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Research paper

Growth hacking: Insights on data-driven decision-making from three firms

Orlando Troisi[a,*], Gennaro Maione[a], Mara Grimaldi[a], Francesca Loia[b]

[a] Department of Management and Innovation Systems, University of Salerno,Fisciano, SA, Italy
[b] Department of Management, University of Rome "La Sapienza", Roma, Italy

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ABSTRACT

Theoretical background: The work explores how Big Data analysis can reshape marketing decision-making in B2B sector. Deriving from Data-Driven Decision-Making (DDDM) approach, the Growth Hacking model is employed to investigate the role of cognitive computing and big data analytics in redefining business processes.
Purpose: The main objectives of the study are: 1) to assess how a data-driven orientation to the use of big data analytics and cognitive computing can reframe marketing decisions in B2B segment; 2) to explore whether the adoption Growth Hacking can be helpful in exploiting the opportunities offered by big data analytics and cognitive computing in B2B marketing.
Methodology: The paper is based on Action Research (AR) methodology that permits researchers to participate actively in the observation of businesses and to examine how decisions are undertaken and managed over time.
Results: The main findings allow identifying the most common strategies and tactics employed in three companies operating in different B2B sectors to exploit the opportunities offered by cognitive computing and big data analytics according to a data-driven marketing approach. Based on the application of the Growth Hacking model, the tools of analytics and the main objectives, outcomes and implications on marketing decision-making are revealed.
Originality: The identification of the main objectives and outcomes produced across the three dimensions of the Growth Hacking model (data analysis, marketing and programming) can help academics and practitioners to understand the main levers to attain marketing goals, such as the enhancement of relationship with customers (CRM), continuous learning and development of new products and potential innovation.

1. Introduction

Contemporary digitized markets provide organizations with the possibility of collecting and analysing large amounts of data easily and rapidly. However, big data should be managed strategically to optimize the use of analytics in business management and to overcome the risk of turning the advantages offered by ICTs tools into threats. There is the need to understand how big data analytics can reframe traditional marketing decision-making by exploring how data-driven orientation at a strategic level can lead to the redefinition of technologies tools in the different marketing phases to enhance the effectiveness of the process. Then, extant research proposes the adoption of a real orientation to manage big data throughout the entire decision-making cycle: *data-driven decision-making* (DDDM). Data-driven managers should base business decisions on data-analytic thinking in order to use the data collected as a driving force to prescribe actions, predict complexity and "make" the change. One of the techniques based on big data analytics with the most relevant implications on decision-making is cognitive computing, an integrated set of automated learning technologies that extract data in order to reproduce the functioning of human brain.

The shift toward the espousal of a data mind-set in marketing decision-making that pursues the constant development of innovation and continuous learning translates into the proposition of a new marketing perspective for big data analysis: the *Growth Hacking* model. The framework combines the main elements of marketing, innovation and big data analysis to introduce a new business attitude that encourages companies to act as never-ending start-ups based on constant learning, synthesis and analytical method and adaptability of competencies.

However, previous research on DDDM seems to be grounded mainly on the analysis of big data in Business-to-consumer (B2C) marketing. The investigation of analytics in Business-to-business (B2B) marketing is related to the exploration of business management concepts as e-marketplace and e-supply chain management. For this reason, the need to adopt a framework for marketing decision-making according to a data-driven approach in B2B marketing strategies can be revealed. Some recent contributions in B2B research call for the examination of

* Corresponding author.
E-mail addresses: otroisi@unisa.it (O. Troisi), gmaione@unisa.it (G. Maione), margrimaldi@unisa.it (M. Grimaldi), francesca.loia@uniroma1.it (F. Loia).

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how technology reshapes marketing strategies and tactics and of how knowledge orientation can drive effectiveness in information technologies management.

Hence, the study aims at revealing how data-driven decision-making in B2B can foster the use and the effectiveness deriving from the use of big data analytics and cognitive computing in marketing decision-making. Secondly, the application of Growth Hacking model to three different sectors (food, building and transports) strives to detect how the main features, steps and objectives of marketing decision-making are reframed thanks to the use of analytics and cognitive computing.

Due to the necessity of analysing deeply the underlying mechanisms, the mood and the orientation that lead businesses decision-making, an empirical research based on action research (AR) is performed. The technique permits researchers to participate in the decision-making process of a given group and to become active members of the community for a given period to observe how an organization can address a complex issue or manage an emerging phenomenon over time. AR understands decision-making as a cycle: therefore, it fits well with the basic assumption of Growth Hacking model and DDDM that companies should turn data into information that can be transformed into knowledge to develop learning and creativity in a circular process of constant improvement.

The empirical research is based on a multiple case study on a sample of three Italian B2B firms. Companies' behaviour has been observed for one year. Semi-structured interviews have been conducted at the beginning and at the end of the period to evaluate potential changes in the management strategies and in the related outcomes.

Specifically, the research aims at addressing the following research questions:

RQ$_1$. *Can data-driven approach improve the use of big data analytics and cognitive computing in B2B marketing decision-making?*

RQ$_2$. *Can Growth Hacking mind-set enable the attainment of marketing objectives in B2B sector?*

Based on the main findings obtained, an integrated model that can help to detect the main steps to implement DDDM in B2B marketing thanks to growth hacking framework is proposed. This model identifies the main steps, the main marketing objectives and implications related to the effective adoption of big data analytics and cognitive computing in each dimension of Growth Hacking framework (marketing, programming, data analysis).

The paper is structured as follows. In the first section (theoretical background), the main models proposed in data-driven marketing are explored and compared. Then, after the identification of Growth Hacking model as an adequate framework to reframe B2B marketing decision-making, the empirical research is performed to assess how the three dimensions of the model (technical, creative and analytical) can be applied to different markets (food, building industry and transports). The main findings are debated by revealing the most common marketing objectives and outcomes accomplished through the adoption of Growth Hacking mind-set. Lastly, limitations and implications of the work are discussed and suggestions for future research are provided.

2. Theoretical background. How big data analytics reframe marketing decision-making

2.1. Big data analysis and big data analytics

Big data analytics refer to the complex set of instruments and analytical techniques employed to store, manage, analyse and visualize large and complex amounts of data (Chen, Chiang, & Storey, 2012a, 2012b). The concept stems from the field of *business intelligence and analytics* (BI&A), introduced in 2006 by Davenport to advance a data-centric approach based on data collection, extraction and analysis technologies (Chaudhuri, Dayal, & Narasayya, 2011; Watson & Wixom, 2007) halfway between computer science, information management and data management.

The connection between data analytics and data management can be noticed in the tools of analytics developed in the early stage of their diffusion that were designed to extract, transform, integrate and store data in companies warehousing systems. Instruments as database queries, online analytical processing and reporting tools based on intuitive graphics have been employed to explore deeply some key variables in datasets to support management processes.

With the growth of Internet, web analytics are proposed and combined to give birth to platforms such as crowd-sourcing systems (Doan, Ramakrishnan, & Halevy, 2011; O'Reilly, 2005) that permit organizations to harmonize data, on the one hand, and allow the production of user-generated contents, on the other hand. Web allows at collecting, organizing and visualizing data through data mining techniques and tools such as Google Analytics or social media analytics, which provide information on user's preferences and purchasing patterns.

In digital economy, web analytics are integrated with mobile analytics (smartphones' applications) and with tools based on sensors that enhance the connections among users and providers, improve service quality and strengthen the relationships between different social sectors, from education to healthcare to governments. These devices can track users' activities thanks to RFID, barcodes and radio tags to support person-centred and context-relevant operations and to create a harmonized system of technologies aimed at improving community well-being and citizens-customers' engagement (the so-called *Internet of Things*, Ashton, 2009). The possibility to share their opinion on service and to interact h24 with providers and other users make customers active participants in business decisions and active members of community.

Thus, as Table 1 shows, it can be noticed an evolution from database-centred analytics to Web and Mobile-based analytics (Chen et al., 2012a, 2012b). Over time, the progressive proposition of new technologies seems to pursue broader and complex marketing objectives that strive to reach economic (e-commerce, marketing activities and profiling), relational (data gathering and user-generated content from social networks, forum, blog) and social goals (e- government and smart health or security).

The increasing diffusion of big data analytics provides contemporary businesses with the possibility to manage and extract data more rapidly. Big data is defined according to five integrated criteria, the five “V” (volume, velocity, variety, veracity, value) identified by

Table 1
The evolution of big data analytics in management.

Evolution phase	Main goals	Main tools	Objectives realized
Data-base centered analytics	To store data from users and to gain insights on their behaviors	Query, online analytical processing, data mining, reporting tools dashboard and visualization	Economic and marketing
Web-based analytics	To collect opinion from users and to provide users with the possibility to express opinion	Web analytics and social media analytics Cloud computing systems	Economic and relational
Mobile-based analytics	To connect social spheres and to increase user's and citizen's engagement toward the creation of smart systems	Mobile devices and applications Sensors (RFID, barcodes, radio tags)	Economic, social and political

Source: Author's elaboration.

Laney (2001) and then revised by Diebold, 2012; Song & Zhu, 2016).

However, big data cannot ensure the attainment of competitive advantage automatically, since their useful exploitation can be influenced by numerous variables, such as data accessibility, availability, quality, heterogeneity (Gupta & George, 2016; Troisi, Grimaldi, Loia, & Maione, 2018) or management's data analysis skills, attitude and perception toward data (Chen, Preston, & Swink, 2015; Kearns & Sabherwal, 2007). The huge availability of heterogeneous and big data exceeds the capacity of traditional storage and analysis tools by raising the complex issue of data management (Provost & Fawcett, 2013; Zhou, Chawla, Jin, & Williams, 2014).

Therefore, big data analysis should go beyond the adoption of data-mining algorithms to embrace a total data perspective based on the careful selection of the right methodological mind-set to extract significant information and meanings from data and gain competitive advantage from their employment (Gandomi & Haider, 2015).

In line with the goal to analyse big data implications on marketing management and decision-making effectiveness, current work understands big data through a process-based view. Thus, big data is intended as the large amount of information that businesses can collect and process (Ciasullo, Troisi, Loia, & Maione, 2018; Erl, Khattak, & Buhler, 2016; Troisi, D'Arco, Loia, & Maione, 2018) thanks to new technologies such as ICTs, software and analytics based on computing. The focus is on the adaptation and rereading of traditional marketing information systems to comply with the large availability of data that requires new technologies to be organized and explored.

According to literature on big data and data process management (Blazquez & Domenech, 2018; Corti, Van den Eynden, Bishop, & Woollard, 2014; Ortiz-Repiso, Greenberg, & Calzada-Prado, 2018; Verhoef, Kooge, & Walk, 2016), data analysis can be accomplished through a cycle (Table 2). The main steps of big data analysis life cycle (Gandomi & Haider, 2015) are: 1) data collection; 2) data organization; 3) data extraction; 4) data integration; 5) data analysis; 6) data sharing; 7) data storage; 8) data reuse.

These steps can be reread according to a total data perspective aimed at integrating data analysis with the traditional management processes (see Table 2). The cycle can start from the sharing of real orientation throughout the business that can be developed thanks to a process-based view in which the main steps of data analysis are identified to understand how the use of analytics can reframe traditional business models and the whole value chain (Lytras, Raghavan, & Damiani, 2017).

Thus, a data-oriented mind-set should create a cohesive culture and a set of values that drives data collection and organization. Big data analysis and the adoption of the related analytics should be incorporated into business complex decision-making starting from the enhancement of managerial intention to adopt analytics to the research and selection of specialized big data analysts and to the development of an adequate infrastructure that support the process of data extraction and integration technically. Thus, not only the entire business information system should be revised to foster the use and collection of data but also the internalization of a data-oriented corporate culture should be spread at each organizational level. Data analysis should be supported with the development of the right analysis and methodological skills (or through the recruitment of big data analysts) and with the management's ability to catch innovative features from data. At the end of the process, feedback, opinions, insights (from users but also from managers and employees) are collected to produce new knowledge that can be stored and re-used as accumulated experience for the restarting of the cycle.

In line with the perspective espoused in this work, big data can be defined as a disruptive and integrated set of technologies that reframes business intelligence in companies' information systems and that involves cyclic activities of research, collection, organization, processing and storage of large collections of data.

