by 2025, an increase to 25 million containers is expected by using Big Data. The goal is to utilize the current infrastructure and increase container turnover by optimizing container traffic while reducing idle time for carriers.[22]

Due to the evolving consumer demands and the ever-growing digitization, the world is digitally transforming which

means that new technologies are used to driven significant business improvements. Big Data is one of the 4 channels through digital transformation is made, together with cloud, mobile and networks. The challenges for digital transforming, and therefore using Big Data as a main technology, are: digital proficiency, legacy systems, security and jobs becoming obsolete.

According to Trifu and Ivan, Big Data is a unique concept that integrates all kinds of data, not just some basic ones like in normal data warehouse. So, Big Data uses data from text to pictures, sounds, movies, music, satellite coordinates, or any other type of input or output data that came from different types of sensors. According to Sven Denecken, Global Vice President for Cloud Solutions, Big Data will stand for predictive insight driven by business strategy, new product strategies, and new consumer relationships. Using the right data in the right context will mean smarter decisions, new opportunities, and ultimately a big competitive advantage.

Using an ERP system a dynamic Big Data environment can be created, using real time data and including all four dimensions of Big Data. One of the tools that can overtake this new created environment is SAP HANA, an in-memory database platform.

SAP HANA was released in the early 2010 to allow for real-time analytics of both structured and unstructured data. In memory analytics refers to the new way computers are managing data and applications by keeping data in their main memory instead of regularly having to access the hard drive to retrieve the data. By using this new technology, users can access quasi real-time data analytics that provide meaningful information. Also, the visualization tools, such as SAP Lumira, allow this exploration and understanding of the data, and ultimately supports the decision-making process.[23]

4 The correlation between the evolution of consumer behavior and marketing research. Big data, the perfect instrument to study today's consumer behavior

In recent history, two of the most important moments that changed the world were the two World Wars. Before them, people were trying to find a balance in their life, consumer behavior being constant. The market research tools were also pretty limited (political pooling and advertising studies), their main goal being to identify if a certain marketing strategy may have an effect: IS it happening? Marketing strategy, does it have any effect on consumer behavior?

After them, consumers started to have an open-minded behavior, trying new products and buying more. Marketers adapted implementing more models in order to study this extensive behavior: surveys, focus groups, interview, trying to create a whole image of their consumers behavior: WHAT is happening? Are the consumers going to buy a certain product?

Today customers want instant value, mobile functionality and user-friendly services, so their behavior has changed. Because they are more informed (57% of the buying process is now completed before a first interaction with sales), socially networked (53% of customers are now abandoning an in-store purchase due to negative online sentiment) and less loyal (59% of customers are willing to try a new brand to get better customer service) they started to act differently. Market research is trying to adapt to this changes, implementing new tools (observation, online surveys, Big Data, neuromarketing) in order to identify WHY is it happening? (figure 3)

Big Data is not only an analysis of a lot of data. It is a complex process that can extract new information in order to understand the background of the industry in which a company operates, to assess the specific factors that apply to a company and to familiarize a company with a great

number of analytical instruments. Big Data is used to present the new information extracted from data, so that managers can understand and use it in business decisions.

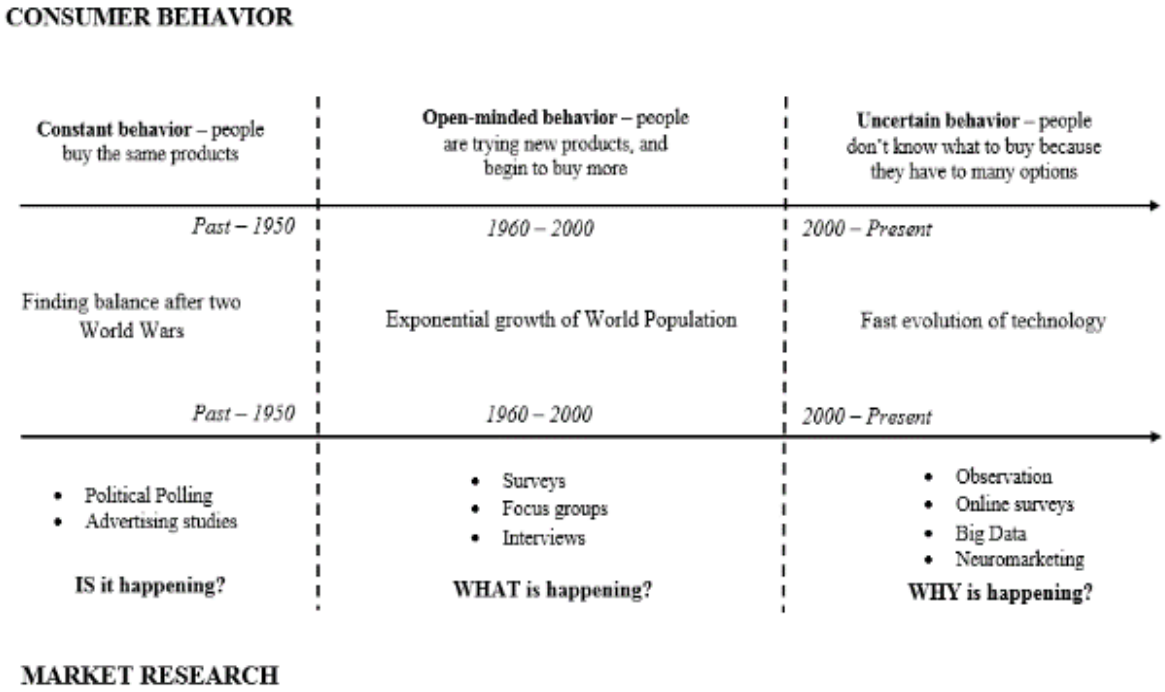


Fig. 3. The correlation between the evolution of consumer behavior and market research

