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Is Big Data the next Big game changer? Impact on Customer services, Marketing and Ethics

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Abstract

In the last 5 years, quite a few studies have focused on the implication that the use of Big data may enhance firms' performance by better streamlining resources and customer services. There is a need for more research focused on understanding how big data influences marketing and customer services and furthermore, explores the ethical aspects of big data applications and processing. To do so, we used a qualitative approach by conducting semi-structured in-depth interviews with two big data specialists in the IT services industry. Improved customer services, product offerings and tailor-made solutions to serve individuals' needs are some key insights proposed for Big data usage in the specific industry. Then, ethical issues such as data ownership, customer identification, consent for handling and transferring data to third parties emerged. The paper concludes with a discussion of the findings in conjunction to the published literature.

Track: e-business and e-government

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Introduction

Currently, there is much debate about the usefulness of Big data for marketing services and products. Much of the debate focuses on the potential for creating better, more effective targeting to enhance business decision making and improving service delivery (Hilbert, 2016; Amado, Cortez, Rita & Moro, 2018). There is much emphasis being placed on big data within the software and IT services industries. It is seen as a game changer in the way that it provides more insights and ability to provide real-time feedback on delivery of service. Within the context of the services industry, little is known about the application of big data from the marketing to specific user issues to derive benefits (Amado et al., 2018; Beer, 2018) and to what extent there are challenges with ethical practices (Bishop, 2017; IBE, 2016).

Much of the current thinking about big data focusses on the usefulness and the potential that it offers for marketing business products and services. There are current concerns about the use of big data within the software industry as to its usefulness and corresponding investments required (Lee, 2017). There are different understandings of the usefulness of big data as a result of varying definitions of the phenomenon. The various definitions often focus on big data as a collection of huge volumes of unstructured data (Amado, Cortez, Rita & Moro, 2018) alternatively, it is considered as a collection of data being taken from different sources and integrated for another use (for example using administrative data). It is not a well-defined tangible object, and the potential of using Big Data to solve problems depend on what the problem is, what sources of Big Data may contribute to the solution, and whether any inherent biases or measurement errors with those sources are significant enough to make them unsuitable for the solution (Tam & Clarke, 2015; Daas and Puts, 2014). Wamba et al. (2015) postulate that Big Data are described via five main characteristics:

- Volume: the bulk of data records categorised based on their attributes and interconnections;
- Velocity: the speed at which data are produced and may be received and processed;
- Variety: the different data formats and content offered by various sources;
- Veracity: the quality and trust in the data exchanged between various stakeholders via several information access points.
- Value: enhanced utility of databases and data flows producing precious synergies.

Because of these characteristics there is a need to investigate how the users of the data view utility, and to what extent businesses can exploit these opportunities that big data offers. This research focuses on the issues by highlighting ethical concerns raised about the collection and exploitation of big data to improve business performance. Furthermore, it provides a view about the current thinking on these issues from the practitioner perspective in order to provide specific application and address the marketing and ethical issues with regard to big data. The research questions are as follows:

R1: How do Big Data affect the performance of marketing tangible products and services?

R2: What are the ethical implications of utilising Big Data with respect to privacy, data protection and ownership?

Literature review

Big data as game changer

The stellar growth of the technological developments, devices to access them and the software developed for collecting and leveraging voluminous data, offer ways for firms to innovate and create better offerings and evaluation for better performance (Moro, Cortez & Rita, 2015). With the use of big data, firms are starting to see great **value** being captured within and across different firms (McAfee et al., 2012; Tan et al., 2015). The power of data relates to what they can offer in terms of intelligence and predictability. The analysis of data may provide great input and shape social, governmental and organisational structures (Beer, 2018). Firms use the big data to analyse which variables provide the most interesting correlations and the significant ones are used to find and determine causality with models. Many firms have developed competitive advantage, that may lead to better **performance**, through the use of data and analytical tools for decision making. Lavalle et al. (2010) identified that companies using business information and analytics for differentiation within their industry had twice the likely outcome of being top performers as being amongst the lowest performing companies.

