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Data-driven innovation capability of marketing for B2B firms: definition and construction process

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Abstract:

Big data knowledge-driven offerings are changing innovation practices for marketing organizations. Although B2C companies are coping with this digitalized-centered innovation reality, it remains a major concern for B2B industries, and, to date, little research studied digital marketing capabilities for innovation purpose. This study explores the concept of data-driven innovation capability within the marketing perspective. We conducted a systematic literature review of 40 scientific papers followed by qualitative research of 10 one-to-one interviews of C-level executives and managers. The analysis provides a first theoretical marketing anchoring definition of data-driven innovation capability and highlights a three-step construction process capability, market-oriented and fueled by dynamic process re-engineering.

Keywords:

Big Data; data-driven innovation capability; digital marketing capabilities; B2B marketing; marketing strategy

Introduction

Big data (BD) is the new R&D for the 21st century economies (OECD, 2015) and impacts every B2B sector. In 2022, 88% of the companies dedicated two thirds of their digital marketing activity expenditures in BD-derived technological tools, such as marketing analytics (The CMO Survey, 2022) to deploy digital marketing capabilities; i.e. a firm's ability to use digital technology-enabled processes to interact with customers and partners in a targeted, measurable, and integrated way to create new forms of value without regard for distance or time (Kannan, 2017; McIntyre & Virzi, 2019; Sridhar & Fang, 2019). It results in a data-driven innovation (DDI) prioritization that allows companies to extract meaningful value from data to generate innovative results (Sultana et al., 2022a, 2022b). Nevertheless, despite both academics (Du et al., 2021; Herhausen et al., 2020; Mikalef et al., 2018; Moorman & Day, 2016) and practitioners (Galante et al., 2013; Wild, 2021) asking scholars to scrutinize the components of these BD-oriented capabilities, little attention has been paid on the topic, particularly for innovation purpose. We identified two gaps that guided us in exploring data-driven innovation capability of marketing (DDIC). First, the marketing perspective about DDIC is missing in the literature, DDIC being mainly treated from the company macro-level perspective (Sultana et al., 2022a, 2022b). Other studies considered BD analytics capability resource as firm constitutive element of DDIC (Mikalef et al., 2019; Mikalef & Krogstie, 2020) and so far, the marketing components are not analyzed in its composition. Second, the construction process within the marketing organizations is not described; papers are focused on the DDIC's innovation outputs components (Lehrer et al., 2018; Papa et al., 2021; Xie et al., 2016), inspecting DDIC's marketing effects, such as data product performance (Sultana et al., 2022a, 2022b). A consensus for approaching the notion through the marketing research prism is lacking. We addressed these gaps by, first, conducting a systematic literature review to clarify the concept and contours of DDIC of marketing. Second, we tested our theoretical construct by undertaking a qualitative research of by 10 one-to-one interviews, to explore the constitutive elements of DDIC of marketing and their relationships.

Systematic literature review: methodology settings and findings

A systematic literature review is 'a process for accumulating knowledge relevant to a given topic, question, or issue and for showing relationships among the pieces of knowledge and the question or issue' (Ward & Reed, 1983, p.11). By means of this method, we gathered state-of-the-art evidence by connecting knowledge on BD, marketing capabilities and innovation to define the emerging phenomenon of DDIC of marketing and advance on the necessity for BtoB marketing to generate scientific knowledge, by compiling interdisciplinary knowledge to answer real managerial problems. Systematic reviews process is more transparent, scientific and replicable compared to the traditional narrative reviews (Pare et al., 2016) and was therefore considered as appropriate to create an anchoring theoretical point for the marketing academic community by aggregating and synthesizing information on DDIC of marketing.

