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A multiple-case study on the adoption of customer relationship management and big data analytics in the automotive industry

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Abstract

Purpose – This paper aims at understanding how automotive firms integrate customer relationship management (CRM) tools and big data analytics (BDA) into their marketing strategies to enhance total quality management (TQM) after the coronavirus disease (COVID-19).

Design/methodology/approach – A qualitative methodology based on a multiple-case study was adopted, involving the collection of 18 interviews with eight leading automotive firms and other companies responsible for their marketing and CRM activities.

Findings – Results highlight that, through the adoption of CRM technology, automotive firms have developed best practices that positively impact business performance and TQM, thereby strengthening their digital culture. The challenges in the implementation of CRM and BDA are also discussed.

Research limitations/implications – The study suffers from limitations related to the findings' generalizability due to the restricted number of firms operating in a single industry involved in the sample.

Practical implications – Findings suggest new relational approaches and opportunities for automotive companies deriving from the use of CRM and BDA under an overall customer-oriented approach.

Originality/value – This research analyzes how CRM and BDA improve the marketing and TQM processes in the automotive industry, which is undergoing deep transformation in the current context of digital transformation.

Keywords Automotive, Big data analytics, CRM, Digital marketing, Digital transformation

Paper type Research paper

1. Introduction

During the coronavirus disease (COVID-19) emergency, the adoption of digital technologies was critical for firms operating in diversified industries. For instance, big data analytics (hereafter, BDA) and smart technologies, including automatic inspection systems, ensured the survival of manufacturing firms and also increased sustainable supply chain performance (Khan *et al.*, 2022). Considering other industries, in the health-care sector, BDA can be applied to increase system efficiency in several areas, e.g. forecast epidemics, fraud detection, avoid avertible deaths and improved quality of life (Singh *et al.*, 2023).

Another main industry impacted by digitalization is the automotive one. Technological innovations, sustainability and the recent COVID-19 pandemic represent major challenges that have strongly affected the automotive industry at the global level (Ishida, 2020). In particular, digitalization is considered the most important phenomenon in the automotive industry's 140-year history, disrupting the traditional business model, which was based on dealership (Kim *et al.*, 2022; Llopis-Albert *et al.*, 2021). Nowadays, automotive firms can rely on BDA to improve customer experience and performance (Accenture, 2021). Vehicle IT is

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also becoming progressively connected with the surroundings, e.g. car parks, other vehicles, gas stations and service providers, as well as with the backend systems of car manufacturers (Winkelhake, 2019).

In this digitalized context, the automotive industry has increased the adoption of customer relationship management (CRM) platforms (Steel *et al.*, 2013). Indeed, CRM enhances value for firms' shareholders (Payne and Frow, 2005), providing several benefits, such as customer engagement, innovation and customer loyalty (Perez-Vega *et al.*, 2022). Moreover, considering circular economy, the use of Internet-of-Things (IoT) technology can lower remanufacturing costs (Khan *et al.*, 2023a).

Given the recent disruptive changes and the limited research concerning the use of CRM tools and BDA in the automotive industry, this study poses the following research question:

RQ. How do automotive firms integrate CRM tools and BDA into their marketing strategies to enhance TQM?

The objective of this paper is to provide an empirical investigation of the adoption of CRM and BDA in the automotive industry. A multiple-case study was conducted involving international automotive firms that operate in Italy, which ranks sixth in Europe for motor vehicle production volume (Statista, 2022). We collected qualitative data in the form of 18 semi-structured interviews with professionals working for leading international automotive firms and other actors involved in the firms' marketing and CRM activities.

The remainder of this paper is structured as follows: the next Section provides a literature review of the studies focused on the topics of digital transformation, CRM and BDA. In Section 3, the research methodology is explained. The findings of the research are presented in Section 4 and discussed in Section 5. In Section 6, theoretical contributions, practical implications and limitations and notes for future research conclude.

2. Literature review

2.1 Digital transformation in the automotive industry

The recent COVID-19 pandemic has drastically impacted the business transformation among firms from diversified industries (Cherrafi *et al.*, 2022; Li *et al.*, 2022). In particular, it has accelerated the digital transformation of companies that had to adjust to the disrupted situation in a short period of time by increasing the adoption of digital technologies (Hu and Olivieri, 2023). Accordingly, after COVID-19, the automotive industry has sped up digitalization processes by 65% (Statista, 2020), leading firms to use advanced Industry 4.0 technologies (Belhadi *et al.*, 2021).