Moreover, big data is regarded as a significant game changer as it is often accessible in real time from forms, such as text created from chats on online social media. Benefits of the analyses of these social media tweets from Twitter for example, have provided key information about the spread of Cholera in Haiti, 2010 which was available before official statistics by two weeks (Chunara et al., 2012). Thus, the benefit of **speed** is stark, as a consequence of the use of big data analytics, information can be disseminated more rapidly, thus delivering better outcomes in practice. Big data analytics provides real business intelligence capability by offering ways to stream unstructured data for example, such as web data provides improved enterprise situational awareness, closer to real time, thus improving operations effectiveness (Castellanos et al., 2012). Decisions made using big data provides the possibility to be more effective with better options and speed (Wamba et al., 2015).

Impact on Marketing using Big data

A Big Data system is only effective for business when it is set up for the extraction of useful knowledge to support business decisions (Sharda, Delen, & Turban, 2015). Predictive analytics solutions can be used with Big Data to facilitate that purpose, in a combined solution that can benefit from both the volumes of data and advanced machine learning solutions (Hazen, Boone, Ezell, & Jones-Farmer, 2014). Predictive analytics based on Big Data drawn specifically for Marketing purposes are called Marketing analytics solutions, aiming to provide solid ground Marketing understanding and techniques for marketers to solve real-world Marketing problems (Grigsby, 2015).

Recently, Malthouse, Haenlein, Skiera, Wege, and Zhang (2013) have identified guidelines for traditional customer relationship management (CRM) solutions to adopt for benefiting from the Big Data explosion that arose with social media. Their recommendations include the prescription of Marketing analytics principles, in both the form of predictive models and adequate human resources with analytical skills to get the most from CRM solutions. The predictive methods are useful to provide snapshots of the CRM data to extract models for predicting success for future campaigns. Furthermore, with the use of analytical skills, analysts can provide guidance to managers to make informed strategic decision-making about their business (Brynjolfsson, Hitt, Kim, 2011). Other studies have also identified the need to incorporate analytics solutions in CRM encompassing widely known concepts in Marketing, such as the evaluation of customer lifetime value (Moro, Cortez, & Rita, 2015b). These impacts are seen as creating real value from a marketing perspective

because traditional data analyses methods have not been able to provide information on volumes of data, such as text and web data.

Marketing analytic solutions with Big Data may benefit organizations in a wide range of problems, such as identifying customers more likely to convert to sales based on a telemarketing campaigns (Moro, Cortez, & Rita, 2014), constructing interactive reports and dashboards for managers or even unveiling interesting trends from what is being said about their brands on social media (Lacoste, 2016). Data driven marketing practices such as; recommendations, geo-fencing, search marketing, CRM, market segmentation, personalisation and market mix optimisation are important for exploiting the big data for creating new forms of data-driven strategies and enabling business innovation (Wedel & Kannan, 2017; Wieneke & Lehrer, 2016). Therefore, Big Data solutions may be considered the foundations for insightful systems that effectively support marketers, relieving the burden of slow-paced human analyses (Sharda et al., 2015).

By the end of 2012 a gap was predicted for the forthcoming years in terms of Marketing enabling technologies and Big Data (Feinleib, 2012). Recent studies confirmed that while some work has been done for filling such a gap, the size of the gap is increasing exponentially in line with the inflation of Big Data availability (e.g., Erevelles, Fukawa, & Swayne, 2016). Hence, there is a need for research and development of Marketing solutions that explore the knowledge provided by Big Data.

While plenty of research is being conducted on Big Data and on Marketing, less is found in addressing specifically the benefits that marketers could potentially achieve through Big Data solutions. While Big Data adoption within the industry exists, there is a gap for research to clearly identify the pros and cons for organizations to invest in Big Data (Amado, Cortez, Rita & Moro, 2018).

Organisational Change

Big data – enabled decision making is still in its infancy, although there is a real openness amongst managers to embrace the organisational change. Such change requires a data decision-making mindset (Davenport and Harris, 2007). The data driven decision-making mindset according to Davenport and Harris, enables managers to make decisions based on a rationale from evidence provide by the big data. Decisions within the organisation are made from an awareness of the usefulness of data and the clear and deliberate strategy for organising data within the organisation. The change requires transforming processes, changing corporate ecosystems and enabling innovation (Brown, et al., 2011). Accessibility and availability of data is needed to ensure technological innovation is integrated to support organisational decisions. When there is a clear data driven strategy in place which becomes part of the organisation culture, then there is more likely use of big data and thus more chances of adopting the integrated approach leading to organisational success.

