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# DATA-DRIVEN INNOVATION CAPABILITY OF MARKETING: AN EXPLORATORY STUDY OF ITS COMPONENTS AND UNDERLYING PROCESSES

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## **TITLE**

### **Data-driven innovation capability of marketing: an exploratory study of its components and underlying processes**

## **ABSTRACT**

The expanding digitalization of the innovation activity is of major concern for B2B industries. While management research is paying increased attention to this new data-driven innovation paradigm for firm specified operational purposes, little research has explained the phenomenon from the marketing organizational perspective. Given the essential role played by B2B marketing department in new products and services development, one may wonder how it can strategically shift its innovation capability to become data-centric. This study is aimed at describing how to build a data-driven innovation capability for B2B marketing organizations, by identifying its components and underlying processes. Based on 10 semi-structured interviews of B2B marketing directors, consultants, sales managers and CEO, the analysis sheds light to a market-oriented and dynamic capability, through the identification of a three-step construction process and four continued renewal capabilities reconfigurations.

## **KEYWORDS:**

Strategic marketing, B2B marketing, digital marketing capabilities, data-driven innovation, process-oriented.

## INTRODUCTION

In 2022, 88 % of the companies had implemented technological tools such as marketing analytics, which stands for the impressive number of 77% of their digital marketing activity expenditures being invested in them (The CMO Survey, 2022). These massive investments emphasize a major change for the marketing department, considering analytics issued from the large-volume, high-velocity and heterogeneous big data (BD) as central in the decision-making process. Marketers leverage analytics because that are linked to product innovation process, allow to accelerate it by reaching the right customer, at the right time with the right information (Zhan et al., 2017). Marketing department is in search of valuable data, determined as insights, that will help it to generate knowledge and critical understanding of customer needs (Chandy et al., 2017) to identify opportunities for innovation (Troilo et al., 2017).

This prioritisation results in researchers and practitioners paying growing attention to data-driven innovation (DDI). DDI can be characterised as series of innovation processes that apply techniques (such as BD analytics) and technologies (e.g. machine learning, deep learning and artificial intelligence) to extract meaningful value from data to generate innovative results (Sultana et al., 2022a). Nevertheless, The CMO Survey (2022) reveals that nearly 40% of marketing organisations – among which two thirds are B2B organisations – are not yet convinced that they have the right systems in place for fully capturing insights that could align with their marketing innovation roadmaps and, apart from analytics, some organizational elements are obviously missing to implement DDI within the marketing department. This statement invites reflection on the composition of the distinctive BD-derived capabilities, particularly on the configuration of data-driven innovation capability of marketing (DDIC), and to clarify the contours of digital marketing capabilities (Du et al., 2021; Mikalef et al., 2018; Moorman & Day, 2016), i.e. a company'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 (McIntyre & Virzi, 2019; Sridhar & Fang, 2019; Wedel & Kannan, 2016).

So far, literature examined the concept of DDIC from the company macro-level perspective (Sultana et al., 2022a, 2022b) and not from the marketing micro-level. These studies inspect DDIC's marketing effects, such as data product performance, and do not develop a process-oriented approach of its construction within marketing organisations. While information systems science scholars recognize BD analytics capability (BDAC) resources as a constitutive element of DDIC (Mikalef et al., 2019; Mikalef & Krogstie, 2020), the marketing perspective is still lacking. Moreover, the marketing and information systems fields, mainly relating to DDIC, have produced mixed results on the innovation output components (Lehrer et al., 2018; Papa et al., 2021; Xie et al., 2016); a consensus for approaching the notion through the marketing research prism is still missing. Supported by 10 one-to-one interviews, the purpose of this study is to analyze DDIC within the marketing angle. More precisely, we seek to address the following research questions:

RQ1: What are the main components and underlying processes necessary to build DDIC of marketing?

RQ2: What are the interactions between the components and underlying processes of DDIC of marketing?

The paper is organized as follows. In the next section, we expose the theoretical background that guided us as an *a priori* method for understanding the phenomenon and facilitating the coding process and themes classification. We then introduce our methodology before presenting our empirical findings. Lastly, we discuss our results and underline the managerial implications and limitations of the research.