Using Big Data a lot of information about consumer behavior that can improve their buying experience can be extracted, like: customer migration, customer approach, promotion analysis, acquisition analysis, priority analysis, sales according season, customer loyalty, cross sales, customer segmentation, channel of communication and media analysis, channel of distribution analysis, basket analysis, customer gain and loss analysis (churn).[11]

For example, by making a seasonality analysis companies can discover how the buying profile changes during the year and therefor create seasonal patterns in products or services that will shape the business strategy. A priority analysis will determine if there is a particular order in which customers prefer to buy products, while target marketing and niche market determination will determine if there are segments that have specific buying patterns. For example, Tesco made a study using different strategies in tandem and discovered that customers who start buying Pampers, also start buying more beers. The explanation for this behavior, which seems strange at first site, is that fathers of toddlers do not have time anymore to go to the pub, so instead they drink beer at home.[2]

But the most popular analyzes made through Big Data are basket analysis and cross-selling analysis. They determine the associations between products within the shopping basket of a consumer, increasing both the quantity of products from the same category and from complementary or even totally different categories.

In conclusion, Big Data is the perfect instrument to study today's consumer behavior, a strong bond being created between them. The succession of Big Data analytics and business decisions is an infinite single loop: users are analyzing current data and making business decisions that will generate other data, which represents the feedback of their decisions.

If the new data corresponds to the objectives of the company then the users have received a positive feedback, else they have received a negative one. In both cases, they need to analyze the new data in order to adapt again their business strategy. In both cases, using information generated by Big Data will adjust the business strategy of a company, helping it to survive in the unpredictable economic environment.

5 Using Big Data and Machine Learning to enrich consumer experience

Big Data and Machine Learning are both subfields of computer science that evolved from the study of pattern recognition. Big Data refers mainly to the large data sets, while machine learning involves the study and construction of algorithms. The list of machine learning algorithms includes the following: decision tree learning, association rule learning, inductive logic programming, support vector machines, clustering, bayesian networks, reinforcement learning, representation learning, similarity and metric learning, sparse dictionary learning, genetic algorithms and artificial neural networks.

Starting from the artificial neural networks, new research concerning consumer behavior led to a new science called neuromarketing. This science studies the reaction of consumers to different stimuli, using neuroimaging techniques such as magnetic resonance imaging, electroencephalography or magnetoencephalography. Basically, this science uses neural techniques in order to understand consumer behavior regarding brands and marketing.

Because neuromarketing brings innovation and added value, this technique has already been used by big companies like PepsiCo, Google, Coca-Cola, Disney and P&G. The complexity of this technology is given by the difficulty to transpose the results in decisions and actions without the help of specialists in the field. However, recent studies have managed to express the reactions of the human brain in only three key indicators: attention (the subject is captured or bored), emotional activity (picture conveys a positive emotion or a negative one) and capture memory (subject is able to easily memorize the received images).

The main problem of Big Data is that it can't predict with full accuracy the consumer behavior, mainly because the behavior is an emergent phenomenon of human brain. However, the prediction can be improved if neural computation is used. The goal is to identify the reactions that take place in brain and map them into mathematical equations.

Although a mapping of biological neurons has been tried, the link between artificial and biologic neural networks is only on algorithmic level. So, although researchers have tried to make a copy of the human brain, eventually creating artificial intelligence, complexity and its details have finally made this action to fail. However, artificial neural networks still use a fundamental principle, which is machine learning, also used by biological neural networks ("The Organization of Behavior," published in 1949 by Donald Hebb shows that a neural connection gets stronger as it is used, using the concept of machine learning)

Big Data and Machine Learning are both used to enrich the consumer experience. According to studies, the markets have shifted from features to experience, consumer user experience becoming the new standard. The process of buying a product or a service is no longer seen as a simple action, but as a complex experience that can determine the consumer to return to the company or to never come back.

The value of user experience can be measured through 3 variables: people, business and technology. All these variables must be taken into consideration when a product is chosen to be sold, or else 3 common mistakes can appear. First one is over engineering: the focus of the company is on the business value and

needs and the technology. In this case, the consumer desire and need is not taken into consideration, so the product is technically feasible and has a business behind it, but is too complex for the consumer (it can be handled only by professionals).

The next mistake is wishful thinking and it commonly appears when only the business and design people are selecting a product that is not technically feasible. The last mistake is vogue and it appears when design and technology people are working without taken into consideration the business part.[22]

Whatever the mistake, the consumer experience is negatively affected.