Ethics applied to the IT services industry

Ethics generally is considered in relation to standards of right and wrong that suggest what we should do, typically led by duties, rights, costs and benefits. One issue of collecting data and then using it for multiple purposes have been highlighted recently as a concern about informed consent (Bishop, 2017). When data is collected, and consent gained, is it possible to use that data for multiple purposes? This question along with the question of who can access

this data is relatively complex. With the advent of big data, there is more blurring of what is permissible in order to allow access and transformation of the data (Weineke & Lehrer, 2017). For example, it is not always possible to get permission from customers for the use of their data. As most of Big Data ends up being beyond the control and ownership of the business, creating the challenge of gaining access to, collecting and assimilating the data within the CRM system and converting into a dynamic 360° understanding of the customer (Kunz et al; 2017).

Data about previous experiences are used to provide useful feedback on the service offerings and for the improved delivery of service (Waller & Faucett, 2013). Data received from multiple sources are not always subjected to informed consent processes because of the scale and cost to businesses. Recently the Institute for Business ethics have focused on these issues by highlighting the need to be transparent about the process of deriving data (IBE, 2016). Furthermore, the data anonymization requirement is not always a requirement for all types of data, (Hashem, et al., 2012). Aggregated unstructured data for predicting future patterns of customer behaviour such as customer retention is not always subject to the same requirements as individual data where identifiers are needed (Weineke & Lehrer, 2017). Because this data does not include individual identifiers there is less concern in sharing such data within companies for multiple purposes. In this respect big data offers enhanced capabilities without violating data ethics (IBE, 2016).

For big data to work, the data owners (the people whose data are being transformed) need to have a transparent view of how the data is being used in order to comply with ethical practise (Bishop, 2017). Research by the Royal Statistical Society found that there is a ‘data trust deficit’ whereby the public have lower levels of trust in institutions to use their data appropriately, when compared to their general levels of trust in that organisation. Privacy protections are not enough anymore. Big data analytics can compromise identity by allowing insights to be gained about the views of customers without their consent. By sharing data there is a level of responsibility and protection that needs to be applied to limit unintended misuse (Beer, 2018). Once data is collected the initial context for its collection is not always considered when the data is shared with third parties. Whilst the big data offers a very compelling argument for improving business outcomes (Chunara et al., 2012; Hazen, Boone, Ezell, & Jones-Farmer, 2014; Hilber, 2016) its use needs to be considered carefully by managers and users of the data for the ethical implications of the consequences of its use. There are considerable challenges for organizations to adopt ethical, data-driven approaches and gain the benefit of business intelligence through big data. Because there are so many grey areas that are still being considered, this research focus is on what is needed to derive the benefits of big data for marketing to customers and the practitioner perspective of the ethical challenges using Big data.

Methodology

Research design

A qualitative research design was used to explore research about the phenomenon of big data (Creswell, 2009; Pantano & Priporas, 2016), and the lack of extant research studies on the experiences of practitioners. This research approach provided richer and deeper information for exploring viewpoints, allowing the researchers to gain a better initial understanding of the

problem and identifying the implications for marketing (e.g. Healy & Perry, 2000; Maxwell, 1996).

The interview guide was structured in two distinct sections focused on the impact of big data on the services industry and the second part focused on the ethical concerns and implications for big data use from a practitioner perspective. The interview began with two introductory questions regarding the penetration of Big data in the services sector and the extent to which Big data is currently used, followed by subsequent questions related to the ways they are utilized in this industry, the challenges professionals face and possible models/frameworks they use. Further questions focused on improving organizational operations and customer marketing. The final question concentrated on the likely future of Big data in supporting services for the services industry.