## **THEORETICAL BACKGROUND**

### *Resource-based theory*

We first rely on resource-based theory (RBT) (Barney, 1991) as a theoretical foundation to explain the components of DDIC of marketing. Marketing capabilities are mainly treated using RBT to expound how innovation generates the constitution of resources and capabilities to improve long-term company performance (Dutta et al., 1999; Srinivasan et al., 2002) and lead to its competitive advantage (Barney, 1991; Slotegraaf et al., 2003; Vorhies et al., 2009). Resources are the assets owned and controlled by a firm and capabilities enable them to be deployed advantageously (Amit & Schoemaker, 1993). Following the Grant's resources classification (Grant, 1996) into tangible resources, human skills and intangible resources (e.g. organisational culture and learning), we list the necessary elements to construct DDIC of marketing. This approach is actively used in marketing innovation topics research (Kozlenkova et al., 2014). Scholars also exploit RBT (Akter et al., 2016; Erevelles et al., 2016 Hagi & Wright, 2020; Mikalef & Krogstie, 2020; Rahman et al., 2020) to elucidate the effect of technologies use in marketing, such as marketing analytics, for innovation purposes and firm performance or to detect company's resources and capabilities as critical determinants in developing DDI (Sultana et al., 2022a).

### *Market orientation theory*

DDI incorporates innovation endeavours and technology evolution into its composition. Those dimensions are typically captured under a process perspective of achievement which is, to date, often disregarded in marketing capabilities studies. We intend to address this gap using market orientation theory (MO) (Jaworski & Kohli, 1993), described as a three-step process that (1) generates market intelligence base, (2) disseminates the information throughout the organization and (3) responds to the market identified needs by developing new offers

(Jaworski & Kohli, 1993). Our goal is to observe how data-centric firms deploy market-oriented marketing capabilities that collect information and distribute valuable insights for innovation projects (Jaworski & Kohli, 1993; Narver & Slater, 1990). MO theory has been depicted as an organizational contingency that can impact digital marketing capabilities (Homburg & Wielgos, 2022) and is positively associated with innovation capability improvement (Kirca et al., 2005; Ngo & O’Cass, 2012). Consequently, MO constitutes our second theoretical pillar to support our findings.

### *Dynamic capabilities theory*

RBT is sometimes criticized for its static position in fast-moving environment (D’Aveni, 1994; Martin & Eisenhardt, 2010) to achieve superior gains. B2B firms need to permanently adapt their organizational capabilities, like routines, patterns and operational modes, acquired throughout its existence, to continue to deliver value to customers. It raises an important issue for DDIC of marketing, particularly because of the changing technologies embedded in its constitution. To solve it, we investigate our concept via the dynamic capabilities theory (DC) (Teece et al., 1997) that repositions the focus on firms’ renewal of existing organizational capabilities or recombination of processes (Winter, 2003) to sense and seize opportunities in competitive markets. Largely employed in new product development (Deeds et al., 2000; Zhou et al., 2019), Wilden et al.’s (2015) emphasizes the need to “*explain the mechanisms leading to the creation and management of marketing capabilities*” (p. 369). We found little research that examined how to build dynamic marketing capabilities for innovation purposes (Barrales-Molina et al., 2014; Mikalef et al., 2019; Quach et al., 2020). Our objective is to assess how DDIC of marketing can be considered as dynamic, presenting an exploration of its operating modes reconfigurations.

### *Systematic literature review on DDIC of marketing*

As an emerging and growing subject, DDIC of marketing is lacking from a clear definition of its concept and contours. Consequently, we established a first theoretical marketing anchoring point by synthetizing the knowledge on DDIC of marketing through a systematic review (authors, 2022). The narrative and explanatory analysis (Rousseau et al., 2008) revealed a list of resources, skills and capabilities needed to build it, integrated into a three-stage process: (1) generation of an ‘outside-in’ information ecosystem, (2) dissemination of data-driven insights and (3) responsiveness to market. We followed this approach to gather and classify our field empirical evidence.