Planning the review. We selected the three-stage methodology of Tranfield et al. (2003) for planning, conducting and reporting a review, widely adopted for systematic reviews in management science (Rojon et al., 2021). We used the mostly employed a *priori* PRISMA protocol for planning our review, with a set of clearly stated objectives, based on a list of checkpoints detailing the rationale, methodological and analytical a priori approach (Moher et al., 2015), to address the following research questions :

- RQ1: What is the contextual role of BD technologies in building DDIC of marketing?
 RQ2: What are the resources, capabilities and underlying processes required to build DDIC of marketing?
 RQ3: Is there evidence of complementarity between DDIC of marketing and company resources?
 RQ4: To what type of innovation output does DDIC of marketing contribute?

Conducting the review. At stage two, we conducted the review and identified 40 exploitable papers, summarized in Figure 1.

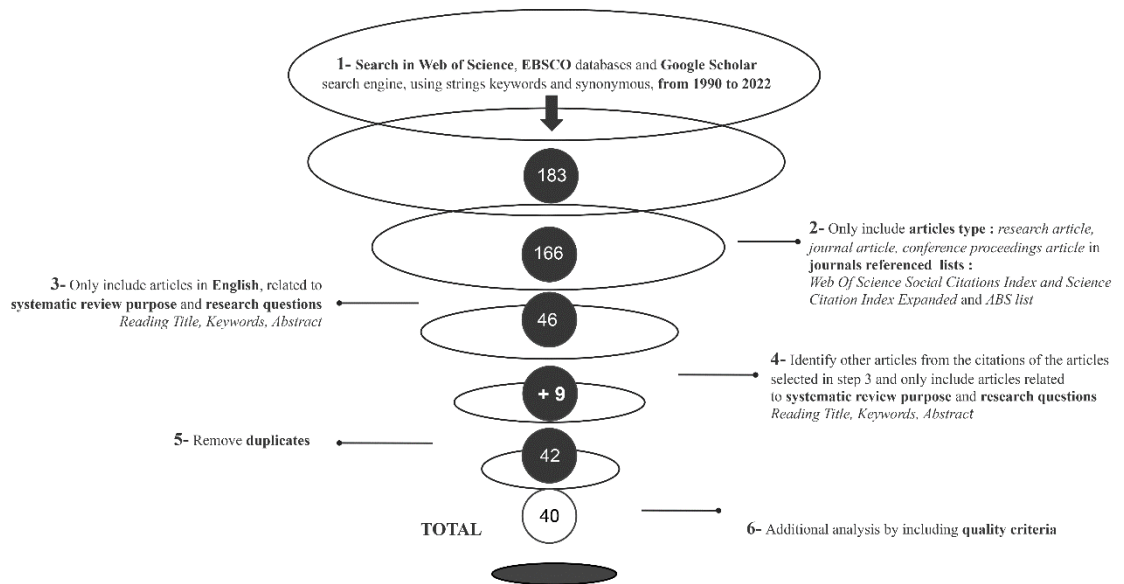


Figure 1 – Systematic review funnel process on DDIC of marketing

Reporting and dissemination.

Descriptive findings. Two thirds of the papers dated from 2019 to 2022 and are of European concern. A strong focus on the complementarity between marketing and information systems domains was identified, with 72.5% of the papers (n = 29) addressing this issue. Most of the identified papers are empirical (n = 34), including 23 that are quantitative, mainly addressing how to use data to innovate, highlighting qualitative studies on the subject are still in their infancy for explaining empirical findings. Lastly, the subject was treated supported by organizational theories, specifically resource-based theory (RBT) (Barney, 1991) and dynamic capabilities theory (DC) (Teece et al., 1997), often mentioned in combination, as well as market orientation theory (MO) (Jaworski & Kohli, 1993) (Figure 2).