Data collection and analysis

For this study, the authors conducted two in-depth interviews with Big data practitioners positioned in the IT services industries of India and New Zealand. The fundamental logic in interviewing these two practitioners was to investigate their experiences of using big data for marketing and also to investigate the applicable ethical concerns, and its effects on performance. In-depth interviews reduce the “distance” between interviewer and interviewee (Johns & Lee-Ross, 1998) and promote mutual understanding between the researcher and interviewee (Bryman and Bell, 2015). Furthermore, scholars such as Cresswell, (2009) and Bryman and Bell (2015) assert that researchers should use in-depth interviews because they offer an efficient approach and provide deeper insights of information and representation of the phenomenon being studied.

The interviewees were targeted as first and reliable contact points for discussing issues about Big data in the services industry, as this individual has extensive experience in big data analyses and reporting from training in New Zealand and practice in India. Both interviews took place via skype in December 2017 (Hahn, 2008). Since this study is part of an ongoing wider project regarding the use of Big data in relation to marketing and ethical considerations, an in-depth interview with an industry expert was deemed as suitable to extrapolate some initial insights (Balogun et al. 2003; Spivack et al., 2014), and is by no means regarded as a complete qualitative investigation on the topic.

Sample

Data were collected via a semi-structured interview guide, since our interest was to keep the discussion flexible and open-ended (McCracken, 1988). The interview guide was designed based on existing literature (Burke, 2002, Granot, Greene, & Brashear, 2010; Pantano & Priporas, 2016) and it had been pre-tested for readability and content relevancy in relation to the research questions (see Appendix A). The interview guide consisted of 21 questions, which were designed to draw information from the participants’ personal experiences on Big data usage in services organizations of the particular industry, including present and future opportunities and challenges and the second part focused on the ethics applications for using big data for users and the respective customer perspectives. The participants also had to respond to four demographic questions.

The first participant was a 27-year old male, married with two children, with education at post graduate level with professional programming certification, and 4 years of experience database reporting and analytics. The second participant was a 45-year old male, married,

with 2 children, with education experience in database management and extensive experience in IT solutions over 15 years.

Interviewers discussed with the participant from India for about 58 minutes, whereas the conversation with the interviewee from New Zealand lasted approximately 53 minutes.

The interviews followed ethical guidelines such as ‘no harm’, ‘informed consent’, ‘anonymity’ and ‘honesty’ (Allmark et al., 2009; Bryman & Bell, 2015). The participants were informed that their honest and frank opinions were what the research was interested in and that there was not a wrong or right answer. Also, with their consent the interviews were audio recorded to increase the accuracy of data collection, since it permits the interviewer to be more attentive to the interviewee (Patton, 1990) and permits verbatim transcription. The participants name was substituted with coded numbers to ensure anonymity.

Thematic analysis was the technique to be implemented. Data collected was administered into different themes and they were also divided into separate categories to be studied (Bowen, 2009). Each interview item / question was treated as representing a distinct category, and answers provided were analysed in a sequential manner. Boyatzis (1998) posits that this technique is particularly helpful in comparing data originating from various primary and secondary sources.

Findings

Big data in services

The interviews started by asking the big data insight specialists to provide an overview of the services industry, and the IT in particular, in their countries and how these industries may benefit from Big data implementation.

Regarding the industries where they have noticed used of big data:

The first interviewee working for an IT services company in India referred to his initial experience in the industry where he saw big data in banking and the consulting services industry in small businesses. The second one, who lives and works in New Zealand, mentioned that Big data have some appearance in governmental services, the retail industry, business intelligence, consultancies and banking.

Regarding the reasons for using Big data they stated:

“Once you get the customers data you can understand customers behaviour payment pattern. Payment on time or taking time to make the payment. Understand whether there are disputes and the reasons for these. Give more offers to customers and arranging to help them out for products etc.” (Interviewee 1)

“To understand the customer better, real-time and right now; not just using historical data from the past” (Interviewee 2)

Then, both participants were asked about the challenges for adopting Big Data (capability, resources, barriers/ constraints). Respondents mentioned the following:

“Challenges are with the hardware- I use Hadoop and SAP software in the company” (Interviewee 1)