## **METHODOLOGY**

### *Research settings and sample selection*

Based on the proposed theoretical reading grids, we sought to examine the constitutive elements of DDIC of marketing. We opted for an exploratory qualitative research as the appropriated methodology to confirm our theoretical rationale and conducted ten semi-directed interviews. Additionally, to the best of our knowledge, to date, there is no empirical study on this B2B marketing subject. 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 big data information exploited by marketing departments. B2B companies choice was independent from their size, sector and type of offer (product or service), to avoid any discriminatory nature and advance towards transferability and generalization of our results. The selected observation unit was mainly anchored in marketing department to be in accordance with our research question problem settlement. Our qualitative research protocol was also enlarged, for a few cases, to other neighboring departments, to strengthen the internal



validity power of our work. We conducted interviews of 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). Table 1 sums up our sample features.

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

Table 1 – Exploratory qualitative research sample characteristics

### *Data collection and analysis*

Data was collected through ten semi-directed interviews, lasting between 35 to 90 minutes, via video conference. The interviews were based on a guide structured around the following topics: (1) the context and objectives behind which marketing department is using data for its innovation activities; (2) resources and capabilities necessary to build DDIC of marketing, with a focus on those that are essential to achieve DDI; (3) the obstacles to build DDIC of marketing; (4) the renewal or readjustment of the marketing organization procedures or mindset to build DDIC of marketing. Themes were not mentioned as such and not systematically in the mentioned order, so as not to influence respondents. Interviews were broken down into 4 major parts : introduction, centering, deepening and opening-conclusion of the subject (Grawitz,

2000). Each one was recorded and transcribed (resulting in 260 pages and 112915 words). We then operated a thematic analysis, mostly employed in management and organization studies (Dougherty & Bowman, 1995). We observed the Miles and Huberman coding's approach (1994) to extract evidence, classified them into a deductive framework derived from our literature review and added inductive codes emerged from our ground material (Figure 1). This data was sorted, defined and redefined during the analysis using *NVivo* software and applying comparison, abstraction, dimensionalization methods. Appendix A shows the codebook that guided our analysis.

The following section outlines our findings into an integrated process-oriented framework (Meyer et al., 2013), illustrated by corpus verbatim reporting (Martin & Eisenhardt, 2010) and thematic codes frequency examination (Appendix B).

## **FINDINGS**

Our content analysis identified four aggregated dimensions that correspond to components of DDIC of marketing: generation of an 'outside-in' information ecosystem, dissemination of data-driven insights, responsiveness to market and process re-engineering. We indicate the second order themes that correspond to the resources, capabilities and underlying processes inventory for each component and represented their relationships into an integrated process-oriented framework (Figure 1).