*RBT: Resource-based theory, **DC: Dynamic capabilities theory, ***MO: Market Orientation theory

Figure 2 – Descriptive findings on DDIC of marketing

Analytical findings. We chose the explanation narrative synthesis method of Rousseau (2008) to report our findings, that is aimed at building and advancing theory by formalising knowledge, i.e. knowledge on marketing capabilities issued from BD and innovation topics. We articulated our thematic findings drawing on the formative framework for narrative synthesis of Denyer et al. (2008), called ‘CIMO-logic’; i.e. a given ‘Context’, a deep understanding of ‘Interventions’, specified generative ‘Mechanisms’ and intended ‘Outcomes’ production, commonly used to structure the propositions from systematic review findings (Rojon et al., 2021). We investigated how, in the specific context of BD technologies (C), marketing department interventions (I) can deploy DDIC solutions to activate a company’s intangible resources mechanisms (M) to create customer-centric innovation outcomes (O). The explanatory synthesis (Rousseau et al., 2008) revealed four major themes that define DDIC of marketing: (1) the contextual role of BD in the development of this capability, (2) the resources, skills and processes needed to build it, (3) its complementarity with companies’ intangible resources and (4) its consequences on customer-centric innovation. The analysis disclosed the second theme - resources, skills and processes of DDIC of marketing - as a central element of the explanation review, connected with the other three. Moreover, it emphasized a construction for DDIC of marketing based on a three-stage process: (1) generation of an ‘outside-in’ information ecosystem, (2) dissemination of data-driven insights and (3) responsiveness to market.

We culminated by offering the following definition for DDIC of marketing: *‘DDIC of marketing is a dynamic capability, forming part of digital marketing capabilities, that generates an ‘outside-in’ information ecosystem, disseminates the extracted data-driven insights and responds to the market accordingly by creating customer-centric innovation’* (Authors, 2022)

We continued our investigation by testing the central element of the systematic literature review empirically, i.e. resources, skills and processes of DDIC of marketing.

Exploratory qualitative research: methodology settings and findings

We opted for an exploratory qualitative research and conducted ten semi-directed interviews to conceptualize DDIC of marketing and examine its constitutive elements. We defined our sample according to similar characteristics to represent our population and to increase the reliability and replicability of our research (Gephart Jr, 2004). The chosen unit of analysis was B2B companies that settled innovative projects thanks to BD information exploited by marketing departments, regardless of their size, sector and type of offer (product or service), to

avoid any discriminatory nature and advance towards transferability of our results. The selected observation unit was mainly anchored in marketing department to be in accordance with our research question problem settlement, and was also enlarged, for a few cases, to neighboring departments, to strengthen the internal validity of our work. We interviewed director or manager (from top to middle management) from the following areas: marketing, sales, data analytics and general management, using snowball technique and iterative method (Arsel, 2017) till reaching saturation principle (Charmaz, 2006) (Appendix 1). Interviews lasted between 35 to 90 minutes, *via* video conference, supported by a guide structured around the following topics: (1) context and objectives behind which marketing department is using data for its innovation activities; (2) resources and processes necessary to build DDIC of marketing; (3) obstacles to build DDIC of marketing; (4) renewal or reconfigurations of the marketing organization procedures or mindset to build DDIC of marketing. Interviews were broken down into 4 major parts: introduction, centering, deepening and opening-conclusion of the subject (Grawitz, 2000), then recorded and transcribed (260 pages and 112915 words). Using NVivo software, we operated a thematic analysis, mostly employed in management and organization studies (Dougherty & Bowman, 1995), observing Miles and Huberman coding’s approach (1994) and applying comparison, abstraction and dimensionalization methods (Appendix 2). We finally integrated our findings into a process-oriented framework (Meyer et al., 2013), illustrated by corpus verbatim reporting. Our content analysis identified four aggregated dimensions of components of DDIC of marketing: generation of an ‘outside-in’ information ecosystem, dissemination of data-driven insights, responsiveness to market and process re-engineering, inside which we inventoried the respective second order themes, i.e., resources, capabilities and processes. (Figure 3)