Table 2
The main steps of big data management.
Source: Author's elaboration.

Main data analysis steps	Main management steps
Data collection	Establishment and sharing of a cohesive data-oriented culture
Data organization	Selection of an integrated set of analytics in line with strategic goals
Data extraction	Adequate technological infrastructure
Data integration	Computing skills
Data analysis	Analysis and research skills
	Management's ability to interpret results in line with strategic goals and to catch opportunities
Data sharing	Data report and diffusion
Data storage	Feedback collection
Data reuse	Renewal of the knowledge acquired for continuous improvement

2.1.1. Cognitive computing

Based on learning cycle principles, cognitive computing solutions (Chen, Argentinis, & Weber, 2016a, 2016b; Hurwitz, Kaufman, & Bowles, 2015) seem to be in line with the main features of the data-driven approach discussed in Section 2.1. These systems are grounded on two main elements: a) the role of contextual insights (inputs) that through the identification of patterns (information associated to data) leads to development of hypotheses; b) the circularity of learning acquired and a continuous learning attitude (Hurwitz et al., 2015) that contributes to pinpoint the most suitable courses of action (Chen et al., 2016a, 2016b).

The challenge posed by big data can be addressed through cognitive computing technologies, designed to integrate and analyse big data sets from hundreds of sources characterized by different formats. Defined as a sub-field of artificial intelligence (AI, Van der Velde, 2010), cognitive solutions are based on advanced reasoning, predictive modelling and machine learning techniques to reproduce human thought processes on a larger scale (De Maio, Fenza, Gallo, Loia, & Parente, 2017; Kelly & Hamm, 2013). The main goal is to integrate human thinking capabilities of reasoning, learning and making inference in a complex system that harmonizes these abilities to solve extant problems or explore novel connections and propose new questions. However, human cognition has several limitations, such as scalability and bias, whereas cognitive systems are capable of handling large amounts of information from unstructured content interpreted without bias (High, 2015).

Cognitive solutions are based on circular mechanisms of learning that make the system more and more “expert” through endless rounds of data processing. Thus, they show similarities with human decisions process and, thus, entail relevant implications for management and decision-making. The main steps of this cycle (synthesized in Table 3) are observation, interpretation, evaluation and decision (Chen et al., 2016a, 2016b).

Observation refers to the integration and examination of data. Cognitive systems access to data, observe them and store the outcome of this observation in a broader and formatted knowledge database (together with other data).

Interpretation occurs through learning mechanisms similar to human natural language processing. The system enhances its learning abilities (on a specific domain) by acquiring language comprehension through dictionaries. As for the human brain, cognitive computing systems interpret all the information based on the known words, especially to infer the meaning of new terms based on contextual clues. After having collected the data, the system can recognize the input and attach some “annotators” to data that specifies their main features. In this phase, predictive analytics can generate hypotheses about relationships starting from the data visualized.

The data interpreted are not evaluated to find the most suitable solution for a problem but to reveal new relationships between data and

Table 3
The main stages of cognitive computing.
Source: Author's elaboration.

Observation	Data access, integration and exploration
Interpretation	Acquisition of rules to extract meaning from data through circular learning
Evaluation	Data synthesis to provide responses to a problem or a series of alternative courses of action
Decision	Proposal of solutions and new questions

to advance new hypotheses for further evaluation. The aim is to discover connections by synthesising extant knowledge, rather than to provide responses.

Finally, based on data aggregation and interpretation, the system finds the associations between them by encouraging researchers to formulate hypotheses starting from large datasets and to discover relationships, not considered otherwise, in a faster way (Chen et al., 2016a, 2016b).

Cognitive computing can support human and management decisions by identifying new pathways to solve problems, new questions and new variables or unexplored relationships among variables. The system does not provide a unique answer but help decision-makers to undertake actions based on data more consciously. For instance, in healthcare cognitive computing can collect information about drug effects and outcome by suggesting alternative therapies.

2.2. Data-driven decision making

The recognized need to propose smart business models able to detect how to act with data in each step of business decision-making incrementally and how to transform data into knowledge and competitive advantage leads to the proposition of *data-driven* approach in management studies (Badinelli et al., 2012; Hagerty, 2014; Simone, Barile, & Calabrese, 2018). Introduced by the program manager of IBM in Hagerty, 2014, the definition of data-driven companies refers to successful organizations that combine efficiently data research and analysis by interpreting and extracting insights and information to answer the question of “what's next?”

Data-driven decision-making (DDDM, Brynjolfsson, Hitt, & Kim, 2011) is a real ideology that conceives data as strategic resources, rather than on intuition and experience and requires the active role of leadership in fostering an innovation-oriented culture and the careful attention to data management in each step of decision-making.

In fact, literature emphasizes the need to integrate data extraction and management with the following interpretation of information thanks to creativity (Provost & Fawcett, 2013). It follows that DDDM can contribute to frame big data analysis in the entire process of decision-making (from data collection to information extraction and generation of new knowledge at the end) as described in marketing management research (Xu, Frankwick, & Ramirez, 2016).

In particular, the traditional phases of business process formalized in literature (De Bruin et al., O'Reilly, 2005; Rosemann & vom Brocke, 2015) can be reframed thanks to the adoption of a a data-centred culture that introduce the needs for companies to combine and integrate synergistically the steps of decision-making and data analysis. The aim of this incorporation is to espouse a new mind-set that intends data as the common thread for the enhancement of business process thanks to the constant enhancement of knowledge (on companies' performances, on stakeholder's behaviour and evaluation of services, etc.).

Thus, a new comprehensive and smart business model for the strategic inclusion of big data analytics into processes should be based on the constant improvement of decisions effectiveness and of data analysis quality. In line with the most common models (Amit & Zott, 2012; Stubbs & Cocklin, 2008), business processes are grounded on a series of circular steps-drivers and are composed of a structural dimension (practices, operations, infrastructure) and of a human and cultural dimension (values, norms, behaviors).

Starting from the “classic” steps of business management processes, the inclusion of DDDM in corporate information systems (structural component) should arise from marketing manager's proactive search (human component) for data that should be turned into market information and, throughout subsequent interpretation, into the most proper marketing decisions (Atuahene-Gima & Li, 2004; Atuahene-Gima & Murray, 2004).

The different models proposed in literature on DDDM can be classified to detect some common criteria that organizations can employ to lead their DDDM strategies in order to redefine their marketing management from a strategic and tactic viewpoint (the 4Ps). Data-driven strategies are based on the following key factors: 1) learning orientation; 2) technological infrastructure; 3) specialized data analysis skills (technical skills); 4) proactive process management (management skills); 5) ability to renew the knowledge (circularity of the process).

The first dimension is related to the strategic necessity of the establishment of a data-driven culture (LaValle, Lesser, Shockley, Hopkins, & Kruschwitz, 2011) in which data are a strategic asset that encourages organizational members (at each level) to make decisions based on the insights extracted and that enhances the ability to undertake good decisions (learning orientation). Then, from a technological standpoint, (Järvinen & Karjaluoto, 2015) the adoption of appropriate infrastructure to manage and extract information increases the integration and accessibility of data (Chaffey & Patron, 2012; Lytras et al., 2017). It follows that to obtain relevant knowledge from data some specific technical and managerial capabilities are required (Chen et al., 2013; Ordóñez de Pablos & Lytras, 2018) such as organizations' ability and promptness to undertake decisions (McAfee & Brynjolfsson, 2012) to foster the strategic alignment of goals (Gupta & George, 2016; LaValle et al., 2011) within the system. Lastly, a process management of multiple sources of data (O'Neal, 2012) should be implemented to optimize input data, process data and output data that intersect with the different functions of business value chain. Thus, the circularity of the process can be stressed (O'Neal, 2012): in response to the insights extracted from data, business rules can be used to assess and improve decisions to pursue sustainability over time (Lytras & Visvizi, 2018).

Over the course of time, numerous models propose the most useful decision-making steps to handle business performance through a data-process management cycle that starts with a design phase and then aspires to generate some “innovative” outcomes such as product development (Zahay, Griffin, & Fredericks, 2004) and customer relationship management (Stein, Smith, & Lancioni, 2013). Then, effectiveness of decisions is evaluated and the process restarts, by leading to a continuous cycle of collection, organization and synthesis of data in support of decision-making (Aagesen & Krogstie, 2011; Ikemoto & Marsh, 2007).

From a combination of the main features of marketing/management decision-making cycle, of big data analysis process and of cognitive computing systems, the following steps can be identified as the leading phases of big data analysis through data-driven approach. As depicted in Fig. 1, five macro-dimensions- strategy, technology adoption, technical skills, management skills and continuous improvement- can be obtained from the integration of the different stages of big data analysis (see Section 2.1 and Table 2), cognitive computing analysis (see Section 2.1.1 and Table 3) and data-driven decision-making.

First, two strategic choices can be performed: a) strategic design and the establishment of business goals; b) identification of resources (data

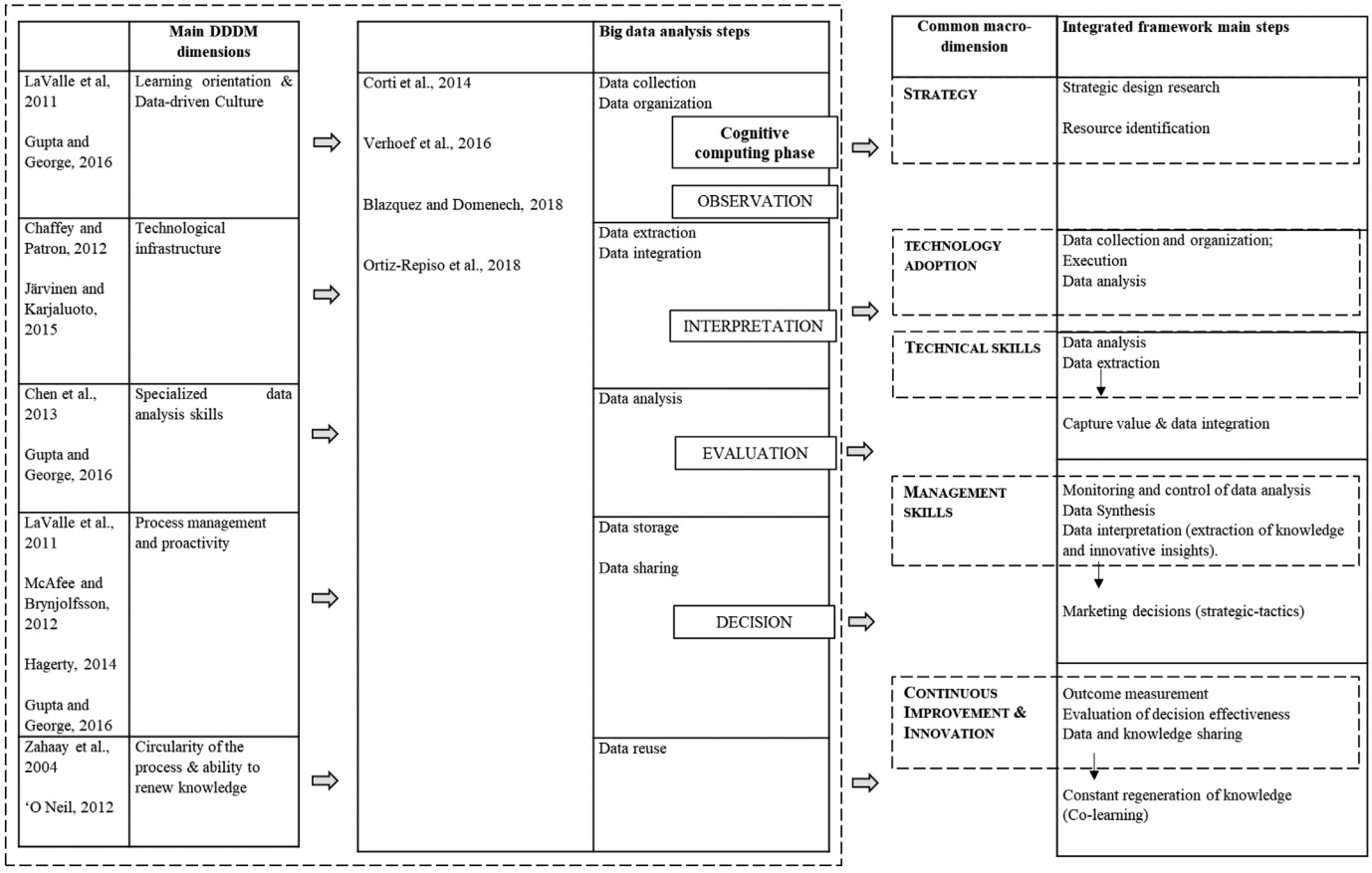

Fig. 1. The main steps of DDDM: between big data analysis and marketing decision-making.
Source: Author's elaboration.

sources and research design) to meet the goals. Then, big data analysis can start based on the following steps: 1) data collection; 2) data organization; 3) data extraction; 4) data analysis; 5) data interpretation. According to machine learning principles, data collection and organization can be translated into the phase of observation, whereas data extraction and integration requires the ability to interpret data based on the rules and the knowledge acquired. Data analysis can result into the real evaluation of alternative courses of actions that are expressed in terms of hypotheses or solutions in the phase of decision.