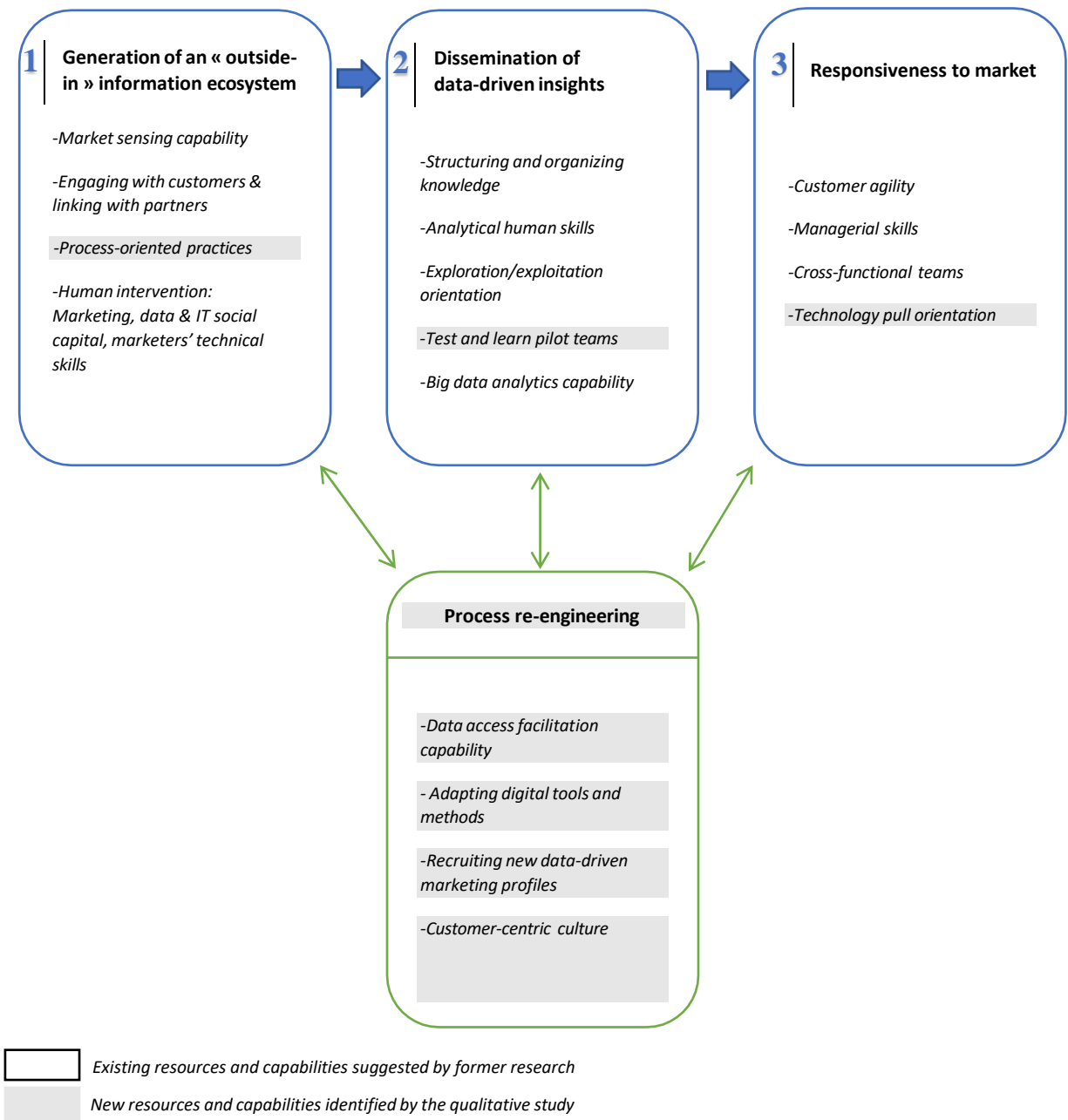


Figure 1 – A process-oriented framework of DDIC of marketing: components and underlying processes

We now describe every coded aggregate dimension.

### *Generation of an « outside-in » information ecosystem (1)*

Firstly, 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). Secondly, "process-oriented practices" capability highlights a new B2B marketers' mindset to collect information about their final users and identify needs or pain points that could be used as a data decision support tool to innovate. *"All those brands that do not have a direct relationship with the end customers, the end users, develop mechanisms to capture this data..."* (6, Marketing, data and CRM Consultant). Lastly, the data analysis revealed a limited importance of human intervention at that stage. It can be explained by the industry digitalisation level; companies decide to internalize or not this first stage, resulting a reduced need for human skills.

#### *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 (Appendix A): structuring and organizing knowledge, analytical human skills, exploration/exploitation orientation, test and learn pilot teams and big data analytics capability. The following verbs "identify", "combine", "orchestrate", "select", "prioritise", "translate" demonstrate how marketers interpret data

analytics into relevant insights for innovation inputs. The analysis also emphasized barriers to DDIC of marketing development linked to change management issue, like silos between data-driven and traditional marketers or a lack of analytical skills. To overpass them, marketing organization is recruiting some motivated talents to create “test and learn teams” that diffuse the new data-centric mindset, through training and brainstorming steering and user cases or best practices dissemination: *“So the implementation of the technology tool that x represented, actually, the key to the success of that, I think, is that it's working with a small subsidiary in the UK, which was kind of looking for new things . So, I had other people in the UK who said, yeah, it would be interesting.... We talked about it to the whole European team, using the UK example, as an example to employ that could be imitated elsewhere. So, there are other teams that said, yeah, we're interested in that”* (9, Small and Medium business EMEA Vice President).