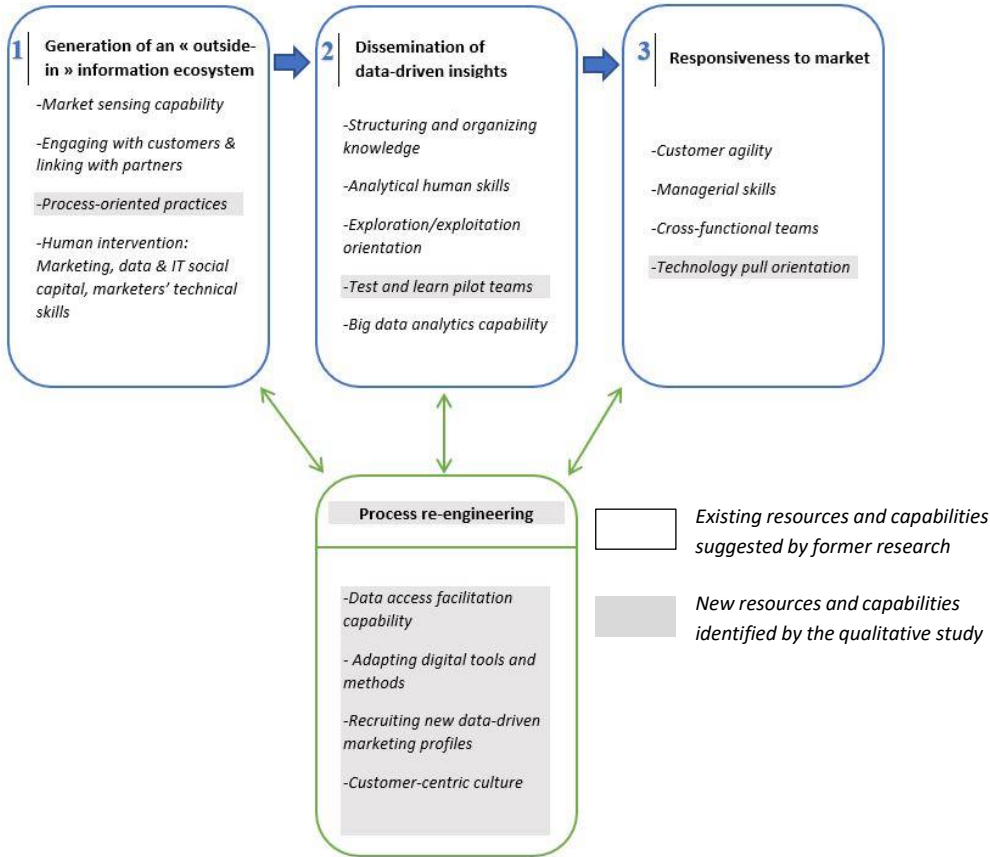


Figure 3 – A process-oriented framework of DDIC of marketing: components and underlying processes

We selected the most relevant results extracted from each of the four blocks that we illustrated by verbatims.

Generation of an « outside-in » information ecosystem (1). Almost all our respondents considered the three capabilities: market sensing, engaging with customers and linking with partners as the most important to generate an 'outside-in' information ecosystem. There are two different approaches depending on industrial sectors. Some marketing departments are 'outside-in' oriented by essence because this mindset is at the heart of their DNA and their activity's sector, like cosmetics: *“so at x, which is its strength at the beginning, it's first ... a customer centric mindset, that means that it's already in the DNA to listen to the customers. But when I say listening, I mean that it was very simple, but it was reports that came in every week that our founder originally read”* (5, France marketing director). Another view is related to significant market evolution, which forced marketing departments to understand innovation beyond purely technical and research and development (R&D) prerogatives and to focus on real customers' needs, like the semi-conductors industry: *“there was another family (of products) that was developed in parallel, that took seven years to develop...And when we came on the market, people said...but that's not what we need. What I would like is to have such... version with such and such a feature...”* (10, Head of product marketing).

Dissemination of data-driven insights (2). The resources and capabilities included are of special attention according to respondents and stand for the most important total occurrence frequency: structuring and organizing knowledge, analytical human skills, exploration/exploitation orientation, test and learn pilot teams and BD analytics capability. Moreover, there is a high need for human intervention at this stage, illustrated by verbs like “identify”, “combine”, “orchestrate”, “select”, “prioritize”, “translate” that demonstrate how marketers interpret data analytics into relevant insights for exploiting innovation inputs immediately or exploring original innovation inputs.