All the steps can be managed thanks to adequate infrastructures and the adoption of big data analytics based on machine learning, natural language processing, API, web scraping, sensors, etc. Analysts should explore data by "capturing" values and integrating them with the other data from the different business functions. The process is supervised by management that should support technicians in the phase of data interpretation (extraction of knowledge and innovative insights from information synthesis). Based on the results of the analysis, implementation of decisions related to marketing strategies and tactics can be accomplished. After the attainment of given outcome, the sharing of results and the constant diffusion and reallocation of the new knowledge obtained within the entire organization can improve the possibility to develop double-loop learning and, thus, innovation (Baccarani & Golinelli, 2014).

In line with the aim to integrate the traditional steps of business models with the main data analysis steps (structural) and the key dimensions of decision-making (cultural and human), organizational processes can be redefined to introduce a "big-data oriented" and smart business model, as depicted in Fig. 2.

Therefore, based on the review conducted above, through a synthesis of key features of decision-making and big data analysis, some strategic levels of a smart business models can be identified: 1) strategy; 2) technology; 3) technical, managerial and methodological skills; 4) continuous improvement. Companies can establish strategic objectives that aim at integrating (*strategic sensing and design*) big data (*technology adoption*) into decisions cycle. Thus, the constant alignment between strategy, use of big data and decisions can be ensured (Rosemann & vom Brocke, 2015). The optimization of the fit between strategy and tactics can be pursued thanks to the creation of a culture (*process management*) which activates the exchange of successful resources (*integrating*) between consonant actors with complementary (technical and managerial) skills and competences. These skills, if properly and dynamically combined (*harmonizing*) can give birth to the potential development of new services or to the enhancement of "old" ones (continuous improvement and innovation). The entire process is represented graphically as a circle, because the new knowledge produced, the data collected and the data-driven culture acquired can be enriched over time thanks to subsequent exchanges based on a proactive culture that aims at pursuing innovation.

Despite the proposition of numerous models that reframe marketing decision-making thanks to data-driven approach, little research applies data techniques to enhance decision-making in B2B marketing.

Unlike B2C sector, digitalization should be applied carefully to industrial marketing and business-to-business markets in which the transformation of big data into threats can be more heightened for two reasons. Firstly, relationships between buyer and seller is mainly one-directional (Järvinen & Karjaluoto, 2015). Secondly, virtualization of markets removes the physical and geographical constraints of traditional supplying and procurement processes (Wiersema, 2013). The softening of organizational boundaries can be a damage for B2B organizations by increasing hypercompetition and fragmenting relationships with customers.

Due to the lack in B2B marketing research and based on the review

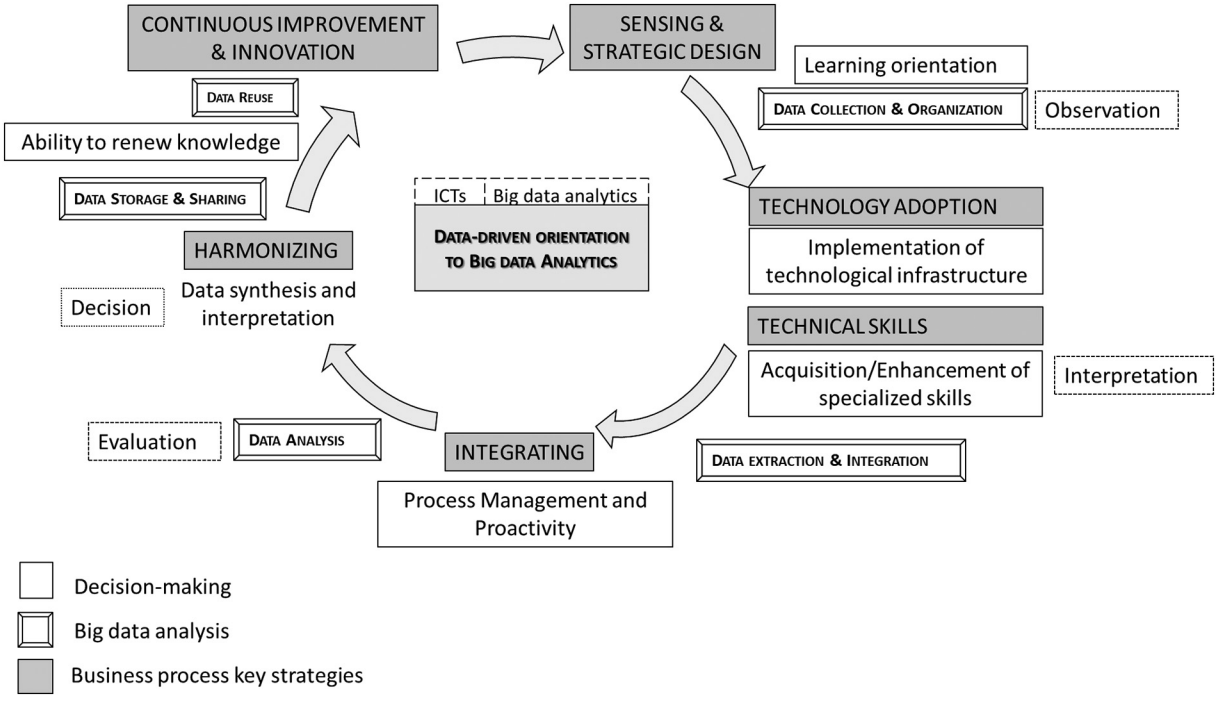

Fig. 2. Smart business model: the integration of decision-making and big data cycle.
Source: Author's elaboration.

conducted above on the potential impact of data-driven approach in reframing the complex process of research, extraction and interpretation of data, the following hypothesis can be formulated:

H_1. *The use of big data analytics and cognitive computing can improve marketing decisions by reframing the entire cycle of marketing-decision making in B2B sector.*

2.3. Growth hacking

In a social context characterized by fast technological development and overwhelming digital revolution, the focus is always more on alternative marketing techniques rather than strategies based on traditional media, as radio, newspaper and television. Along these lines, the development of innovative decisions techniques leads to new approaches for marketing, such as the "Growth Hacking" (also known as *Hacking Growth* – Herttua, Jakob, Nave, Gupta, & Zylka, 2016), a new process able to identify the most efficient ways to grow a business, combining thinking and technology "out of the box" (MLT Creative, 2016). This term is used for the first time by Ellis (2010), entrepreneur and start-up advisor, who defines it as "a process of rapid experimentation across the funnel to learn the most effective way to scale sustainable customer adoption". Later, Chen (2012) introduce the term to a wider audience in a blog post titled "Growth Hacker is the new VP Marketing", in which he discusses the concept and offers some examples about it. Since then, this innovative marketing approach has been debated increasingly, as during the "Growth Hackers Conference", held every year (Griggs, 2013) all over the world. In 2015, Sean Ellis and Everette Taylor create "GrowthHackers", the largest website community dedicated to Growth Hacking.

According to the prevailing thought traceable in literature, the growth hacker, in particular, is "a person whose true north is growth. Everything they do is scrutinized by its potential impact on scalable growth", able to connect marketing skills and high-level IT abilities, with the aim to increase organization's reach, brand recognition or revenues (Ellis, 2010; Holiday, 2014). "Growth" is connected to the goal of making their primary metrics go up, by growing from zero to millions (or hundreds of millions) of users in a few years. On the other hand, "Hacker" means programmer, able to encourage a company's product to experience viral growth, in any case, also alluding to someone who thinks outside the box, disregards the rules, and discovers new ways to solve problems. In this way, a growth hacker needs to be as creative as analytical (Biyani, 2013; Casanova & Casanova, 2013). Therefore, depending on the particular company, the growth hacker, through different expertise (e.g. software development, business analytics, web design, etc.) uses, as depicted in Fig. 3, analytical thinking, software engineering and creativity to increase significantly their company's core metrics.

In Growth Hacking the most used marketing framework is the "funnel" of the pirates, able to describe in the best way the customer's life cycle. The funnel metaphor describes new users flow through a five stages funnel: acquisition, activation, retention, revenue, and referral. Rapidly optimizing this process is a core goal of Growth Hacking, since making each stage of the funnel more efficient will increase the number of users in the most advantageous stages (Arnaux, 2016). Thus, compared to the traditional marketing approaches, more focused on creating awareness through conventional media, Growth Hacking techniques, as reported in Table 4, consist of data-driven processes conducted through low-cost channels in order to increase quickly the measurable metrics (Sukhraj, 2017).

Jahandarpour (2016), well-known influencer and start-up coach, outlines a set of Growth Hacking techniques. The first phase regards attracting potential customers through blogging, leveraging on forum marketing techniques. Therefore, the goal is to engage the visitors and convert them to leads (e.g. mail marketing approach that offers exclusive tips, promotion codes, etc.). Then, it is fundamental to acquire customers and maintain them (for instance, through the A/B testing). Other tactics, used by growth hackers, regard the viral acquisition, which, leveraging built-in product features, encourages existing users to share the product with new users and the content marketing (Fishbein, 2014) which, instead, leveraging blog posts, infographics, and viral videos, increases brand awareness and site traffic (Biyani, 2013).

Growth Hacking uses various types of marketing strategies and product iterations to test rapidly persuasive copy, in order to increase

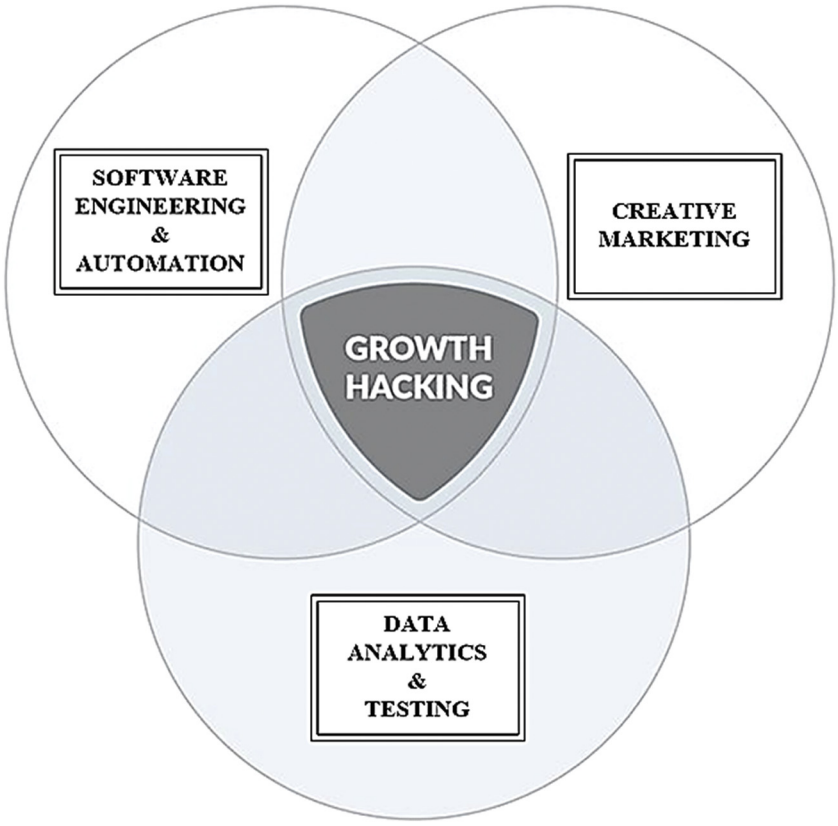

Fig. 3. Growth Hacking pillars.
Source: Adapted from Gaito (2017).

conversion rates and achieve rapidly growth of the user base.