Lopez-Vega and Moodysson (2023) argued that digital transformation in the automotive industry results from incremental technological advancements, which provide necessary preconditions for the development of more radical technologies. Thanks to innovative technologies, novel services are emerging in the automotive industry that can lead to the creation of new value propositions to consumers (Athanasopoulou *et al.*, 2019). Specifically, digital transformation concerns three main fields (Winkelhake, 2019): (1) mobility services and connected services, (2) electric mobility and (3) automated driving. Regarding the first trend, the increased vehicle connectivity is reshaping business strategies, contributing to the shift from an approach based on product selling to delivering value through enhanced customer experiences (Zayer and Strempel, 2019). Concerning electric vehicles (EVs), enabling factors in their adoption are sustainability and environmental consciousness (Secinaro *et al.*, 2022). Finally, automated driving is related to self-driving cars, which use artificial intelligence (AI) to navigate a vehicle and require little to no user input (Eggers and Eggers, 2022).

Digital transformation offers opportunities to car manufacturers to increase profits, productivity and competitiveness, while customers can access better services and obtain

greater satisfaction with the required services (Llopis-Albert *et al.*, 2021). Moreover, digital technologies provide advantages in the relationships of automotive firms with other stakeholders of their network. For instance, Svahn *et al.* (2017) analyzed the case of Volvo Cars' connected car initiative, highlighting the importance of developing the skills and relationships of the people within the organization while also engaging external partners and resources. In the supply chain, digital technologies are key to enhancing efficiency improvements, higher transparency and information sharing (Paolucci *et al.*, 2021).

Considering sustainable business practices, digital technologies can also facilitate the monitoring and tracking of overproduction, energy use and waste (Khan *et al.*, 2023b). Therefore, digitalization sustains social responsibility and enhances the quality certification process, for example, by utilizing blockchain in the product traceability (Zoppelletto *et al.*, 2020).

According to a study by Sommer *et al.* (2021), who analyzed 167 global automotive companies, digital transformation primarily concerns a strategic transformation, while applications of digital technologies are still often unconnected. Dremel *et al.* (2017) stressed that for traditional manufacturers like car companies, introducing BDA requires substantial organizational transformation and new organizational structures and business processes. Hence, there should be an active collaboration between the IT and business departments. In a recent study, Giacosa *et al.* (2022) underscored that digital transformation requires a digital mindset, a flexible and agile company structure, extensive digital skills, together with robust IT infrastructures.

The exponential growth of big data generation during the digital era allows companies to target the right customers at the right time and with appropriate touchpoints. Indeed, firms can analyze multiple data to improve the relationships with their customers and lead to new product success (Kumar *et al.*, 2020). In this context, CRM software systems serve as an increasingly adopted tool for data collection and the enhancement of organizational functions. Their purpose is to deliver products that align with customers' expectations, thereby contributing to the growth of business performance. As argued by Bhaskar (2020), TQM and a marketing-oriented approach can represent a value strategy combination to ensure firms' competitiveness in the market; however, a support from the top management that emphasizes automated systems for data is necessary for TQM.

2.2 CRM and BDA

CRM has its roots in relationship marketing (RM), a strategic marketing approach aimed at creating, expanding and maintaining relationships with all company's stakeholders (Moser, 2021; Rao and Perry, 2002). RM has evolved into "one-to-one marketing" by focusing on more personalized offers for customers and, consequently, CRM has developed in order to manage more effectively profitable one-to-one relationships with customers in the long term (Osarenkhoe and Bennani, 2007). Practitioners and scholars have proposed numerous definitions of CRM based on different perspectives. As pointed out by Zablah *et al.* (2004), CRM has been conceptualized as a process, strategy, philosophy and/or technology tool. For several authors, CRM is a process that involves many areas within an organization and relies on a set of IT applications to automate marketing and sales activities (Kim and Wang, 2019). Others stated that CRM is not just a technology; it represents a business philosophy based on a customer-centric approach in which companies proactively respond to customers' evolving needs (Payne and Frow, 2005). By measuring and managing the key customer-level KPIs, CRM implementation generates customer value and enhances a firm's profit potential (Krasnikov *et al.*, 2009; Shah and Murti, 2021). As underscored by Kumar and Reinartz (2018), higher customer satisfaction results in stronger customer loyalty, which in turn fosters profitability growth thanks to repeated customers' purchases over time. Thus, the potential benefits of CRM include achieving customer loyalty and enhancing the effectiveness of marketing activities, by building strong relationships with those customers most profitable for the company (Moser, 2021).

As explained by Buttle and Maklan (2019), CRM takes three main forms: strategic, operational and analytical. Strategic CRM aims to construct a firm that consistently innovates and delivers value to customers in a way that surpasses that of other relevant competitors (Al-Homery *et al.*, 2019). Operational CRM supports the dialogue between companies and consumers by combining activities such as the design, planning and implementation of operational CRM functions through software tools. These tools automate daily tasks within marketing, sales and customer services business areas (Lamrhari *et al.*, 2022). Analytical CRM involves systems for data-driven decisions that enhance both customer and company value. It is the process of collecting and interpreting operational data to build sustained customer relationships (Moser, 2021). Other authors have pointed out the existence of the fourth form of CRM, known as collaborative CRM, which integrates and aligns multiple communication channels, including social media, to strengthen interactions between firms and customers (Alt and Reinhold, 2020).