“The reliability of the data sources is a crucial issue, especially in case where big companies collect a lot of data. Also, to produce a big data app would be a challenge. Finally, for individual level data (not aggregate one) would be a challenge to access the corresponding source” (Interviewee 2)

Concerning the business models used to develop a knowledge base for integrating big data, the interviewees suggested:

“Our organisation uses Big data for trend analyses. My Big data reports are utilised to create customer trends analyses on a day-to-day basis, and customer behaviour, such as late payments. Big data are also used in organising expenses and payments related to running business operations.” (Interviewee 1)

“More real time data on customer behaviour. More and more professionals have started thinking about using data to provide better customer services and not just improving aspects of the core product; this is what I call ‘smart’ products.” (Interviewee 2)

Then, both participants were asked about ways Big Data can improve and integrate departments, such as operations, marketing, supply chains, communications and promotions.

“It is useful to provide new insights and provide a better option for deciding how to create changes.” (Interviewee 1)

Furthermore, the same interviewee said that *“because big data is not just in the organisation, it is useful outside as well to analyse salary and expenses as well.*

Hence, it may be proposed that:

PI: Big Data greatly influence the functional processes of organisations, which has potential to improve business performance.

The second interviewee used a single phrase to respond to this question:

“Big data make business intelligence customer ready; a just-in-time approach” (Interviewee 2)

Regarding the potential influence of big data on creating a differentiated product, unique selling positions that may lead to a competitive market advantage, both interviewees provided very interesting feedback:

“Yes, other companies such as Dell, IBM are using big data for business intelligence. There are others, such as small businesses in India and the banking industry, that are using big data to offer better loans, more customisation and attract customers.” (Interviewee 1)

“Understanding the customer better, altering the product offering according to their needs and desires, thus making the product a more useful one and potentially easier to pick from various alternatives” (Interviewee 2)

Thus, we propose the following:

P2: Big Data can provide enhanced marketing insights to create unique competitive market positioning by improving the offerings to existing customers, and identifying, targeting and attracting better prospects.

As concerns the ways companies’ management can use big data to create a unique selling position that may lead to a competitive market advantage, the following responses have been provided:

“Yes, because of the example of HP- collection- raise a dispute for the customer- understand the dispute by categorising it based on the type such as delivery issues and using feedback to handle complaints.” (Interviewee 1)

“By targeting different segments of customers more successfully and consequently positioning the product offerings in a more favourable way” (Interviewee 2)

Closing this first part of the interviews, participants were asked to envisage the likely future of big data, and they have responded as following:

“It will grow bigger and there will be multiple applications in the future to keep up with newer ways of analysing data. I am interested in this big data and looking to get offers to work in this area going forward.” (Interviewee 1)

“More companies will certainly be using data from smart devices (e.g. smartphones, smart watches), thus making each individual a separate and explicit source of rich information. (Interviewee 2).

Big data Ethics

The second section of the interview guide covers ethical issues that emerge from utilizing Big data. The discussion started with discussing on ethical issues that specifically relate to the use of big data:

“The format the way the data is shared with you such as date. If there are many different formats, then each of these data need to be cleaned to run so that it can be synchronised. Make sure that the data is in correct data. Multiple data can be used to clean the data and transform it for the analyses.” (Interviewee 1)

“Sharing pieces of information can be quite challenging, because individuals and companies are sometimes quite reluctant in sharing data. Also, the ‘immigrants’ to internet world are less open to the young generations” (Interviewee 2)

(Supplementary question) - Is it substantial change to change the data?

“The time spent- 60-70% of my time and it can be quite substantial. This is consistent with other professionals’ reports of time spent on the process.” (Interviewee 1)

“It depends on how data would be used from different companies or organisations i.e. Google collecting and sharing data with governments” (Interviewee 2).

Then, the two respondents were asked to describe any substantial risks associated with the ways that data are protected and used. They specifically stated:

“I am using the HP laptop and it is monitored- it’s not really possible as the data is backed up. There are some risks- running some applications such as data being changed as a result of importing data into different applications. Data can be lost therefore not all data is being transferred.” (Interviewee 1)

“Yes, data from third parties are being mixed and thus consent is not always provided for other parties’ use.” (Interviewee 2)

Therefore, it may be proposed that:

P3: Processes related to Big Data flows produce various ethical issues and associated risks regarding data control, handling and integrity.

