The Management of Big Data in Online Marketing: Challenges and Opportunities. A Theoretical Review

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Abstract

The growing volume, complexity and diversity of data available on the internet that can be used in marketing is a real challenge. In this work, the main goal is to determine the degree of opportunities, challenges and research questions that arise with the emergence of Big Data. It also concludes that Big Data processing enables the marketing sector to gain new opportunities, integrate new metrics related to potential customers and finally redefine market opportunities based on open business models. In addition, the challenges and opportunities created by big data in the field of online marketing are examined, as well as how companies can make the ideal management of big data technology for the best results.

Keywords: Big Data, Knowledge Management, Marketing Capabilities, Customer Relationship, Online Marketing

Introduction

The increase in the quantity, complexity, and number of data sources available to companies represents a real challenge for marketing decisions. The volume of data sent has increased exponentially in recent years, due to the development of the Internet, social networks, e-customer relations, and e-commerce, which have made this submission of information available (*Sagiroglu et al., 2013*). The term Big Data, defined as a large and complex data set of differentiated, structured and unstructured, difficult approaches and tools, classical data management and analysis acquires its full meaning here. Some even talk about a "big data revolution" (*Davenport et al., 2012*). This phenomenon seems to be more than a fad, but a fundamental trend that should be taken seriously by businesses. Indeed, according to an international survey conducted in 2016-2017 on 1,217 companies with revenues of over $ 1 billion, half had a Big Data strategy in 2016, 7% had invested at least $ 500 million and 15% had at least $ 100 million. This presence of Data offers great opportunities in the field of marketing, especially in predicting their behaviors and environment (*Erevelles et al., 2016*).

The purpose of this research is to determine to what extent Big Data brings new issues and to what extent these changes can be perceived with the current conceptual framework. Also, what are the new research questions related to the Big Data issue?

More specifically, we are dealing with the problem of data processing. Marketing is becoming increasingly difficult to manage larger volumes of data, more complex, more diverse, and requires new specific skills for assimilation. In addition, the ability to dynamically understand data offers opportunities for near-real-time analysis and action but also poses the problem of human and organizational skills necessary for this reactivity (*Agrawal et al., 2011*).

Chapter 1 - Exploitation of Data in the Big Data Context

In marketing, the systematic analysis of large amounts of data is not a new practice, especially with the use of data panels, which appeared in 1930, with the creation of AC Nielsen in the United States. The term intelligence has been used by artificial intelligence researchers since the 1950s. The term "intelligence" became popular in business in the 1990s and, in the late 2000s, the term "business analytics" was introduced to represent the basic component of business intelligence (*George et al., 2014*). In traditional databases (in CRM, for example), data is mostly structured and easily stored for future use due to its relatively low volume. Given the large amount of information and especially the speed at which data is currently being generated, research is focused on the new capabilities required for big data processing.

Data Processing and Information Restitution

Traditionally, structured data from internal sources are stored in a database by each company before being analyzed and then returned in the form of reports or descriptive checklists made up of internal and structured data, but also external data, often unstructured (for example, data from social networks). Added to this is their continuous flow and high volume as well as their heterogeneity, which implies that they have to be stored on specific servers, especially in the Hadoop framework, and processed by parallel servers such as, for example, MapReduce (*Xu et al., 2016*). The difference with the processing of "classical" data does not only lie in the technical tools to be used, but also in the possibility of selecting useful data and processing them appropriately, using prediction, sentiment analysis, or anomaly detection algorithms. Also, thanks to real-time data analysis we can analyze the acquisition of reactivity. Thus, data will no longer be perceived as a static mine to be "drilled" (in the classical "data mining" perspective), but as a continuous flow (streaming). This is particularly true for the management of data generated by the Internet of Things and social networks, one of the specificities of which is their speed.

Challenges, Opportunities and Research Questions

The capability to convert this data into usable knowledge to perform customized actions in online marketing is a real challenge. However, in online marketing the management is quite difficult due to the volume and variety of the increasingly available data, also another reason for the increasing difficulty of management is the lack of appropriate skills that are lacking (*Anshari et al., 2019*). The gap between the potential of online marketing and the complexity of the market is constantly widening. The challenge will therefore be to acquire not only technical skills but above all organizational skills. Beyond the marketing function in the narrow sense, it is the organization in the broad sense that is subject to the challenge of redefinition, which requires close cooperation between the various divisions, particularly between the marketing and outsourced commercial function, removing the inflexible boundaries of a company (*Chen et al., 2013; Halkiopoulos et al., 2022*). The sharing of information inside the enterprise, as well as the acquisition of fresh competencies outside the marketing function, brings up the question of marketing's position within the enterprise, in the presence of this context that is failing it and the data that it can no longer be managed. However, recent analyses of marketing skills do not integrate the problem of massive data and its organizational implications. In fact, what are the particular skills for utilizing big data? On a more discrete level, what are the new skills that marketing practitioners will need to continue understanding their market, and their customers, and developing appropriate propositions? In order for the marketing function to preserve a key position in the company's strategy, it will have to develop skills that facilitate exchanges with other parts of the company, particularly with the DPO, and be able to continue to launch new ideas by integrating the opportunities offered by new analytical methods. Thus, marketing has to develop the technical and analytical skills that will allow it to seize the opportunities offered by the big data. The perception of data as a flow, rather than in a static way, allows the analysis of market patterns and developments in almost real time. In the area of retail sector, for example, analyzing in-store buying behavior in real-time can let them adjust stock levels, prices, offerings and maximize sales (*Davenport et al., 2013*). This way of processing data means that the business has the capability to manage knowledge and act rapidly. Nevertheless, among the studies that deal with knowledge management, only some take into account the company's responsiveness and include a time variable, which is necessary to comprehend the analysis and the resulting actions in real-time (*Halkiopoulos et al., 2020b*). In fact, how does responsiveness is essential to the business - a recurring topic in the information systems literature that is translated into marketing?