Considering the level of adoption, Growth Hacking is prevalent with start-ups businesses, referring to the need of a rapid growth in the early-stages of launching of a new product or service to market. For start-ups, in fact, getting the attention of the media can be as important as getting funding (Pelt, 2016).

In addition, B2B transaction could and should take advantage from it. Indeed, the 68% of B2B organizations have not identified their funnel yet and might benefit of Growth Hacking to streamline the entire process through a funnel that centres on a great customer experience (Den Holder, 2016).

Hence, as discussed above, Growth Hacking seems to represent a great opportunity for companies, since it combines and takes advantage of technological innovations and creative mind-set. In the light of the possibilities offered from this model, big data analytics, cognitive computing and Growth Hacking can go together, although not many authors deal with these aspects jointly. One might even think that, to make the best use of big data analytics and cognitive computing, nowadays companies should follow an approach oriented to the logic of Growth Hacking.

In this regard, based on the above considerations, this work aims to verify the following hypothesis:

H_2. *The use of big data analytics and cognitive computing for marketing decisions implies that companies enable the Growth Hacking mindset/approach.*

Table 4
A comparison between traditional marketing and Growth Hacking.
Source: Adapted from Sukhraj, 2017.

	Traditional marketing	Growth hacking
People	– Economic or creative background – Traditional approach to find growth solutions – Decisions based on hierarchy – Rarely overview or overall vision on business	– T-shaped knowledge based on few dominant skills and general knowledge – Ingenious approach in findings growth solutions – Strong overview on product and business – Data-driven decisions and analytical approach
Approach	– Focus on acquisition and activation throughout the whole product lifecycle – Focus on brand awareness and sales approach	– Focus on different metrics based on the stage and validation level of the product – Focus on increasing activation, referral, and acquisition
Channels	– Paid advertising through traditional communication channels (e.g. publications newspapers, magazines, journals, radio and television, billboards, telephones, postal service, face to face)	– Free or low cost alternatives rely on technology-based *solution* or strategies in which the product itself works as distribution channel
Process	– The *funnels* are not clear, because the focus is mainly on brand awareness and reputation	– The *funnels* are clearly defined, specifying actionable goals, prioritize hypotheses, analytics, and experiments

3. Research design

3.1. The approach

The work follows a "multimethodology approach", also known as multimethod research, introduced by Brewer and Hunter (1989). This choice derives from the awareness that when certain conditions of interpretative complexity occur, for instance linked to a specific research context, the use of an approach based on several methods allows obtaining results characterized by a greater degree of generalizability. In this regard, Creswell and Clark (2017) state that every scientific research approach, theoretical and experimental, can be improved in terms of greater reliability of findings (Mason, 2017; Padgett, 2016). In this way, it is possible to operate some comparisons, both synchronic (among the results obtained through surveys carried out at the same time in several contexts or with multiple units of analysis) and diachronic (among the results obtained through surveys carried out in the same context and with the same units of analysis but at different times). For these reasons, the multimethod research is used frequently in the studies that pursue several goals, although it is very often confused with the "mixed method", since both of them imply the use of different methodologies. However, the mixed method represents only a particular type of multimethodology, characterized by the combined use of qualitative and quantitative methodologies.

Fig. 4 graphically summarizes the approach, methodologies and techniques used for research.

3.2. The methods

The work has been carried out by integrating two methodologies, the Multiple Case Study and Action Research, in order to facilitate the understanding of the phenomenon investigated and then make improvements through a series of interventions (Brink, 2017).

3.2.1. Multiple case study

The Multiple Case Study is a research method frequently employed in social sciences to analyse complex situations and phenomena. The main advantage offered by the use of the Multiple Case Study instead of the single case study is the possibility for the researcher to understand any differences and similarities between the cases considered (Baxter & Jack, 2008). Furthermore, by collecting and analysing data both within each case and in multiple cases (Yin, 2003), the researcher has the opportunity to minimize the risk that the results obtained from the analysis of a single case are affected by factors not controllable (e. g. coincidences, randomness, etc.). Its diffusion is due to Robert Stake (1995), who highlight the numerous advantages deriving from the use of this method. Over the years, many authors used the Multiple Case Study for their research (Aaboen, Dubois, & Lind, 2012; Goduscheit, 2014; Santos & Eisenhardt, 2004; Stake, 2013; Wouters, 2004) and, to date, in literature it is possible to trace a large number of scientific contributions that recommend its use (Blijleven, Gong, Mehrsai, & Koelemeijer, 2018; Lashgari, Sutton-Brady, Solberg Søilen, & Ulfvengren, 2018; Su, Wu, & Zhou, 2018). As with other research methodologies, each author has his/her own idea of how the Multiple Case Study should be structured, according to the research objectives, the analysis context, the historical period, and so on. In any case, regardless of its structure, the consideration of the Multiple Case Study implies the need to treat each case separately, i.e. as an individual case, in order to guarantee the reliability of the research, the replication of the analysis and the comparability of the results (Baxter & Jack, 2008). Theories, ideas, hypotheses, assumptions, statements, propositions, principles and postulates deriving from the study of other cases constitute the reference framework for research. The aim achievable by means of the Multiple Case Study is the investigation of a phenomenon through the separate analysis of individual sub-units (the cases), maintaining for each of them the same set of basic assumptions, although the progress of the analysis could lead to further considerations, enriching the theoretical and experiential baggage.

3.2.2. Action research

Coined by Lewin (1946), the meaning of the expression "Action Research" has evolved over time, although it is possible to trace some elements that distinguish it and differentiate it from other qualitative research methodologies. In particular, the Action Research presupposes the creation of a collaborative climate, from the definition of the problem to the implementation of the interventions. Furthermore, the Action Research is based on the idea that every research should aim not only to expand knowledge but also to provide a concrete solution for the problems emerged during the analysis. According to some scholars (Coghlan & Brannick, 2014; Kemmis, McTaggart, & Nixon, 2014), in the Action Research there is a circularity between theory and practice, since it allows to observe, verify, intervene, modify and enrich many aspects of the investigated phenomena, often proposing useful solutions to improve the starting conditions.

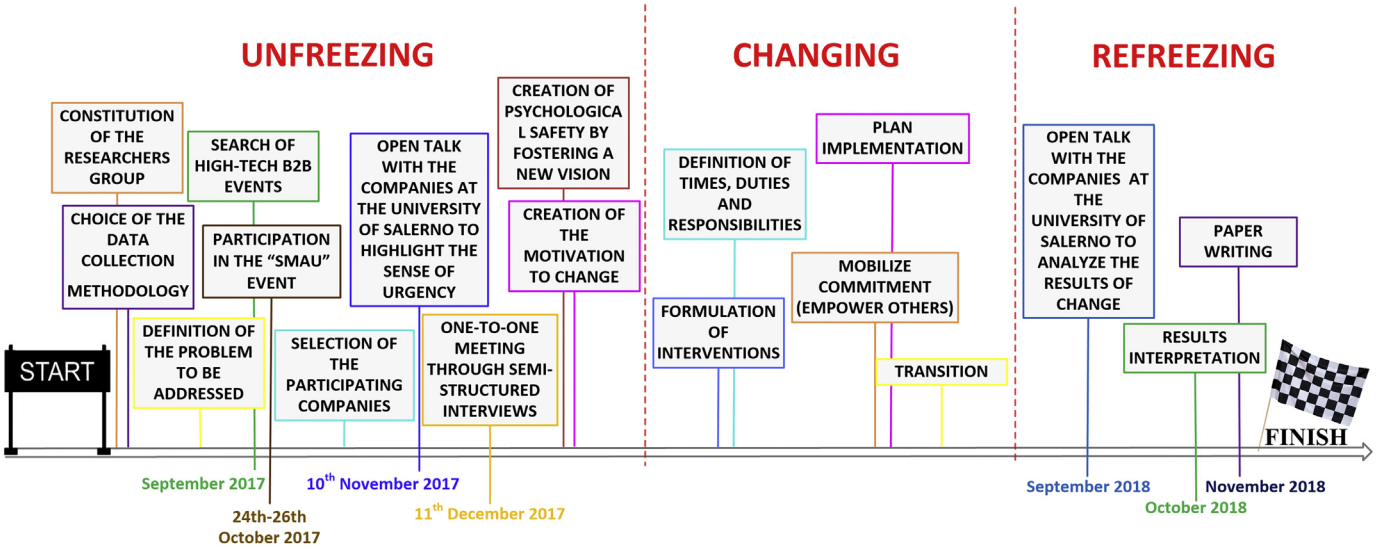

Fig. 4. Approach, methodologies and techniques of the empirical research.
Source: Authors' elaboration.

Table 5
Variants of action research.

Author(s)	Phase		
	Unfreezing	Changing	Refreezing
Lewin (1946)	– Choice of data collection methodology; – Problem definition; – Group formation.	– Training of group members; – Formulation of intervention hypotheses; – Definition of times, duties and responsibilities; – Plan implementation.	– Maintenance of the state reached over time.
Lippitt (1958)	– Develop need for change; – Establish change relationships.	– Work toward change.	– Stabilize change; – Achieve terminal relations.
Schein and Bennis (1965)	– Lack of confirmation/disconfirmation; – Induction of guilt –anxiety; – Creation of psychological safety.	– Scanning interpersonal environment; – Identifying with a model.	– Integrate new into personality; – Integrate new into relationships.
Kolb and Frohman (1970)	– Assess need for change: Scout for change agent/consultant; – Diagnosis.	– Develop plan Action.	– Evaluate Terminate.
Devanna and Tichy (1990)	– Recognize need for revitalization; – Create new vision.	– Mobilize commitment; – Transition.	– Institutionalizing change.
Kotter (1995)	– Sense of urgency; – Form guiding coalition; – Create vision.	– Communicate vision; – Empower others; – Plan short term wins.	– Consolidate; – Institutionalize the new.
Schein (2010)	– Creation the motivation to change.	– Learning new concepts.	– Instituzionalizing new concepts.

Source: Adapted from Cummings et al., 2016.

The model proposed by Lewin is based on three main consecutive phases: a) *unfreezing*, b) *changing*; c) *refreezing*. *Unfreezing* is the re-crystallization aimed at "unblocking" habits to highlight their non-effectiveness in relation to the problem. *Changing* is intended as the process of experimentation of new solutions to the problems previously identified. Lastly, *refreezing* consists in the crystallization of the underlying logic of the change occurred in order to guarantee the fruition of the benefits over time. Over the years, many authors provided his/her own interpretation of the three phases that constitute the Action Research by revising the original model. However, none of them diverges particularly from the Lewin's idea. To synthesize the key insights offered by the different reinterpretations, a systematization of the main variants of the original model is proposed in Table 5:

3.3. Sampling and data collection

To test the hypotheses formulated previously and respond to the RQs defined above, the first step performed has been the selection of the research context, i.e. the space-time perimeter within which to collect the data to be analysed. Consistent with the objectives of the work, the focus has been placed initially on the identification and selection of the other actors to be involved, in addition to the article's authors. To this end, at the beginning of September 2017, the authors gather information about the subsequent events dedicated to the high-tech companies operating in the B2B context. The "SMAU" (https://www.smau.it/company/pages/home/),one of the most important international events, focused on topics such as digital culture, development, innovation, and technology, has been chosen. For over 50 years, SMAU has been involving more than 80,000 established companies, startups, spin-offs, research and technology transfer centers, even providing participants with an innovation laboratory and a marketplace where they can discover, meet and gain new ideas, projects and strategic partners. Its great importance leads the authors to choose it as an event during which the companies participating in the research could have been selected. Moreover, the fact that it would be held in Italy has been considered as a relevant advantage for the whole data collection phase, also by virtue of possible subsequent meetings with companies willing to take part in the research. During the event, which took place from 24 to 26 October 2017, the authors asked the representatives (mostly owners, shareholders, and managers) of some companies for their willingness to take part in the research project. After the identification of the potential participants (the different stakeholders engaged in SMAU activities), the selection of the final panel of respondents has been determined on the availability of companies to participate. Then, to each of them the objective of the work has been explained, the phases of the research-action have been represented and all the possible benefits that could emerge over time have been highlighted. Out of the 21 companies contacted, three have agreed to take part in the project. The remaining part denied its availability asserting that it was not interested or that being able to obtain the necessary authorizations would have been too complex.