The next discussion topic was about the ways big data affected the way that the clients’ data is being used. The following comments were made:

“Client data is being controlled in the organisation- Clients information is being stored that they have shared with us and they are aware of the way that we store their data. There are no issues.” (Interviewee 1)

“Consent for data is not always needed now. So, the data maybe used without clients’ consent in various cases. There are different ways that we can map data for clients onto different systems, i.e. administration data.” (Interviewee 2)

Then, it was investigated whether there are any issues in relation to data ownership when considering how it is being used by potentially multiple users or in various contexts?

Yep, there are multiple users using the same data. Once the reports are shared there are some clear file changes with versioning which is clearly signalled on the file and to the business team. There are some chances to change the report. If there are changes as a result of customer contact later in the month. There are monthly reporting from the credit team, sales, engineers as well. (Interviewee 1)

Yes! On what can be shared. People know but not formalised very well. (Interviewee 2)

(Supplementary question to interviewee 1: Who owns the data? Who are the owners of the data?)

“Not anyone is owning the data but everyone within the organisation can access and use it.” (This is thus considered to be enterprise-wide data.)

Furthermore, the interviewees were asked whether it is ethical to use data for different purposes than the original ones (on which consent has been granted from individuals). Their thoughts are described in the following quotes:

“No, I don’t think so. The data is not always genuine from social media. HP data is more specific and future planning is not possible to get from social media. Is it possible to use the data from multiple places? Customised data is used and this is appropriate.” (Interviewee 1)

“No, it is not. For example, banks do not anonymise customers data. Customers’ inputs (phone number etc.) should not be available. There should be first approval and care taken and deal reliably with situations of malicious usage.” (Interviewee 2)

The sixth question examined how firms deal with the identification of people in data and whether anonymity is still important and whether it always apply.

“Is it about the uniqueness- It should be unique- reference number is used for the customer to identify them. For example, in the case of the banking sector the customer gives you the information and you derive a unique identifier for each customer. Banks can be using many products within the bank for the same customer and therefore that customer id is important to track them. Not all information is released such as the id is the one generated by the bank but is not shared with other banks.” (Interviewee 1).

“It depends on the nature of the business. Retail is a different case to banking. Who has the authority to regulate Google and other big companies are setting their standards.” (Interviewee 2).

Subsequently, it was discussed how the companies decide about using publicly posted user-generated content for their own business intelligence and what rules apply in the ethics for handling this data:

“The business tends to use this information from market and from customers to create the best insights. I am not in that role the manager will generally deal with the customers and they will generally control the process for collecting the information. The collection team will use two different applications and the CRM for reporting the disputes. I work with the data and analyse the information to provide reports.” (Interviewee 1).

“There is not an authority that would deal with the feedback.” (Interviewee 2)

The second part of this question asks whether businesses need to look into trends or one incident is enough to make decisions. The respondents stated:

“They need to have trends. With the payment collections team, it will be about the number of logs for calls. If they have many calls for big companies, then they will look more closely at these as they have a priority.” (Interviewee 1).

“It’s on a case by case basis.” (Interviewee 2)

Participants were asked whether they were aware about any clear strategies to mitigate risks of breaches of trust from unintended misuse of data, and they responded:

One example, there are policies that we should not share id passwords. There are clear policies in place. They are general policies rather than the specific ones, but they cover what to do in the event of an incident (Interviewee 1).

“I don’t know but there should be some strategies in place from an organisational perspective.” (Interviewee 2).

Finally, respondents were asked about any other ethical challenges that big data poses for businesses.

“I don’t know of any specific ones, other than those that I have spoken about earlier.” (Interviewee 1)

“To correctly archive and secure the data, otherwise it is hard to make sense and use of that data. Smarter companies capitalize on big data and are distinguished from unsuccessful companies by the ways they make decisions using big data. Of course, most companies don’t do this.” (Interviewee 2).