Responsiveness to market (3). We identified four resources: customer agility, managerial skills, cross-functional teams and technology pull orientation. To take benefits from these extracted data-driven insights, marketers need to develop customer agility. Two facets are observed for this capability. First, B2B markets are accelerating faster, requiring a need to adapt the innovation activities rapidly to sense and seize business opportunities. Second, agility helps to adopt new industries business model, like in the automotive field, shifting from a B2B to a B2B2C approach, resulting in marketing offering a global solution to the end customer and not just a single product to the B2B intermediary: *“Today..., a car...it's a computer on four wheels. As the market has really changed..., we have really, had to hire people who understand the system, that is to say that we have...really had to transform ourselves in order to move from a product approach to a system approach, and to really understand the needs of the end customer, and that has been a real transformation”* (8, Senior director product marketing).

Process re-engineering. This part focused on the continual renewal of the marketing organization to implement and use DDIC of marketing. Four dimensions were underlined: data access facilitation capability, adapting digital tools and methods, recruiting new data-driven marketing profiles and customer-centric culture. The latter is permanently disseminated throughout marketing organization to perform the above-mentioned technology pull orientation innovation. This is a new paradigm brought about using DDIC in the B2B environment, accustomed to being product-engineered centric and technology push: *“That's the core value, it's been the customer centric... and...we've made upgrades...changes, to products, especially in terms of software, because obviously, the instruments, they work with software, that wasn't necessary for us but*

that made life easier for customers. We would never have done it before” (2, Senior Director, International Marketing).

Discussion, implications and research limitations

This work introduces the first exploration of data-driven innovation capability from a B2B marketing organisational perspective.

Our contribution is threefold. First, we confirmed a capability that is market-oriented, based on a three-step process of construction, echoing to the MO theory of Jaworski and Kohli (1993) that (1) generates market intelligence base, (2) disseminates the information and (3) responds to the market identified needs by developing new offers. Specifically, we explained the building stages ‘generation of an outside-in information ecosystem’ and ‘dissemination of data-driven insights’ as catalyzers of market-based resources, in line with the outside-in view of Day (2014) who suggests sensing the market, engaging with customers and linking with partners as core competences to develop market-based knowledge capability for marketing departments.

Secondly, based on Homburg’s definition (2022), we contributed to identify data-driven innovation capability as being part of digital marketing capabilities. We detailed a construction process to set up DDI, enriching the existing literature on organisational marketing science.

Lastly, the fourth building block ‘processes re-engineering’, whose resources and capabilities are embedded at every step of the construction process, demonstrated a dynamic view for DDIC of marketing. This dimension corroborates the dynamic capabilities theory rationale (DC) (Teece et al., 1997), reflecting a continuous focus on integrating, reconfiguring, gaining and releasing resources to benefit from BD technologies and to innovate (Eisenhardt & Martin, 2000; Teece et al., 1997). By assessing the underlying routines included in DDIC of marketing construction, we advanced research on examining how to build dynamic marketing capabilities (Barrales-Molina et al., 2014; Mikalef et al., 2019; Quach et al., 2020) for specified innovative purposes.

In terms of managerial implications, our resources inventory can guide marketing decision-makers in their DDIC investment roadmap. Our respondents mentioned some internal drivers that may conduce to build DDIC of marketing faster, like turnover issues or the necessity to increase customer segmentation granularity with more data-practices use. External environment, like aggressive competition or high level of industry digitalization, can press marketers to engage more rapidly in DDIC establishment. These levers provide a better understanding of DDIC of marketing maturity level and, thus, the managerial decision to quickly move towards it.

Finally, this research has limitations. Further research could deepen the understanding of DDIC of marketing construction by questioning its antecedents, consequences and possible moderators. Lastly, we recommend a quantitative survey on a larger sample to scrutinize the respective weight of every resource or capability embedded in DDIC of marketing. This may lead towards a scale measure, helpful for marketing managers to evaluate their advancement level of DDIC of marketing building.