#### *Responsiveness to market (3)*

Four resources were identified: customer agility, managerial skills, cross-functional teams and technology pull orientation. Two facets are observed for customer agility. First, B2B markets are accelerating faster, requiring a need to adapt the innovation activities rapidly to sense business opportunities and seize them: *“Today, we have information on the customers, on what they do, in the companies in which they work. You see, and afterwards, how we manage to offer them something according to...their job, to offer them something, to adapt...in relation to their professional expectations”* (4, CEO). Second, agility has become necessary to adopt new industries business model, like in the automotive field, where the value chain has been transformed, passing 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: *“In fact, at the time... the people who made semiconductors...developed products. These products, they went to the BtoB... to what we call an automobile equipment manufacturer. The car*

*manufacturers,... the transformation of their model has been quite systemic... Today..., a car...it's a computer on four wheels. As there was more and more electronics..., they went directly to what we call the second-tier suppliers, for example our company... 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).*

Furthermore, we highlighted the importance of managerial skills. Top management support fosters DDIC of marketing leveraging and praises middle management to instil the data-centric mindset in their innovation decision-making: *“We had management reviews in which we presented the results of satisfaction surveys and data surveys as well. So what we had recovered from the CRMs and then... from the regulatory department and we presented to the C Suite (i.e. members of the executive committee)”* (2, Senior Director, International Marketing).

Additionally, marketing department developed some cross-functional teams to respond the market, particularly because it reinforces customers knowledge to better apprehend its issue and offer innovation solutions: *“So in fact, we really had me who was a consultant, we'll say. Pierre was a weather expert and the client was an agronomy expert. And there, but it's great sessions with people. So we mustn't exclude the technical people, experts in what we know how to do, from the discussions with the prospects”* (3, marketing and sales manager).

It results a new way to organize marketing innovation roadmaps driven by outside-in insights and technology-pull orientation: *“You're going to go from an inside-out aspect to an outside-in aspect, i.e. you're really trying to understand the customer's problem. And as a result,... in terms of marketing, instead of spending, let's say 80% of your time with your engineers to*

*accompany them in the development of the product, you're going to spend a lot less time internally but a lot more, in fact with the customer or the customer's customer, to understand what the real final need is” (8, Senior director product marketing).*

### *Process re-engineering*

The latest component concerns 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. These aspects can be involved in every of the three steps previously mentioned and act as a continued marketing operational modes adaptation. Firstly, it is essential to facilitate communication on the available data, based on two recognized prerequisites, data visibility and quality: *“You need a database that is well fed... that the data is reliable, clean, that it can be easily exploited, accessible” (3, Marketing and Sales manager).* Secondly, DDIC of marketing is using updated technology-enabled processes to interact with customers and partners. In the travel industry, for instance, it was a necessity to adapt upgrading digital methods to cope with market turbulences, like Covid-19 context, when companies were facing a lack of employees in different countries meanwhile needing to preserve their established customers and maintain market shares: *“To have digital tools that really save time, so to be able to respond to this demand in order not to lose market share, we are obliged to innovate...this is where all the data that we have, we have to harmonize it in order to always keep the link and to always keep the business” (7, Product manager).* Thirdly, marketing department is in permanent search of data-driven skills, that include technical skills, to enable searches for unexpected insights, analytical skills, to exploit insights proactively and reactively, and managerial skills, to set innovation priorities: *“Organizations have been transformed. And there has been the creation of functions that we'll call, systems, for example, marketing systems, which, in fact, that's exactly right, it's a more analytical profile,... it's also a technical profile*

*because you have to be able to understand ...if I combine product A and product B from product line A and product line B, I'm going to generate more value for the customer than if I take product C and product D for example”* (8, Senior director product marketing). Lastly, marketing department is permanently disseminating customer-centric culture to perform customer-centric 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, the customer centric in fact and, and clearly, we've put, we've made upgrades. I mean, or some, yeah, 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**

Our exploratory study contributed to confirm and specify four components and underlying processes to build DDIC of marketing: generation of an ‘outside-in’ information ecosystem, dissemination of data-driven insights, responsiveness to market and process re-engineering, and established their relationships through an integrative conceptual framework. We also defined DDIC of marketing as a market-oriented dynamic capability, forming part of digital marketing capabilities, built according to a three-stage process and supported by a continued renewal of its operational modes.