Hence:

P4: There are currently ambiguities relating to ownership of data, after ownership has been given to organisations, as the conditions, standards and guidelines are not clear to enact in practice.

Discussion and Conclusion

The use of Big data has started spreading across the whole spectrum of industries. Corporate decision-making can significantly improve as a result of combining and customizing data coming from different sources on different formats (Davenport, 2012; Gandomi & Haider, 2015). Although many companies, especially multinationals, have actively started utilizing Big data, the majority of the firms across various industries are still exploring their implementation of, without taking action yet (Kwon, Lee, & Shin, 2014). This is mainly happening due to a lack of experience and understanding of Big data adoption or even unavailability of appropriate data (Wamba et al., 2017), processing and implementation on behalf of top managers and administrators (Provost & Fawcett, 2013).

The current research is part of a wider on-going project that investigates Big data implementation in various industries, including the IT services one. It intends to provide a deep and better understanding of the current situation of Big data implementation in the specific industry by interviewing two specialists who manage this type of data in the IT services industry. We discussed with both respondents how Big data may influence IT companies’ operations, marketing and performance, as well as challenges with respect to ethical implications emerging from this new approach of data processing in business management.

Starting from the reasons of using Big data, both respondents mentioned their enhanced abilities in revealing consumers’ behavioural patterns in selecting and purchasing products.

As regards the challenges in adopting Big data, the first interviewee spoke about hardware limitations when running Big data and depending on the analyses to be run it can take up to a day to run one single report which limits the ability to do other tasks. Furthermore, he

suggested there are challenges with the hardware and its interaction with software. In addition to software challenges, the second interviewee referred to the reliability of data sources, the access and transfer of, and the difficulties in handling individual level data. This has also been suggested by Demirkan and Delen (2013) who include customizability and reliability as two very important channel communication features to make Big data succeed from a technical point of view; our study exemplifies the same attributes from a managerial point of view too.

A question followed about the business models that are being used for developing a knowledge base for integrating big data for businesses. In this case the first interviewee suggested that they mainly use the data for trend analysis. The business would use the reports the respondent creates to provide trend analyses on retention of customers, their purchase and pay-off behaviours. So, there is a data driven strategy being used, which has been previously

The second interviewee postulated that data need to be better corresponding to the real customer behaviour. Business models should be adjusted in a way that data would be used to build better customer services and not just improve aspects of the product. This is in line with Demirkan and Delen (2013) who indicate that market-driven volatility calls for deeper understanding and improved interoperability of the horizontal and vertical layers of component business modelling within a dynamic sourcing framework.

Furthermore, regarding the ways Big data can prove useful for companies' various divisions, both respondents referred to enhanced business intelligence to tackle organisational issues which may have positive implications for the internal environment, as well as the performance one. This is in congruence with Wamba et al. (2017) and McAfee et al. (2012) who posit that the combination of enhanced IT capabilities and big data analytics lead to a sustainable competitive advantage.

Participants' suggestions for creating differentiated product offerings agree with Assunção et al. (2015) who have also suggested IT services in offering new financial solutions, which for example may significantly enrich consumers' evoked set of banking products (Sun et al., 2014).

Some very interesting comments about the future of Big data have been provided, with both respondents projecting that Big data will greatly develop into becoming the main data analysis framework, with the focus being on exploiting data acquired from individuals on a totally personal basis. As Wamba et al. (2015) postulate, this would facilitate the design and marketing of proper tailor-made product offerings reflecting on consumers' detailed profile (Manyika, 2011).

The ethical issues of implementing Big data were discussed in detail with the two interviewees. Summarizing their views and concerns on this very important matter, they have mentioned that the data format is a major issue, as most of data that are accessible come from different sources and they are mainly unstructured; thus, synchronisation of data may involve changing parameters or data content to conform with format guidelines. However, changing data because of importing data into different applications may create discrepancies at different levels including safe data transfer and protection.