Table 6 summarizes the general information of the companies involved in the research.

To get useful information on the ways of using big data analytics

Table 6
Anonymous sample's features.
Source: Author's elaboration.

	Sector	Market	Segment	Venue	Number of employees	Revenue 2017 (in millions €)
1	Primary sector (activities dealing with natural resources such as agriculture and breeding)	Agrifood	High-Tech B2B B2C	Italy	7600	1208
2	Secondary sector (industrial activities)	Building industry	High-Tech B2B	Italy	600	182
3	Tertiary sector (services)	Transport	High-Tech B2B B2C	Italy	15,000	111

and cognitive computing for marketing decisions (RQ1) and to identify the marketing approach that best suits their use, the representatives of the 3 participating companies have been invited to take part in a cognitive group meeting at the University of Salerno. The entire meeting, held on 10 November 2017, has been audio-recorded with the consent of the persons involved. As concerns the kind of interactions with the companies, at first, the researchers have re-explained the rules of engagement (anonymity, objective of the work, phases of the Research-Action, benefits, etc.), in order to put the participants at ease and favor their socialization. Subsequently, through the open interview technique, the topics of big data analytics and cognitive computing have been introduced to assess the degree of knowledge of each participant and make sure to use a common language to avoid interpretative distortions. The open interviews have been prepared by focusing on two main aspects: how the companies intend big data; and what kind of short, medium or long terms goals have been pursued with big data.

The second meeting with the companies, which lasted 4 h (including two breaks of 15 min each), has allowed researchers to identify the key elements of the phenomenon investigated, permitting to formulate the two research hypothesis described above. On 11 December 2017, a third meeting has been held with the companies. Unlike the previous one, in this circumstance, semi-structured interviews have been administered individually to the representatives of each company to avoid that their answers could influence the opinions of the other participants or generate ambiguities, inconsistencies and conflicts. Similarly to the previous step, the semi-structured interviews have been prepared by considering two main priorities: 1) to identify the needs that had pushed the companies to analyse and use big data; 2) to understand the strategies defined and applied to provide efficacy and efficient answers to those necessities. However, the use of this technique of data collection (rather than open interviews) is justified by the consideration that, although there is a fixed trace, the development of the interview may vary according to the interviewees' answers. In fact, administering semi-structured interviews, the interviewer cannot address issues extraneous to the track but, unlike what happens with structured interviews, he/she can develop some topics that spontaneously arise and that could be useful for understanding the phenomenon investigated.

The three interviews have lasted differently: 60, 75 and 85 min. Both the questions and the answers have been recorded and transcribed verbatim. After 9 months, in September 2018, the fourth and last group meeting with the companies has been held. The long time span between the third and fourth meetings is not random: the researchers let the companies implement the improvement changes declared in the previous meeting and become aware of the effects. Even the last meeting has been audio recorded and the researchers have transcribed its content slavishly.

Overall, the phases of conception, collection and analysis of data have lasted about a year and two months (from September 2017 to November 2018).

4. Results

The main findings of the study are discussed in two different sections for each company according to the main phases of the action research. The first one concerns the results deriving from the *unfreezing* phase (semi-structured interviews in 2017), in which a given problem that management aims at addressing in the future is identified. The second phase reports the findings from the last meeting (September 2018) related to *changing* and *refreezing* phases, in which researchers have assessed the changes adopted in the companies thanks to the use of new big data solutions.

4.1. Case study 1: agrifood company

4.1.1. Unfreezing

The first group meeting and semi-structured interviews administered to managers of the firm 1 reveal the need to automatize business processes to connect suppliers with buyers. The company, usually engaged only in the supplying of food to mass retailers, butcher shops and food shops, two months before the SMAU launches new point of sales (vertical integration) in order to deliver their products directly to customers. As reported by the owner: "*despite being one of the main leaders in agrifood sector, we felt the necessity of enhancing our competitiveness to compete with mass market retail. Thus, we opened ten stores in different Italian regions to have our own point of sales capable of enhancing relationships with buyers and of encouraging loyalty*". Therefore, the main objectives of the project were: 1) to increase control power on the distribution; 2) to strengthen brand distinctiveness; 3) to foster customer's loyalty. However, some difficulties in the management of physical stores arose. In particular, the firm felt "*the urge to optimize the large amount of real time information acquired from user's interaction with front-office employees, from the ordering process to the real sales and the potential expression of opinions*". For this reason, new business objectives was settled aimed at acquiring the right infrastructure and the digital competencies to manage the infrastructure in order to control stocks, increase trades and to connect suppliers with buyers more efficiently. Moreover, the firm wanted to acquire new big data analysis and methodological skills in all the functions and departments. Data analysts should have been supported with external researchers and new employees for front office to manage information in real time.

4.1.2. Changing and refreezing: smart logistics and CRM

Over several months, a new engineering infrastructure was realized based on an e-commerce platform that allows customers to book products online that can be sold, then, at one of the points of sale. The project involves about 30 stores until now (butchers, poultry shops, delis). Each store has a control panel to manage incoming orders and update the assortment of products available on the online store. Customers choose directly from the Internet the shop in which they will buy foods and can check the products available in store and order the unavailable ones. Payments and delivery are finalized only in the point of sales that remain the main touchpoint with final customers, mediated by face-to-face interactions with front office employees. The platform is based on a series of tools that collect big data from users both in online e-commerce platforms and in stores, thanks to tablets in the point of sales in which customers should insert their personal data and the information related to their orders thanks to access to their user areas on the website of the company. To conclude the transaction, users should complete a brief questionnaire on their satisfaction toward the service. Then, thanks to API and web scraping, reviews are analysed from IT department through sentiment analysis and other statistics techniques applied to customer databases. In particular, the API (Application Programming Interface) technology is set of procedures, generally grouped by specific tools, designed to facilitate the performance of a given task by simplifying the possibility of dialogue between several applications and avoiding redundancies and unnecessary code replication). The platform has been supported with Salesforce, a cloud computing system that permits to gather real time information in the point of sales and enable the implementation of a Continuous Replenishment Planning (CRP). Based on the parameters set by the company, the software stores automatically all the purchase orders and analyses the information through dashboards and visualizations.

Thanks to the increased income realized, the firm hired new front office employees that work together with IT department. In addition, each month a meeting with researchers from University is held to interpret data and extract insights from the reviews released on the e-commerce platforms. The necessity of the acquisition of new data analysts with unique methodological competencies is emphasized by IT manager: *"The real thing that changed was not the role of research, which is central in our decision-making, but is the total change of perspective, both methodological approach and the 'attitude' within the entire organization [..] to interpret Big data, sure, that are a double-edged sword, but also to*

understand how to catch and then interpret small data and detect weak signals". Furthermore, as reported by the brand manager, the firm develops some strategies "*to turn data into information that should be transformed into real stories…To talk with customers' heart means to make satisfied users feel like happy people, by going beyond algorithms to adopt open-mindedness culture based on sharing and communicating of business strategic goals. Information need to tell stories, to talk to peoples' mind, of course, and with people heart, too. Stories are useful to motivate employees, managers to pursue more challenging issues challenges and to engage users and customers"*. In so doing, according to sales manager, *"the company is able to predict in advance users' orders and we prepare additional limited products for the event in their commercial activities for Christmas or Easter and so on. Then we share their personalized products and photos or videos of their events in store on our social network pages*". The possibility to collect big data and to analyses them by creating customers profiles and "histories" strengthens buyer's loyalty. Thus, even if interactions are ICTs-mediated and enabled by technologies personal relationships based on "*trust between buyer and seller still remain a key driver to retain customers"*. IT manager declares: "*our digital marketing strategies stems from a new cultural dimension within the company that enabled 360 degrees development. We boosted the distinctive assets of the company through the reduction of impact on the organizational processes, but using digital as a lever to reduce times, costs and efforts*".

Table 7 schematizes the main results reached by the company 1 related to the three dimensions of Growth Hacking.

4.2. Case study 2: building company

4.2.1. Unfreezing

The second company operates in the building sector and purses the goal to broaden its activities. To this aim, in 2015 the company created a data center in a new building but soon some challenges related to data management arose. As reported by general manager, the company had "*problems with the maintenance of the server, with people that managed the unexpected events such as lowering of power. Thus, we want to ask for management to another data centre with high availability to manage this situation"*.

Thus, during the first group meetings in 2017 a new project advanced from the company was in the phase of design. The aim was to develop a Smart cloud system to adopt a "*global data management model that unifies the flow of commercial, logistic and marketing functions through a centralized solution that combines all the data gathered"*. In this way, the organization shares knowledge throughout the organization (internal data) and integrates it with the new skills and competencies arisen during the process (from the inside and outside and vice versa).

4.2.2. Changing and refreezing: cloud data center between B2B and B2C markets

In 2018, the firm realizes its own data center by externalizing the function of data collection and analysis to a technology service provider (Colt) that offers an infrastructure based on ASP-SaaS that provides businesses with the service of hosting and managing specialized business applications. By outsourcing the management of a data center to an IT partner, the firm decreases costs by demanding the administration of the platform and enhancing the possibility to collect data more efficiently thanks to the work of specialists.

As IT manager declares, "the company *is continuously connected with data center that manages directly the private cloud through some appliance such as Firewall or Access Point*". The two data servers (of the firm and of cloud external system) communicate h24 without stopping the server.

The Cloud system is based on an engineering infrastructure (sedApta solution) that allows managing business processes in an innovative way by employing different analytics targeted at satisfying the diverse aims for the various stakeholders: 1) management; 2) suppliers; 3) customers.

Big data analytics offered by SedApta to collect data from suppliers permit to obtain a detailed monitoring of products lines and variety and traceability of loads through automatized scheduling and optimization of the plans of stock, of purchases of raw materials and packaging.

Finally, some first steps to realize an integrated set of tools of analytics for customers are implemented through the propositions of sensors and global positioning systems to explore the use of houses, the way to "inhabit" of people. Moreover, the technology of Smart Metering allows collecting data from users' utilization of water and energy through LoRaWAN technology that creates "consumption history" for each user in the houses in order to encourage the inhabitants of to waste reduction. The adoption of this last set of analytics (oriented to final customer) is an unexpected innovative outcome derived from the

Table 7
Findings from case study 1: impact on the three dimensions of Growth Hacking.
Source: Authors' elaboration.

Growth Hacking dimension	Main goals pursued	Objectives realized	Unexpected features
	Time T_1 (Unfreezing) December 2017	Time T_2 (Changing & refreezing) September 2018	
Software engineering & infrastructure	Optimization of the large amount of real time information acquired on users	*E*-commerce internal platform (ordering, e-booking, Tablets in store) Saleforce cloud computing system API & Web crawlers to extract customer's feedback	Association of an internal platform with the external cloud system
Data analysis management & skills	Enhancement in the management of: 1) physical stores; 2) data related to service and product delivery (ordering process, sales and users' opinions)	Increase in the number of front-office employees Meeting with researchers from Universities	Synergy between front-office employees & IT department "Total" research approach
Marketing decision-making	1) To increase control power on the distribution; 2) To strengthen brand distinctiveness; 3) To foster customer's loyalty.	- Reduction of risks for storage and reduction of prices - Increased sales and - Reduction in costs for stock (CRP Continuous Replenishment Planning) - Increased effectiveness in efficient response to customers - Reduction in time for decision-making - Enhanced brand awareness and distinctiveness - New integrated strategies and tactics for B2B loyalty (combination of virtual, physical tools and ICTs and front-office)	Multiple benefits in the enhancement of CRP, CRM, e-CRM strategies Personal relationships are still a key driver in firm's B2B marketing strategies ICTs and big data analytics as enablers of "traditional" personal relationships with buyers

building of the cloud system. While speaking about the whole research design of the project, IT manager revealed: "*The task that they assigned to me was to reposition the company toward the target of designers and suppliers and to reach final customers. The project has some elements that I did not understand immediately. The first thing that crosses my mind was to assume a new vision of research to develop an informative asset according to a strategic vision. I thought that the idea of the creation of an ongoing observatory to understand which are human needs, expectations and concerns in their houses*".