By integrating all CRM core attributes, Lamrhari *et al.* (2022, p. 2) proposed a holistic definition that sees CRM "as a business strategy that integrates internal processes and functions, and external networks, relying on technology and scientific methods, to identify new customers, build lasting customers relationships, retain customers by meeting their needs, and finally reduce their churn rate, while minimizing the marketing and customer service costs."

Firms can store customer data in a centralized database using technology tools within CRM activities, thereby identifying sales opportunities and increasing revenues (Suoniemi *et al.*, 2022). A combination of internal coordination and use of technology tools facilitates the achievement of CRM benefits, including improving financial and marketing performance. In this context, big data allows for more accurate predictions of future market demand (Kumar and Reinartz, 2018). Additionally, BDA yields useful consumer insights for segmentation as well as product customization (Del Vecchio *et al.*, 2021). Companies that integrate CRM with other business systems and technologies, such as social media applications, can enhance the performance of customer relationships by providing greater access to market information (Trainor *et al.*, 2014). In this regard, academics have developed various models aimed at increasing profits by leveraging data mining; for instance, text-mining and social media data monitoring help companies establish long-term relationships with customers (He *et al.*, 2013).

In the digital era, CRM and BDA tools serve as strategic assets for companies. BDA enables the analysis of a vast volume of diverse data, and business intelligence tools may be helpful in increasing the efficiency and effectiveness of overall business processes, thanks to the high operational and strategic potential of big data (Singh *et al.*, 2023). In the automotive industry, BDA played a significant role during COVID-19 by providing real-time information on various supply chain activities to overcome the challenges posed by the emergency situation (Belhadi *et al.*, 2021).

Marketing and TQM are considered complementary, as organizations strongly oriented toward customer needs and expectations are successful in maintaining a competitive positioning and achieving a high level of business performance (Bhaskar, 2020). However, CRM necessitates significant efforts in intraorganizational and interorganizational coordination among the involved entities (Bohling *et al.*, 2006). Indeed, to enhance customer loyalty and achieve a sustainable competitive advantage, a cohesive, customer-centric perspective requires deep coordination among various company departments (Nicolescu and Nicolescu, 2022).

According to Nasir (2015), firms should adopt new, more flexible business models and sophisticated analytics systems to respond to shifting customer needs, as well as effectively leverage CRM activities. The large volume and variety of data lead to the development of new technology solutions which firms can implement within their CRM operating systems. As a result of the increasing use of CRM by companies, CRM software functionalities that apply AI

have been integrated. AI will have a disruptive influence on marketing strategies thanks to the substantial amounts of valuable data it gathers, offering opportunities to create a more personalized customer experience and contributing to innovate business models (Ledro *et al.*, 2022; Zhang *et al.*, 2020). Eriksson *et al.* (2020) pointed out that AI can be used within processes of marketing strategy formulation as an effective solution to manage high volumes of data from the external environment. However, they also highlighted that there is a need for further research about how this is implemented within firms' overall marketing strategies and the conditions for firms to actually benefit from using AI. Moreover, Rossato and Castellani (2020) found that investments in technological tools allow organizations to improve internal processes in terms of job management, developing new skills and reducing product time to market.

3. Research methodology

After revising the recent literature, a research gap concerning the role of CRM and BDA within the marketing strategies of automotive firms was identified. To address the literature gap and answer the research question presented in Section 1, following previous studies on CRM (Alshawi *et al.*, 2011; Curry and Kkolou, 2004; Dibb and Meadows, 2004), a qualitative methodology based on the case study (Eisenhardt, 1989; Yin, 2009) was adopted. Moreover, we opted for a multiple-case study since it reduces bias and is more generalizable than the single case study research (Eisenhardt and Graebner, 2007). We involved international automotive firms operating in the Italian market, which ranks sixth in Europe for units of motor vehicle production volume (Statista, 2022). To provide a holistic view of the phenomenon, the interviews were carried out with automotive companies' managers and other key actors involved in their marketing and CRM activities, including two informants from a leading CRM software company, a manager operating for a dealer and a professional with expertise in digital transformation in the automotive industry.

A theoretical sampling approach (Eisenhardt, 1989; Yin, 2009) was adopted to identify cases of automotive firms to analyze through databases and newspaper articles. We contacted potential interviewees through LinkedIn based on their job title related to automotive firms and the expertise in CRM, explaining the objective of the study and asking for availability to participate. In total, we collected 18 semi-structured interviews (Table 1), in detail:

(1) 14 key informants operated in eight leading automotive firms, holding roles such as CRM specialists and marketing managers, who provided an overview of the adoption of CRM systems in their firms' marketing strategies.