Another major challenge relating to ethics is the reluctance on behalf of individual and organisations to share data with third parties. Data could be potentially misused, non-intentionally transferred to other parties or even lost. Thus, a transparent way of collecting, sharing and processing big data is necessary and that would potentially dispel people's and

companies concerns about data management in the Big data era, as Janssen and van den Hoven (2015) recommend. On the other hand, the second participant mentioned that a consent for data processing and sharing is not always needed, depending of course on the nature and aim of utilizing the data. This last comment of interviewee 2 relates to data ownership with respect to data flows incorporated into Big data schemes. As both respondents mention and LaValle et al. (2011) support, the main issue with data ownership is that due to multiple departments' and individuals' involvement at different segments of data flows, it is not always clear who should share what. Therefore, introducing specific guidelines to monitor and control data ownership as databases get updated is necessary, since Big data actually entails a dynamic process (Mittelstadt and Floridi, 2016). Moreover, both respondents agree that it is not ethical to use data for different purposes than the original ones and that specific measures and care need to be taken such as prior approval from individuals and have a reliable mechanism in place to treat problematic situations.

Issues emerged from the research such as the identification of individuals when collecting data about their preferences and purchase behaviour from various sources. Respondents refer to usage of identification of information acquired and transferred in various sectors (e.g. banking, retail) as in practice there are different reasons for using identification in those industries. Also, it seems that the ethical aspect of using user-generated data –for various purposes– that have been posted publicly is an issue that companies have not yet considered carefully, especially under a Big data perspective. This seems to corroborate previous similar findings of studies, with most of them calling for a careful consideration of individuals' identification while transferring Big data, because mishandling may cause severe consequences (LaValle et al., 2011; Herschel and Miori, 2017), such as the recent saga of Cambridge Analytica where they used 50million Facebook users' profiles without their permission to target political advertising using psychological profiling in the US election (the Guardian, 2018).

Finally, regarding strategies/policies that may have been introduced to mitigate unintended misuse of data, it was suggested that there are some general policies, such as not sharing id/passwords, but nothing that could be characterised as an integrated way of treating these situations. The literature makes specific reference to this issue, as big data sharing agreements are informal and have many gaps in terms of monitoring and compliance with privacy and ethics (George et al. 2014).

As with any empirical research, this one has some limitations that could serve as a motive for further study. Firstly, this research is part of a wider effort to explore in depth some important aspects of Big data in practice, but the two experts offered their insights mainly for the IT services industry and with applications in banking and financial services. Secondly, although the info kindly provided by the experts is extremely useful, it would be important to run these interviews with experts coming from other industries to collect more data regarding Big data performance and ethics. Moreover, a quantitative study approach could be useful in trying to generalise any patterns unravelled in the qualitative studies. This could potentially occur using a single or a multiple case study methodology.

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Appendix A: Semi-structured questionnaire guide

Section A: Big data in the Business industries

- 1.a What are the industries where you have seen big data?
- 1.b. What are the reasons for using big data in business?
2. What are the challenges for adopting Big Data? (capability, resources, barriers/ constraints)
3. What business models are being used for developing a knowledge base for integrating big data for businesses? tangible or intangible resources (e.g., tools, software, and information); human resources (e.g., skills, knowledge, and virtual communities); and relational ones (e.g., relations to partners and suppliers, and network membership).
4. How can Big Data be used to improve and integrate departments such as; operations, marketing, supply chains, communications and promotions?

5. How can management use big data to create a differentiated product, unique selling positions that may lead to a competitive market advantage?
6. What do you think is the likely future of big data?

Section B: Big data Ethics

1. Are there any ethical issues that specifically relate to the use of big data?
 2. Are there any substantial risks associated with the ways that data are protected and used?
 3. Has the way that big data affected the way that the clients' data is being used?
 4. Is there an issue in relation to data ownership when considering how it is being used by potentially multiple users or in various contexts?
 5. Is it ethical to use data for different purposes than the original ones on which consent has been granted from individuals?
 6. How are firms dealing with the identification of people in data? Is being anonymous still important and does this always apply?
- 7.a. How do the companies decide about using publicly posted user-generated content for their own business intelligence and what rules apply in the ethics for handling this data?
- 7.b. Do businesses need to see trends or is one incident enough to make decisions?
9. Are there clear strategies to mitigate risks of breaches of trust from unintended misuse of data?
 10. Are there any other ethical challenges that big data poses for businesses?