Regarding organizational skills in the management of big data a, the company pursues strategies of externalization and acquisition of expertise from specialized companies. The outsourcing is chosen to reduce costs for management and for the acquisition of hardware and software and to prevent any waste of time in the release of products and in the coordination with other business departments. As confirmed by general manager: "*in IT department we have 28 persons and we want that the staff works together with the entire business, if they should manage and control server or infrastructure it would be a waste of time, because we need them for business…we are not a IT company*". Hence, the company externalizes the use and management of the platform to enhance business process and to exploit skills that are more specialized.

Lastly, the creation of an e-marketplace based on cloud system allows the company to pursue relevant marketing objectives with implications on decision-making. As confirmed by the general manager of the company, "*happy staff means happy customers, thanks to the possibility to habit smart house, and happy suppliers, thanks to the reduction in costs for selling and delivery".* Thus, the global organizational well-being increases since the company and the employees should not deal anymore with meaningless amount of data on users that should be interpreted. In this way, the ambiguity of organizational tasks and the potential overlapping of goals are lowered and the company can focus on management.

Table 8 synthesizes the findings of case study 2 by classifying the main objectives and implications obtained from the project according to the dimensions of Growth Hacking.

4.3. Case study 3: transportation company

4.3.1. Unfreezing

During the first meeting group and the semi-structured interview carried out in 2017, the management of the third firm operating in private transportation of both materials (goods trains) and passengers (buses and trains) - reported a huge problem: the lack of coordination of the needs of multiple stakeholders involved in the mobility ecosystem. In fact, as the general manager declared: "*we are a private company, of course, but we should take into account inevitably the demands from local institutions, public administrations, other transports private and public companies. For this reason, we launched a project for the development of a platform that acts as a 'center of operations' to coordinate our management with the rules and the decisions undertaken by local authorities, other private and public companies, associations and so on*". Moreover, a survey on users (suppliers and passengers) revealed "*one big result: the main motivation of inefficiencies in our service, and in mobility in our country, is the lack of communication in case of delay and incidents [..] This occurs in the relationship with suppliers of materials for goods transports and in the low coordination with public administration and collateral facilities that do not provide users with information in real time on mobility, traffic and on unexpected events*".

Hence, in 2016 the firm realized a platform to manage information fluxes and to propose a communicating architecture based on new technologies and on a smart mobility cloud system. The main goals pursued through the proposition of a cloud smart mobility system was to reduce time, inefficiencies, and wastes and to promote all the collateral economic and cultural activities. The final aim is to foster the economic and social development of community as a whole, "*to promote smart mobility, to keep passengers updated on schedules, timetables and delays in real time and to encourage smart citizenship, too."*

4.3.2. Changing and refreezing: smart cities & co-development of innovation projects

After one year, during the fourth meeting in 2018, researchers

Table 8
Findings from case study 2: impact on the three dimensions of Growth Hacking.

Growth Hacking dimension	Main goals pursued	Objectives realized	Unexpected features
	Time T_1 (Unfreezing) December 2017	Time T_2 (Changing and refreezing) September 2018	
Software engineering & infrastructure	To address problems in the maintenance of server in the internal Datacentre	Creation of a smart data cloud system to manage information in all the departments Outsourcing of cloud service (ASP-SaaS) provided by external technology service provider (Colt)	Creation of an e-marketplace that connect: - (organizational level) business departments with each other - (supply chain): suppliers with designers, intermediaries and final customers
Data analysis management & skills	To solve problems in data optimization and in the overlapping of multiple tasks To acquire new competencies in data management and integration	Tools for management: cloud system that manages and stores data related to: - stock levels - productivity peaks, - planning of volumes and loads Tool for suppliers: SedApta (smart management of stocks for scheduling and traceability) Tools to gather data from final customers: - Gps & sensors to explore the use of houses, the way to "inhabit" - Smart Metering: LoRaWAN technology to obtain archive and products history	Synergistic collection and interpretation of data on multiple stakeholders in the supply chain
Marketing decision-making	To reach and communicate more efficiently with intermediaries and final markets To strengthen the ineffectiveness in decision-making To avoid reputational risk	- Enhancement of connectivity between headquarters and decision-making groups - Increased products/service quality - Strengthening of job motivation & buyer's satisfaction	Broadening of markets through big data: from B2B to B2C Outsourcing of cloud systems (low costs and low risks)

Source: Authors' elaboration.

reveal that another platform was combined with the smart mobility cloud developed in 2017. The aim was to optimize information management and solve potential efficiencies inside and outside the organization through intelligent solutions such as Atlassian, JIRA and Confluence, which permit to create an internal digital team to support two relevant business dimensions: decision-making and the development of innovation projects. This integrated system enables decision-making thanks to machine learning and cognitive computing based on decision support systems (DSS), which allows *"machines to communicate with operators in natural language. Finally, the solution leverages on mixed reality: machine tools can inform operators by showing telemetry data via holograms*", as reported by IT manager. In particular, *security supervision system,* a platform of simulation and decision support, collects and correlates heterogeneous data flows coming from various devices to create a unique and integrated view of the monitored areas potentially affected by all the problems related to urban resilience (climate change, security in public events, mobility of large flows of people).

Furthermore, the co-design with users released a series of solutions that promotes service innovation and improvement in existing service. Users' evaluations and reviews are collected through official web pages and social networks pages (Facebook and Instagram). For instance, based on user's suggestions, Wi-Fi networks at buses stops and in the station have been installed through a unified network that involves public Wi-Fi from municipalities to prevent the frequent problems in signal droppings. In addition, the firm launched "I-move" mobility solution, an integrated set of sensors positioned in the asphalt of streets to keep users and drivers updated on the status of vehicles at the bus stops. Users are provided with information on the available parking, the number of passengers that are waiting at the stops and the status of buses and trains with availability of seats. Moreover, they can buy tickets through QR codes on their smartphones. Even improvement in interior and exterior design of buses and trains and additional services (music, free books and movies) have been accomplished thanks to user's feedback collected from the results of a contest named "design your own bus/train". In this regard, the general manager of the firm states that *"increasing users' participation seemed to be an expense in the short time but in the long run involvement can turn into to a source of competitiveness: by engaging users, we create more satisfied citizens and we prevent any future problems in services failures and complaints*".

Concerning the enrichment of data analytics skills in the whole organization, the proposition of a new hybrid solution provides employees with new competencies in data analytics management. In fact, the firm broadened its structure to include an IT department and internalized big data analysis function. These inner skills are supported with the knowledge acquired thanks to the information offered by the external platform by renewing constantly the internal knowledge of the firm: in this way, co-learning mechanisms are encouraged and continuous improvement is promoted.

Definitively, as Table 9 shows, the use of big data and cognitive computing contributes to create a smart mobility system that can give birth to multiple advantages.

5. Discussion

The empirical study based on action research allows at exploring how the B2B marketing strategies of three companies operating in different sectors can take advantage from the data-oriented mind-set described in Section 2 to generate benefits throughout the entire supply chain and in the relationships with customers. These smart B2B businesses are grounded on open business models that- thanks to a centralized and distributed technological infrastructure- can increase communication flows (within the organization and outside the network), reduce time for supplying and logistics and enhancing stakeholders' loyalty.

As Fig. 5 shows, findings confirm the existence of a strategic data-driven approach to big data analysis in the three firms analysed based mainly on the main steps of the integrated marketing decision-making cycle for data analysis and management hypothesized in Section 2.2 (see Fig. 1). In line with the conceptual model proposed in the theoretical section, the main decision steps of the three firms are strategy, technology adoption, management and technical skills and continuous improvement. Then, the cycle starts from the common adoption of a data-oriented mind-set (*strategy*) that leads to the implementation of an integrated architecture based on a combined set of analytics (*technology adoption*), managed thanks to specialized competencies (*management and technical skills*) in order to realize marketing aims and to pursue co-innovation over time (*continuous improvement and innovation*).

In detail, the need for the strategic adoption of a data-oriented culture (step 1: *strategy*) is emphasized by the brand manager of agri-food company (Case study 1). As reported, there are many positive effects deriving from a total research approach based on the sharing of business strategic goals and on the acquisition of a set of analytics in line with the research objectives and business philosophy. Moreover, the three firms employ an integrated set of analytics (internal and external platforms) to collect and interpret data gathered from multiple stakeholders in the supply chain (step 2: *technology adoption*). To explore these data, the recruitment of big data analysts (internal or external to the firm) can enhance the synergy in data management and interpretation across the different departments of the company (front-office employees & IT department), as revealed from the analysis of case study 1 and 2 (step 3: *management and technical skills*). The creation of new knowledge (new management and research skills, new experience for users and new information on customers) can lead to the constant renewal of value and to the improvement of service that can foster the emergence of innovation over time. This innovation outcome is co-created among all the stakeholders involved: therefore, as reported by the general manager of case study 3, the engagement of users, employee and management through data-driven and knowledge-based mind-set can contribute to generate "co-innovation" over time (step 4: *continuous improvement and innovation*).

In this way, the three sections of Growth Hacking model are optimized and integrated synergistically by producing shared growth deriving from the attainment of positive outcomes across three dimensions: 1) engineering and technological architecture; 2) data analytics management and analytical skills; 3) marketing strategies and tactics.

Based on the strategic goals, companies implement a technological infrastructure (the first dimension of Growth Hacking model, *engineering architecture*) composed of platforms to manage stocks (e.g. SedApta), cloud systems to plan the production and delivery phases (implementation of a Continuous Replenishment Planning) and e-commerce or ICTs-based platforms to connect with users and gather their feedbacks and evaluations (Ugolini, 1999). The platforms devoted to connect the organizations and to automatize service and products delivery are integrated with the use of big data tools and marketing analytics. These instruments range from cognitive computing systems (machine learning, decision support systems and group decision-making) to API and web crawlers to collect and store user's feedback from posts on social networks or reviews on e-commerce platform.

After the creation of a real e-marketplace, smart B2B businesses should develop analytical and technical skills to manage data and analytics (the second dimension of the model, *big data analysis*). These competencies can derive from an enhancement of internal skills (case 1), can be acquired thanks to outsourcing strategic alliances (case study 2) or can be generated both within the business and through external collaboration to produce the general improvement of expertise in the network. The statements of the managements in the sample –the interview excerpts reported in Section 4- highlight the need to espouse a creative data-orientation corporate culture based on the acquisition of a start-up attitude grounded on proactivity, continuous improvement and constant "tension" in innovation.

Lastly, from the combination of an integrated technological infrastructure and of the right competencies and management approach to

Table 9
Findings from case study 2: impact on the three dimensions of Growth Hacking.
Source: Authors' elaboration.