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Appendixes

Person	Department	Type of company	Position	Sector
1	E-business	MNC*	E-business, services and analytics manager	Cosmetics
2	Marketing	MNC	Senior director, international marketing	Medical equipment manufacturing
3	Marketing	SME/SMI**	Marketing and sales manager	Environment
4	Top management	VSB***	CEO	Training
5	Marketing	MNC	France marketing director	Cosmetics
6	Marketing	VSB	Marketing, data and CRM**** consultant	Services
7	Marketing	MNC	Product manager	Travel industry
8	Marketing	MNC	Senior director product marketing	Semi-conductors
9	Direction Sales	MNC	Small and medium business EMEA***** vice president	Softwares and Internet solutions
10	Marketing	MNC	Head of product marketing	Semi-conductors

MNC: Multinational company; **SME/SMI: Small and medium enterprise/small and medium industry; *VSB: Very small business; CRM****: Customer relationship management; *****EMEA: Europe, Middle East, Asia*

Appendix 1 – Exploratory qualitative research sample characteristics

<i>1st Order Concepts</i>	<i>2nd Order Themes</i>	<i>Aggregate Dimensions</i>
<ul style="list-style-type: none"> Market situations and issues Customer needs listening Detecting frictions and pain points 	Market sensing capability	Generation of an 'outside-in' information ecosystem
<ul style="list-style-type: none"> Establishing customers connections Capturing customers information Learning from customers 	Engaging with customers	
<ul style="list-style-type: none"> Expertise search Data partners ecosystem: providers, competitors, ... Digitalisation maturity level 	Linking with partners	
<ul style="list-style-type: none"> Iteration and test processes Systems automation Data-decision support tools 	Process-oriented practices	
<ul style="list-style-type: none"> IT and data management competencies Data science Collaborative teams Data pyramid construction 	Human intervention: marketing, data & IT social capital	
<ul style="list-style-type: none"> Experts team technical profiles recruitment 	Human intervention: Marketers technical skills	
<ul style="list-style-type: none"> Orchestrating information CRM deployment Data selection, data filtering Transforming information into insights 	Structuring and organizing knowledge	Dissemination of data-driven insights
<ul style="list-style-type: none"> Interpreting data Algorithms treatment Analytics coordination teams 	Analytical human skills	
<ul style="list-style-type: none"> Innovation projects prioritisation Data translation into innovation inputs Data segmentation Customers global interest assessment 	Exploration/exploitation orientation	
<ul style="list-style-type: none"> Small teams and early adopters Testing and coordinating information Motivated people and personal ambition 	Test and learn pilot teams	
<ul style="list-style-type: none"> AI*, machine learning, algorithms Customers predictive analytics, Google analytics Cloud systems 	Big data analytics capability	
<ul style="list-style-type: none"> Mechanisms settlement to gain in agility Answering to market and customers more rapidly Time-to-market reduction 	Customer agility	
<ul style="list-style-type: none"> Arbitrating decisions on data analytics support Choosing the good insights Developing a data leadership mindset 	Managerial skills	Responsiveness to market
<ul style="list-style-type: none"> Pluri-disciplinary projects Experts' involvement Decompartentalising departments 	Cross-functional teams	
<ul style="list-style-type: none"> Customer-inspired and oriented innovation From product to solution innovation 	Technology pull orientation	
<ul style="list-style-type: none"> Data facilitating tools Data quality Data visibility 	Data access facilitation capability	Process re-engineering
<ul style="list-style-type: none"> Data-competent marketers' profile Customer-centric analytical marketers' profile 	Recruiting new data-driven marketing profiles	
<ul style="list-style-type: none"> Adapting communication channels Information collection process automatization Collaborating with data management department 	Adapting digital tools and methods	
<ul style="list-style-type: none"> From an 'inside-out' view to an 'outside-in view' Customer-centric mindset Customer voice dissemination A B2B2C approach 	Customer-centric culture	

*AI : Artificial intelligence