If no mistake is made, and the user experience is improved, than the company will gain both non-monetary and monetary benefits. The non-monetary benefits are increase user satisfaction, increase customer loyalty, increase solution adoption and strengthen relationship between IT and business, while the monetary benefits are productivity gain, training costs saving, users errors decrease, change requests decrease.

Today, a company that does not fulfill the standards of its industry or does not uses a certified system, may encounter a lack of integrated data. This is not the case of ERP systems which have single point access to all data. Because of this the concept of Big Data can be easily applied and new information can be extracted, that will bring benefits to the business management.

Big Data is used in a lot of industries, one of them being the Marketing industry. One of the tools that uses Big Data in order to study the consumer behavior is SAP hybris Marketing, the marketing solution of SAP (Systems, Applications & Products in Data Processing) which is integrated into the other SAP solutions like ERP (Enterprise Resource Planning) or CRM (Customer Relationship Management). The main goal of this tool is to identify what the consumer is looking for by combining the information about what the consumer is doing now and the information regarding what the consumer has done. There are a lot of similar tools that do not integrate historical data, this way excluding the most important part of consumer behavior.

SAP hybris Marketing can collect data about what the consumer have purchased in-store or on the Web shop, what he has looked at on the dot.com pages, what he has shared on social media, and even about inquiries or complains he has sent to the company. All collected information fits together into single profiles of costumer.

By creating a complete image of the customer behavior, real time individualization is possible, which can be explained by the next example. At the time that a consumer leaves a Web shop, he gets the information that his abandoned shopping cart is still available to him for further purchase. The company also does not lose this information, but instead uses it in order to send an offer to the consumer for a price reduction for the same products that were in the abandoned shopping cart. This is right-time context information delivered to the consumer.

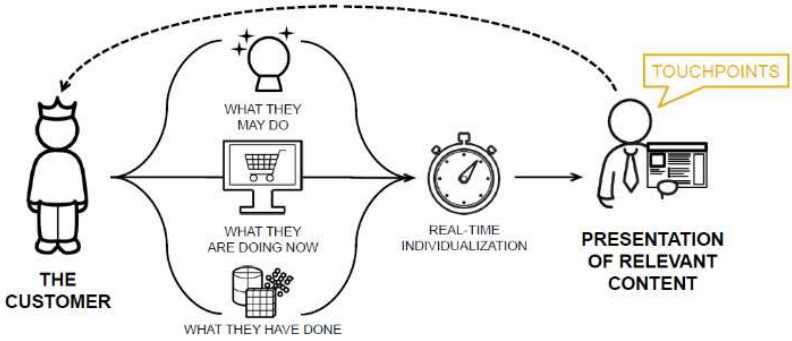


Fig. 4. Improving consumer experience (real time individualization using Big Data)

Also, by providing real time data, Big Data can be used to improve the response time of companies that will finally increase the customer satisfaction, gain customer loyalty and receive a higher degree of coming back.

The most important SAP hybris Marketing RDS (rapid deployment solutions) are marketing data management (SAP social contact intelligence), marketing segmentation (SAP audience discovery and targeting, dynamic target group integrated into SAP CRM, customer segmentation based on a predictive KPI), marketing acquisition (campaign management), marketing recommendation (modeling product recommendations) and marketing insight (customer value intelligence).

These RDS are preconfigured software and service packages that can run in the cloud, on premise or in a hybrid environment that can help companies to deploy quickly, predictable and affordably.

SAP RDS software applications provide a standardized approach through the use of such things as its Step-by-Step (SBS) guide, a tool which contains all the assets required during implementation, including accelerators and knowledge-transfer materials. The SBS guide is created specifically for each application, according to SAP, and is arranged in a specific order that mirrors the RDS implementation roadmap.

In conclusion, a company can improve its customer experience by empowering innovative new business models, value-added services and customer responsive products.

6 Conclusions

Consumer behavior is studied for 300 years and today it is the main focus for all companies. Along with its evolution, marketing research techniques have evolved in order to understand the customer behavior. The two concepts are described in detail in section 2 (evolution of consumer behavior) and 3 (evolution of marketing research) of this article, creating a complex image of their evolution. The novelty is represented by the strong correlation between their evolution which is graphically represented in the figures from this article.

In 2001, A. Hirschowitz stated that “no matter how sophisticated a company's ability to generate customer insight, it will deliver little value without the processes in place that exploit this understanding to build stronger customer relationships.” Today, the best processes that can create a complex and complete image of what consumers buy, and can also understand why they buy a certain product or service, is Big Data.

In an interview for KDnuggets, in January 2015, John Schitka, who works on the SAP Big Data Solution Marketing team, said: “Big Data is an opportunity to re-imagine our world, to track new signals that were once impossible, to change the way we experience our communities, our places of work and our personal lives.” So Big Data is the perfect instrument to study today’s consumer behavior.

Regarding Big Data, studies reflect that after 2017, this techniques of data analysis will be a competitive necessity, so companies need to start to adapt to the trends in order to survive in the dynamic and digitalized markets.

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