Growth Hacking dimension	Main goals pursued	Objectives realized	Unexpected features
	Time T_1 (Unfreezing) December 2017	Time T_2 (Changing and refreezing) September 2018	
Software engineering & infrastructure	2016- first platform External platform: Cloud smart mobility platform (outsourcing)	2018- s platform Internal platform (data center): Atlassian. JIRA e Confluence Cognitive computing systems *machine learning DSS- scenario* fuzzy logic and group-decision making I-mobility solution Service innovation suggested by users: Sensors- gps – qrcode: Augmented reality Unified Wi-Fi network in stops and in the station Official web page, social networks pages (Facebook and Instagram), form, chat *E*-booking and e-commerce platforms with reviews	Association of an internal platform with the external cloud system (smart mobility system)
Data analysis management & skills	Absence of system mind-set and proactivity in data collection and analysis Lack of promptness in the solution of emerging problems	Enhancement of internal skills data analytics management (IT department). Acquisition of know-how through knowledge sharing and integration (through *cognitive computing*, DSS, Security supervision system)	Co-learning mechanisms and continuous improvement attitude Open innovation model & co-innovation through distributed decision-making
Marketing decision-making	Reduction of delay in services Improvement of effectiveness in decision-making with other private and public companies of transports and other sectors on the territory Harmonization of multiple stakeholder's needs in the mobility ecosystem (users, private transport companies, public stations, facilities and private and public services)	Internal/external coordination of information flows Reduction in costs and time (delay) Enhancement of competitiveness and new service development Strategic improvement & operational continuity Promotion of collateral economic and cultural activities.	User-generated content and involvement of customers in service improvement and co-design Common growth and development of territory (smart community and smart cities) Corporate citizenship - Right to Internet & information access

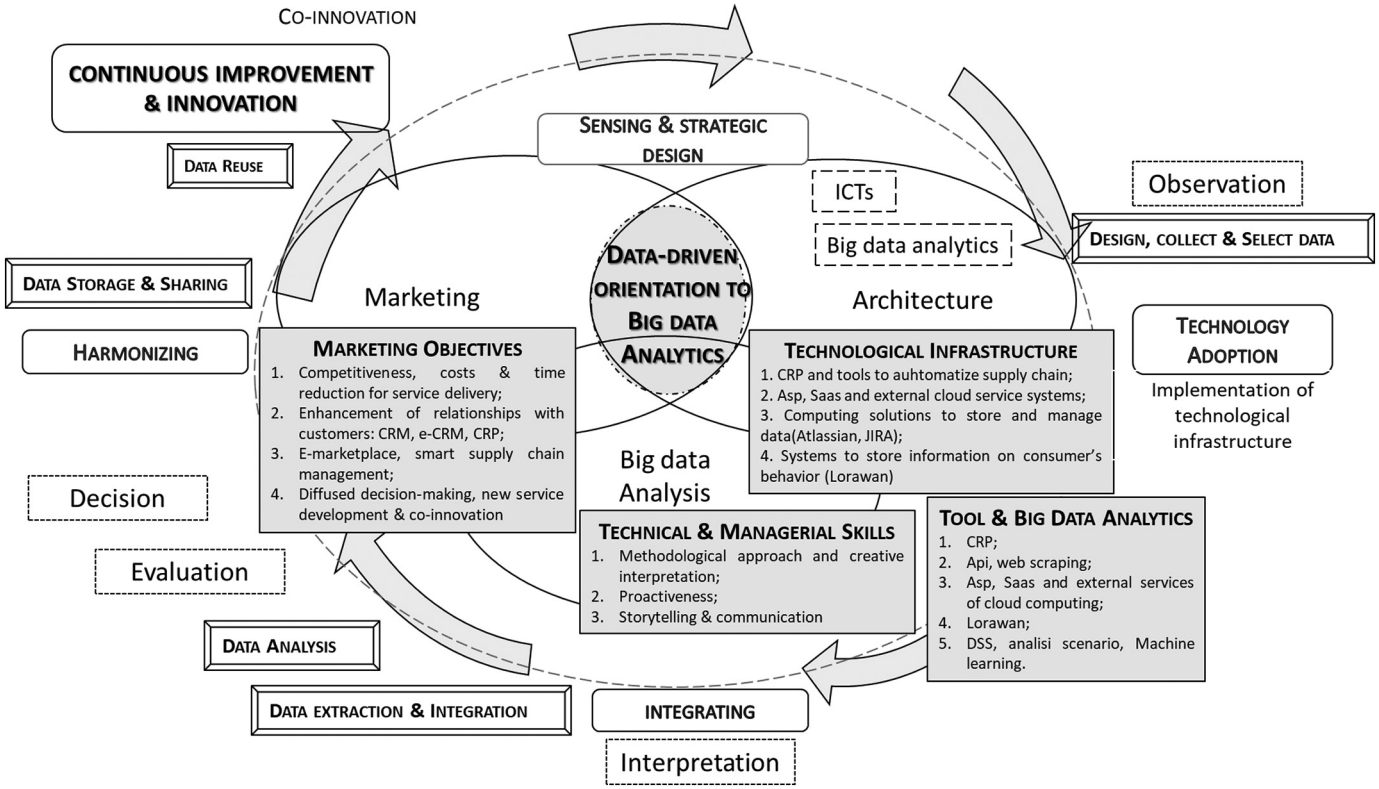

Fig. 5. Synthesis of results: application of Growth Hacking and DDDM to smart business process.
Source: Authors' elaboration.

Table 10
Synthesis of the main findings obtained.

Research question	Hypothesis confirmation	Main findings
RQ_1: Can data-driven approach improve the use of big data analytics and cognitive computing in B2B marketing decision-making?	The companies (see Fig. 1) follow the main steps of the integrated data-driven decision-making approach.	1) enhancement of data analysis skills, interpretation capabilities and synergy between departments 2) effectiveness of decision-making
RQ_2: Can Growth Hacking mind-set enable the attainment of marketing objectives in B2B sector?	The improvement introduced thanks to the synergy of the three areas of Growth Hacking model can be specified in different marketing objectives for each of the cases	1) strengthening of CRM strategies; 2) creation of an e-marketplace based on smart supply chain management; 3) 3) co-learning, co-development of innovation and co-distributed decision-making

use the infrastructure, some relevant marketing objectives can be attained (the third dimension of the framework, *marketing*).

Firstly, the automation of service procurement, logistics and delivery processes can help companies to: 1) reduce costs for stocks and manage orders; 2) increase rapidity and effectiveness of decision-making; 3) enhance the competitiveness of service offering. Together with economic benefits, the optimization of internal and external information flows can contribute to the creation of an integrated smart ecosystem composed of a given company and its stakeholders.

The creation of an integrated automatized supply chain with real-time access to data can help B2B businesses to reach global markets through alliance, partnerships or vertical-horizontal integration and can create (direct or indirect) benefits for final consumers (B2C).

In particular, the three cases analysed in the empirical research reached different three marketing objectives thanks to the use of big data analytics in a DDDM approach: 1) strengthening of CRM strategies (food sector); 2) creation of an e-marketplace based on smart supply chain management (building industry); 3) Co-development of innovation and co-distributed decision-making (transportation).

Thus, the results obtained allow at validating the two research questions formulated in the theoretical section by showing that the three firms in the sample can benefit from the adoption of a data-driven approach and from the synergistic management of the three areas of Growth Hacking model. As reported in Table 10, by following the main step of a strategic data-driven decision-making approach (RQ_1), the businesses analysed can strengthen management and employees' abilities to manage, optimize and extract useful knowledge from data and can improve the effectiveness of decision-making by increasing communication and data transfer among the different departments and between users and providers. Thus, thanks to the strategic management of the three areas of Growth Hacking, some relevant marketing objectives can be obtained (RQ_2) ranging from the improvement of relationships (CRM) to the creation of circular mechanisms of co-learning and innovation.

With reference to RQ_1, findings show that- despite the issues related to virtualization and to the negative implications of the use of ICTs and Big data on B2B strategies- a smart use and an innovation-oriented mind-set can act as enabler of some of the traditional B2B marketing drivers, such as the personal relationships with buyers. In this way, DDDM approach can help B2B companies to strengthen relationship one-to-one with customers by using analytics and ICTs without "depersonalize" these relationships. At the same time, multi-stakeholder and many-to-many relationships can be established to reduce the risk of virtualization of the value chain by creating a differentiated set of strategic alliances (Gummesson, 2006; Gummesson & Polese, 2009).

Lastly, collaboration with users in product design, delivery and in the development of innovation can have a significant impact on decision-making and on the development of innovation. As the case study 3 on smart mobility reveals, analytics and ICTs can engage customers in the different phases of delivery and can develop decision-making cycles that integrate the knowledge acquired from customers in progress by analysing users' feedbacks that are updated and stored in real time.

In order to address RQ_2 and to analyse critically the results obtained with reference to the theoretical frameworks debated in the first part of the, Growth Hacking can be reread in line with the phases of big data analysis and of data-driven strategic approach identified in Section 2 (see Fig. 5). Thanks to the results obtained, the framework identified in Fig. 2 can be integrated with the main dimensions of growth hacking that can be reinterpreted as key strategic levers of a smart business model.

The first management step can be the establishment and the diffusion of a data-driven strategy (at the centre of the figure). After the diffusion of research innovation-oriented culture, companies can design (business process phase: *Sensing and designing*) a coherent architecture based on: 1) platforms to manage information flows and automatize service delivery; 2) big data analytics architecture (the Growth Hacking dimension of *engineering architecture)*.

Then, data can be collected and selected (business process phase: *technology adoption and implementation*) based on strategic objectives and thanks to the architecture realized in the first step and, thus, can be managed and analysed from data analysts. Analysts (internal or external to the company) should explore data by "capturing" values and integrating them with the other data deriving from the different business functions to coordinate supply chain (business process phase: *integrating*) thanks to specialized methodological skills (the dimension of *big data analysis*).

The process is supervised by management that should support technicians in the phase of data interpretation (extraction of knowledge and innovative insights from information synthesis). Based on the interpretation of results of the analysis, implementation of decisions related to marketing strategies and tactics (business process phase: *harmonizing*) can be accomplished and marketing objectives can be realized (dimension 3, *marketing*). After the attainment of given outcome and their related measurement, the process can restart continuously over time. Information should be transformed into knowledge through the dissemination of intuitions, perception and vision deriving from data analysis. The sharing of results, the constant diffusion and reallocation of the new knowledge obtained within the entire organization can improve the possibility to develop double-loop learning and, thus, innovation (management dimension: *continuous improvement and innovation*).

6. Implications

6.1. Theoretical advancement

The results emerged from the analysis provide interesting ideas from the theoretical point of view, highlighting how the study of big data analytics and cognitive computing is no longer confined exclusively to the area of computer research, but extended to different disciplinary areas, such as management and, more specifically, marketing. This consideration is in line with the great growth of scientific marketing contributions dedicated to this topic.

Therefore, from this point of view, the work could be considered as

a useful tool for marketing researchers since it provides an original key to understand the conceptual evolution of data-driven marketing. Moreover, it allows gaining a wider awareness about the aspects that should be taken into account in order to analyse the phenomenon in an appropriate and thoughtful way. In this regard, the article highlights how the use of big data analytics and cognitive computing enables a better re-reading of the dynamics characterizing the entire marketing decision making process of high-tech companies operating in the B2B context. Being aware of how data-driven marketing evolved over time and how it could further change helps to identify new aspects to be explored to investigate the competitive success of companies and their network of customers, such as accessibility, availability, quality, and heterogeneity of data (Gupta & George, 2016).

In this regard, the authors propose the Growth Hacking as a possible approach to the study and use of big data analytics and cognitive computing to improve the effectiveness and efficiency of marketing decisions. In so doing, the paper contributes to enrich and update the state of the art related to data-driven marketing and, more in detail, the big data marketing of B2B high-tech companies. The study, in fact, encourages the consolidation of a research orientation that goes beyond the limits of traditional marketing, to push for the search for more flexible approaches that can quickly adapt to sudden changes within companies and, more in general, within market. The adequacy of Growth Hacking is justified by its ability to favor the dynamic and creative use of data in every phase of the marketing decision-making process for the generation of knowledge, value and success for the company.

Moreover, this work stimulates the research world to deepen the Growth Hacking in order to widen the knowledge dowry related to the ways through which a small, medium or large enterprise can grow fast. Paying attention to Growth Hacking means devoting interest to new approaches to marketing and, more generally, to company management, in an attempt to cleverly combine theory and practice, to ensure that the former does not deviate too much from the latter but, on the contrary, supports it effectively. Examining in depth the strategies and techniques of Growth Hacking allows focusing on the search for solutions for business growth favored by the aptitude to reason “outside the box”. Thus, the findings contribute to the expansion of the state of the art on marketing with notions atypical and not still frequent in literature and along roads until ignored or scarcely taken into consideration.

In addition, the empirical results emerged from the survey with High-Tech B2B companies underline that, to date, it is unlikely and implausible to think about developing and proposing theoretical models for the improvement of marketing decisions without placing data at the center of decision making and business ideas. This increasingly consolidated conviction will soon make space the recognition of the fact that, in the more and more complex, turbulent and globalized B2B segments, the Growth Hacking enables big data and cognitive computing to act as the real key to the competitive success of all companies, not just those with a high technological rate. Hence, from a theoretical point of view, the work takes just a first step, proposing itself as a possible starting point for marketing scholars, who cannot ignore the existence of a mindset that is spreading in literature as a sort of new philosophy to improve marketing decision making. In this regard, the suitability of the paper to be interpreted as a catalyst for the study of big data analytics and cognitive computing to support marketing decisions could suggest putting Growth Hacking at the center of the scientific debate to encourage further investigations able to highlight all the potential for companies, not only for the high-tech B2B ones.