Chapter 2 - Knowledge and Management of the Customer Relationship

The customer relationship emerged in the 1990s, especially with market orientations, a set of convictions within the company that has the best interests of the customer in mind. The customer relationship is at the core of current marketing issues (*McAfee et al., 2012*). Companies seeking to establish and develop a relationship with their most engaged customers in order to preserve (i.e., retain and stimulate) them and enhance their profitability. For optimum customer satisfaction, good customer knowledge is crucial (*Halkiopoulos et al., 2020a*). To accomplish this, businesses have at their disposal metrics from traditional data sources such as panels, ad hoc surveys, or even transactional and relational systems that permit the management of their customer relationships. What about the increasing complexity of data, as well as from the multiplication of contact points?

Multiplication of Customer Indicators

The customer is becoming increasingly complex and segmented, which compounds the difficulty of getting to know and comprehend their behaviour through traditional methods. The number of touchpoints is rising, due to the multiplication of choices available to the customer, either to search for information or to conduct a transaction, thus raising the number of indicators available for marketing: click-through rate, conversion rate, engagement rate, recommendation, etc. (*Strauss et al., 2014*).

Challenges, Opportunities and Research Questions

The volume and variety of information available offer major opportunities in terms of customer relationship and knowledge for businesses that will be able to determine the appropriate indicators for understanding consumer behaviour and measuring the performance of marketing initiatives. Channel-specific indicators for each channel rapidly present limitations because they do not allow the effectiveness of marketing actions to be taken into account in the customer journey as a whole (such as the click-through rate for screen-based communication or the conversion rate for a commercial website) (*Dritsas et al., 2019*). So, what are the indicators that make it possible to understand the increasingly fragmented customer journeys and therefore guide investment across these journeys? To prevent being swamped by this great mass of data, businesses must select the most appropriate indicators in line with their strategy, instead of diving straight into the available data (*Sagiroglu et al., 2013*). So the challenge of big data will be to select the appropriate indicators to make the right decisions without necessarily integrating a large amount of data. Bulk data processing is not an end in itself, but a means of aligning decisions with customer behavior and managing investments.

Chapter 3 - Identification of Opportunities, Innovation and Business Models

The detection of market opportunities is affected by knowledge of its environment and consequently through access to information. It is not recognizable by everyone, but it depends on the information that has been generated and, as such, partly on the data that is accessible by the business *(Hofacker et al., 2016)*.

Big Data, Innovation and Open Business Models

The big data revolution enables businesses to gain access to a lot of data about their customers and their environment. Some public data that are available to everyone, without legal restrictions (open data), or the use of sensors, have made it possible for industrial companies to gain information on the usage of their products. (Sakr et al 2014) This is the case, for example, of General Electric, which provides engines connected to aircraft, which sends Data to their engineers, who can determine when maintenance is required. GE uses this Data to both innovate and develop new solutions for its customers, helping the airlines that purchase GE's reactors to monitor their performance and forecast maintenance needs. The open business model is emerging, allowing the company to integrate its customers' resources and skills into its value propositions (*Kanavos et al., 2019*).

Challenges, Opportunities and Research Questions

These challenges in terms of the access to data provide an opportunity for some companies to innovate, providing customers or prospects with new benefits (which may be in the form of services or solutions) and value. (*Antonopoulou et al., 2022*) Companies are experiencing difficulties in embracing, negotiating, and leveraging the complexity of their environment. How can companies implement a reconstruction of their environment to deal with rapid changes in the market? Is the concept of market orientation, which arose as markets evolved at a slower pace, sufficient to handle Recent research rather than promote the idea of orientation interaction). However, how does this concept relate to the more classical literature on market orientation and marketing skills? We need to move beyond the linear view and the simplified version of behaviours associated with market orientation, which does not take into account either the nature of the data that is now accessible to firms or the current complexity of markets. This would involve identifying the skills and resources that firms need to acquire, both on their own and through exchanges with the outside world (customers, suppliers, etc.) to develop the skills needed to understand their environment (*Anshari et al., 2019*).

Conclusion

By identifying the changes led to by the phenomenon of Big Data, we've attempted to focus on the bounds of current conceptual frameworks to grasp this new phenomenon and to propose some possible lines of research: the place of promoting within the face of those data that escape him which he can now not manage skills development individual and organizational to take advantage of such Data; the concept of your time within the use of this information by the corporate (concept of agility in marketing); the selection of recent indicators to know increasingly complex customer journeys and manage relevant marketing investments; the event by companies of a representation of their environment supported this data ethically, the challenging the notion of consent. Our conviction is that the phenomenon of Big Data is probably going to renew several current research issues. Through this communication, we, therefore, wish to encourage researchers to conduct inquiry from a perspective that mixes marketing, management of data systems, and strategic management (particularly on the difficulty of organizational and individual skills, insofar as where Big Data potentially calls into question the place and role of marketing).

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