Specifically, we assessed “generation of an outside-in information ecosystem” and “dissemination of data-driven insights” as the main steps to focus to build DDIC of marketing. The results are in line with the outside-in view of Day (2014) who suggests that companies develop market-based information capability by sensing the market, engaging with customers and linking with partners, and with considering data-driven insights orientation as an



expanding contributor to innovation projects (Ashrafi & Zare Ravasan, 2018; Dubey et al., 2021; Ghasemaghaei & Calic, 2019; Mikalef et al., 2019).

The material detected the presence of additional resources and capabilities to constitute DDIC of marketing, among which process-oriented practices, test and learn pilot teams and technology pull orientation. We can interpret process-oriented practices settlement as a return-on-investment (RoI) innovation strategy. Delivering ROI on marketing analytics is essential for marketers to convince top management to increase budgets that will further reinforce the strategic use of DDIC of marketing (Johnson et al., 2019). Test and learn pilot teams implementation concedes teams more autonomy, increasing the chance for marketing to use more big data information for its innovation portfolios and to cultivate a network of peers that facilitate innovation (Chen et al., 2015; Zhan et al., 2017). Lastly, a technology-pull orientation in responding to the market allows to leverage the benefits of DDIC of marketing deployment. This capability can be related to the latest block of our framework, ‘process re-engineering’, composed of routines that are continuously renewed to converge towards a technology pull orientation for DDI projects, i.e. facilitating customers data access by implementing platforms (Trantopoulos et al., 2017) or Internet-of-Things (Ng & Wakenshaw, 2017), and adapting digital tools and methods by interconnecting data aggregation and analysis tools, for example (Hajli et al., 2020). Recruiting data-driven marketing profiles with an ignorance based-view, capable of detecting the unexpected insight (Erevelles et al., 2016) and developing a customer-centric culture to offer a differentiated and personalized technology pull innovation are also key points (Cao et al., 2019; Lehrer et al., 2018). Finally, customer-centric culture constitutes an essential shift of B2B marketers’ mentality, moving progressively from a B2B to a B2B2C approach in their innovation process. All the conducted interviews connect customer-centric orientation with DDIC of marketing implementation. Some research evoked how B2B and B2C innovations are intertwined in the world of data and systems, cited the example of Amazon

whose philosophy and expertise is to work with customers to solve the problems of customers' customers, i.e., the end consumer (Wright et al., 2019). We advanced on DDIC of marketing definition within the B2B environment by considering customer-centric culture as a catalyzer throughout its settlement and use process.

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 the constructing of DDIC of marketing 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 and capability enclosed 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

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

\*AI : Artificial intelligence

Appendix A - Data structure codebook

<b>2nd order themes</b>	<b>Aggregate dimensions</b>	<b>Interviews frequency</b>	<b>Encoded references frequency</b>
Linking with partners	<i>Generation of an outside-in information ecosystem</i>	10	37
Analytical human skills	<i>Dissemination of data-driven insights</i>	10	32
Engaging with customers	<i>Generation of an outside-in information ecosystem</i>	10	27
Customer agility	<i>Responsiveness to market</i>	10	23
Structuring and organizing knowledge	<i>Dissemination of data-driven insights</i>	9	40
Market sensing capability	<i>Generation of an outside-in information ecosystem</i>	9	28
Managerial skills	<i>Responsiveness to market</i>	9	25
Data access facilitation capability	<i>Process re-engineering</i>	9	18
Exploration/exploitation orientation	<i>Dissemination of data-driven insights</i>	8	30
Process-oriented practices	<i>Generation of an outside-in information ecosystem</i>	8	27
Big data analytics capability	<i>Dissemination of data-driven insights</i>	8	14
Test and learn pilot teams	<i>Dissemination of data-driven insights</i>	7	26
Adapting digital tools and methods	<i>Process re-engineering</i>	7	14
Cross-functional teams	<i>Responsiveness to market</i>	6	11
Recruiting new data-driven profiles	<i>Process re-engineering</i>	6	11
Customer-centric culture	<i>Process re-engineering</i>	5	23
Human intervention: marketing, data & IT social capital	<i>Generation of an outside-in information ecosystem</i>	5	10
Human intervention: marketers' technical skills	<i>Generation of an outside-in information ecosystem</i>	4	11
Technology pull orientation	<i>Responsiveness to market</i>	4	9

*Appendix B – Second order themes and aggregate dimensions ranked by occurrence frequency*