6.2. Managerial insights

The three different cases analysed show the suitability of Growth Hacking to enable the application of big data and cognitive computing. Thus, the work highlights that big data analytics integrated with management and marketing decision-making should develop smart B2B business with a network infrastructure able to create integrate value chain with real-time data, and reach global markets, both reinforcing relationship one-to-one and exploiting the advantages on multi-stakeholder relationships. As a result, this study also yields useful insights for managers, highlighting the potential of digital revolution to change deeply the art of management (Chen et al., 2012a, 2012b) and marketing, and proposing Growth Hacking as an engine of new and innovative marketing strategies.

While justified by extant empirical research, the work suggests that, through big data analytics and cognitive computing it is possible to gain a better comprehension of costumers, via a complete view across every touch point of the organization, in order to enable an optimal costumer experience (Laher, 2016).

However, whether on the one hand big data and cognitive computing offer the promise of unlocking ideas and accelerating innovations, on the other the their large amount appears very difficult to be managed, and only a fraction of them may often be rightly analysed, understood and integrated. Thus, the challenge lies in exploiting volumes of data, synergistically combining them from many sources, and understanding their different formats. New technologies, in turn, offer promise for addressing this challenge since they are designed specifically to integrate and analyse big datasets. Cognitive solutions are trained to understand technical and industry-specific content, use advanced reasoning, predictive modelling, and machine-learning techniques (Chen et al., 2016a, 2016b; IBM Institute for Business Value, 2017). In other words, cognitive computing enables creating and delivering personalized and intuitive experiences to customers (Hurwitz et al., 2015).

Following the new mind-set represented by Growth Hacking managers and analysts can measure and hence know more about their businesses, since knowledge is directly translated into improved and timely decision-making (McAfee, Brynjolfsson, Davenport, Patil, & Barton, 2012). In fact, Growth Hacking strategies and techniques enhance the possibility for big data technologies and analytics methods combine and analyse structured (e.g. clicking through websites) and unstructured data (e.g. posting comments on social networks) in real time, helping to discover hidden patterns, such as the way different groups of customers interact and how this interaction leads to purchasing decisions.

Equipped with these insights, companies may develop targeted marketing campaigns that consider the specific customer's individual preferences (Svilar, Chakraborty, & Kanioura, 2013). Furthermore, it is possible to collaborate with users through the large amount of data shared on line in product design, delivery and in the development of innovation (Tao et al., 2018; Zhan, Tan, Ji, Chung, & Tseng, 2017), augmenting customer engagement (Kunz et al., 2017). Thus, companies should realize their need to “marry a sort of wide philosophy”, the Growth Hacking philosophy, to better manage huge quantitative of data and hire data scientists, putting together data-science programs and publications. Even because data science is definitely a new important interdisciplinary field, strongly connected with data-driven decision-making and marketing (Provost & Fawcett, 2013).

Traditionally, big data and cognitive solutions have been being associated with B2C companies, especially in the attempt to understand and predict consumers' behavior. Thus, considering that the buying cycle for B2B is usually significantly longer and more complex than B2C, it turns out even more important for B2B companies to use big data and cognitive computing in any way possible to quickly get to know customers and respond to decision makers with the objective of closing sales as efficiently as possible (Marr, 2017). Indeed, as far as the present B2B scenario goes, a better approach would consist in analysing individual multi-faceted customer relationships but also in augmenting the internal data with external data (Koshy, 2017). For instance, top tech trends for B2B sales and marketing today regard personalized e-mail, diversified strategies, younger workforce, interactive web content

and mostly big data analytics (Ripton, 2017). In fact, the most successful B2B companies are taking a systematic, data-driven and proactive approach to managing sales, through the support of analytics-based platform. A research from Forrester (Ramos, Cooperstein, & Ramos, 2014) found that big data analytics solutions increase marketers' ability to get beyond campaign execution and focus on individual customer relationships for better personalization at every step of the customer journey. Therefore, the secret to success for B2B businesses lies in collaboration and sharing of big data to improve customer experience and engagement (Vaan Loon, 2017).

Furthermore game-changing technologies, allowing capturing and extracting customer insights and permitting enhancing companies' capability, push to follow the Growth Hacking as something more than an approach, an innovative process of rapid experimentation across the marketing funnel (Erevelles, Fukawa, & Swayne, 2016; Fan, Lau, & Zhao, 2015; Hausman, 2017). With the aim to increase an organization's reach, brand recognition or revenues, this new mindset, combining software engineering and automation, creative marketing and data analytics and testing, seeks to go up the primary metrics, by growing from 0 to millions (or hundreds of millions) of users in a few years, encouraging the companies to experience viral growth.

Some successful companies are already trying to do that. For instance, AirBnB, in order to build its user-base, customer-base, and reputation, contrived to take advantage from Craiglist, one of the most important US portals, already known and with a huge number of users when AirBNnB was only beginning to test its product. In particular, when new users should compile the format to rent a house or a room on the AirBnB portal, they have the possibility of automatically inserting the ad also on Craiglist. This meant not only making the offer more appealing and reliable (Craiglist was an already known name) but also creating a series of underground links between the two platforms that improved the visibility of the ad and platform. Also, Dropbox, another well-know and successful company, gamified its own boarding process, offering to existing users more free storage for linking their account to Twitter and Facebook, and sharing information about Dropbox on those social websites to get new users and to grow exponentially. Another example of how Growth Hacking can help companies to get success comes from Yammer, a start-up that created a suite of business collaboration software and applications, which used the freemium model to obtain its first users. They made it easy for anyone in an enterprise to get started installing, using and sharing it with colleagues in a simple and secure way. Likewise, HubSpot created a free “Marketing Grader” tool that anyone can use to test the effectiveness of a website in terms of moving visitors through the sales funnel. This provided massive value for online marketers and stimulated them for the full suite of the company's tools.

Therefore, especially in B2B high-tech sector, Growth Hacking may represent an important opportunity, through the implementation of various strategies, such as e-books, whitepapers, webinars, slide share decks and case studies, in order to educate the audience and provide something of value to customer lives. In addition, designing a free model is a smart way for showing to users the benefits of the product.

Ultimately, given the growing importance that it is rapidly acquiring both in marketing literature and in operational practice, scholars and practitioners should reflect on the opportunity to exploit the potential offered by Growth Hacking. Implementing the mind-set Growth Hacking, in fact, does not simply mean following the guidelines of a marketing approach, but changing philosophy in observing the reality, the complexity of the markets, customers and the solutions necessary to fulfil fully and promptly their expectations. This consideration helps to understand why Growth Hacking differs from other marketing approaches, not just traditional ones. In this regard, a clarification should be made: in an attempt to identify the most innovative marketing trends, one could consider Growth Hacking as alternative to other approaches. For instance, one can think of the Agile Method, to new method for marketing management, “where all stakeholders are coordinated, interconnected and take advantage of technology for developing dynamic marketing solutions in the marketplace” (Inversini, Pesonen, & Buhalis, 2014). However, although the latter is a hot method in today's business, it presents a more limited conceptual and operational structure, being able to be considered as a complementary approach. The Agile Method emphasizes the role of agility in defining and adopting effective and efficient marketing strategies that can foster the spread of the Growth Hacking philosophy inside and outside companies (Ellis & Brown, 2017).

7. Conclusion

Starting from the need to explore the impact of a data-driven approach on the use of big data analytics and cognitive computing in marketing decision-making, the work adopts *Growth Hacking* model to analyse the implications of B2B marketing objectives.

Then, to understand how the traditional process of B2B marketing decision-making is reframed thanks to Big data collection and analysis, the empirical research is performed to assess how the three dimensions of Growth Hacking model (technical, creative and analytical) can be applied to three different case studies from food, building industry and transportation sectors. Growth Hacking model is reframed and specified in the light of the results obtained by identifying some sub-dimensions and objectives related to each of the three dimensions. Moreover, the three dimensions of Growth Hacking are integrated with the main steps of big data analysis and management decision-making deriving from the findings achieved.

Based on the main results obtained, an integrated model that applies Growth Hacking to B2B marketing has been proposed (see Fig. 5) to assess the main steps, objectives and implications related to the effective adoption of big data analytics and cognitive computing in each dimension of the framework (marketing, programming, data analysis).

The research shows that B2B marketing strategies can benefit from a data-oriented mind-set to generate multiple (economic, knowledge-based and marketing) advantages throughout the entire supply chain and in the enhancement of relationships with customers (case study 1). Thanks to a distributed computing architecture, smart B2B businesses can reduce costs, rise competitiveness, increase communication flows (within the organization and outside the network, see case study 2) and increase stakeholders' loyalty. The integrated model proposed can help to detect the main steps to implement DDDM in B2B marketing thanks to Growth Hacking framework and to understand the most common analytics of cognitive computing adopted in the different phase of decision-making.

Moreover, the findings allow at identifying the impact of data-driven marketing decision making on the competitiveness of B2B businesses and on the fulfilment of marketing objectives (customer relationship management, enhancement of quality and new product and services development). The main goals attained by the companies analysed reveal how B2B marketing strategies and tactics can be optimized through big data by reinforcing service quality and promptness in procurement, logistics, delivery and post-delivery assistance.

In this way, the impact of big data analytics on the enhancement of the main drivers to improve competitiveness and growth can be observed (Eng, 2004). The main marketing variables strengthened by big data adoption in the sample analysed are: 1) the strengthening of relationship with customers (CRM); 2) the creation of an e-marketplace that connects the entire value chain through technology; 3) the increase in continuous learning (Bachrach, Mullins, & Rapp, 2017; Wilden, Gudergan, & Lings, 2018); 4) the development of new product and innovation (Cuzzocrea, Loia, & Tommasetti, 2017; Zahay et al., 2004). The changes observed in businesses conducts and realized during the time span of one year highlight the advantages that smart companies can obtain in comparison with companies that do not exploit the use of big data. Lastly, collaboration with users in product design, delivery and improvement of the service can have a significant impact on

decision-making and on the development of innovation and continuous learning (case study 3).

The work shows some limitations concerning mostly the adoption of case study methodology that does not allow at drawing any generalization of results. In addition, the narrowness of the sample and the poor number of interviews can determine some problems in extending the results obtained to the general population. However, the paper proposes an exploratory research that can be considered as a first qualitative step that can address future research related to the development of further qualitative and quantitative research.

The methodological issues- related to some intrinsic limitations of exploratory analysis of complex and multi-levelled constructs not well defined in literature- can be addressed through further empirical research. First, the sample can be broadened to include firms operating in other B2B markets and some other qualitative (Observation or netnography) and quantitative (structural equation modelling) techniques can be combined with the results of this study. The adoption of mixed method (Axinn & Pearce, 2006), that combines quantitative and qualitative methodology, seems to be the most adequate approach to explore cross-sectorial and multidimensional concepts. In detail, quantitative techniques can be employed to test the statistical correlation among the variables and the effect of the use of technology or technology adoption on organizational success, competitiveness or innovation. Furthermore, the investigation of customer's viewpoint can be included in future research and comparisons between case studies from B2B and B2C sectors can be realized to assess the existence of different data-driven strategies in different markets or different users' engagement practices (Lytras & Visvizi, 2018).

Future works can investigate other business sectors to confirm the results obtained in other organizational contexts or to make some comparisons between the different data-management and analytics strategies and tactics. In addition, quantitative studies can empirically detect the main data-driven management steps through quantitative analysis aimed at exploring the statistical relations between data-driven culture, intensity/quality in the use of analytics and the development of innovation and/or sustainability.

The exploration of the synergy between big data analysis and marketing management can allow at understanding how marketing analytics reframe the traditional B2B strategies and tactics. For this reason, other key marketing challenges such as the influence of social media or the emergence of sustainability (fostered by smart technologies) can be analysed further through the application of the general framework introduced in the current work.

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