(2) Two key informants were professionals from a prominent CRM software company, so they offered insights into the CRM adoption from the perspective of a service provider.

(3) One key informant was a marketing and CRM manager working for a main automotive dealer.

(4) One key informant was a digital product owner for an equipment and services company, with an expertise in the automotive industry and digital transformation.

Primary data from interviews were triangulated with secondary data belonging to several sources, e.g. sector reports and newspapers' articles. The semi-structured interviews were conducted in the period June 2022–March 2023, with an average duration of one hour each. With the consent of the key informants, all interviews were recorded and transcribed ad verbatim.

Company	Industry	Headquarter country	Key informant
Company A	Automotive	The Netherlands	1. Head of Communication 2. CRM Specialist 3. Head of CRM and Customer Journey Management 4. Media Manager 5. Head of Customer Knowledge, Frameworks and Synergies
Company B	Automotive	Italy	6. Head of Customer Experience
Company C	Automotive	France	7. Digital Marketing and CRM Specialist 8. CRM Project Manager
Company D	Automotive	Germany	9. Marketing Communication Director
Company E	Automotive	Japan	10. CRM and Loyalty Manager
Company F	Automotive	Germany	11. Digital Marketing and Retail CRM Coordinator
Company G	Automotive	Italy	12. Customer Journey and Retail Marketing Manager
Company H	Automotive	Germany	13. Digital Customer Journey Manager
Company I	CRM software	United States of America	14. Vice President Solution Engineering 15. Senior Manager and Demand Generation Leader
Company J	Dealer	Italy	16. Marketing and CRM Manager
Company K	Equipment and services company	Italy	17. Digital Product Owner
Company L	Automotive	United States of America	18. Global Supply Manager

Source(s): Authors' elaboration

Table 1. Descriptive data of the key informants

The analytical process was based on an abductive approach that continuously compares data and theory, involving coding and grouping of qualitative data into different categories (Strauss and Corbin, 1998). The theoretical framework was modified over the course of the analysis, taking into consideration findings from the interviews and secondary data (Gioia *et al.*, 2013). Data were coded in two stages. In the first stage, the case description was built by analyzing interviews and secondary data. To identify first-order concepts, researchers initially conducted open coding separately and later compared the analysis through a discussion. In the second stage, by using an open coding approach (Strauss and Corbin, 1998), themes were developed emerging from the data. By iterating between emerging themes and the relevant theories from the literature, first-order codes, second-order themes and aggregate dimensions were developed. This process resulted in the identification of a data structure that underlined the connections between the data and the final aggregate dimensions (Gioia *et al.*, 2013). Data were analyzed with the support of the software NVivo. Table 2 presents the data structure of the study.

4. Findings

4.1 Customer-oriented approach based on a digital culture

During COVID-19 lockdowns, most automotive customers switched to digital touchpoints to interact with original equipment manufacturers (OEMs) because of dealership closures. With regard to the first aggregate dimension, the key informants reported that automotive firms strengthened their digitalization in response to changing consumer buying behavior after the COVID-19 outbreak. This was underscored by several interviewees:

First-order concepts	Second-order themes	Aggregate dimensions
(1) Online customers' habits after the COVID-19 pandemic (2) "Phygital" customer journey in the automotive industry	i. Company adaptation to changing customer needs	Customer-oriented approach based on a digital culture
(3) Cross-functional teams to develop and manage digital projects (4) Role of top management in fostering the company's digital culture	ii. Organizational structure changes	
(5) Tracking of customers/prospects' online actions (6) The analysis of the online customer behavior allows to develop targeted marketing campaigns (7) CRM and customer insights from BDA are useful to develop awareness on sustainable mobility among customers	iii. Digital marketing as a source of customer knowledge	Digital tools to build business relationships
(8) "Educating" employees and dealers in daily digital activities (9) Digital platforms for customer data sharing within the organization as well as between OEMs and dealership	iv. Collaboration between dealership and manufacturers	
(10) Monitoring of CRM-driven KPIs to measure business performance (11) Managing global customer data to optimize supply chain management and pricing strategy (12) BDA for customer segmentation	v. Higher effectiveness and efficiency in business processes	CRM and BDA to support TQM
(13) CRM allows to develop tailored strategies based on the collection of local customer data (14) CRM-driven KPIs, e.g. increase of conversion rate, brand awareness, customer loyalty	vi. Improvement of marketing functions	

Source(s): Table by authors

Table 2.
Data structure

> Digital touchpoints are becoming a growing share of our budget precisely because customers are increasingly shifting toward this direction. In broader terms, a few years ago, digital touchpoints accounted for about 25% of total automotive advertising spending, while now they account for more than 40%. (Key informant 4)

The growing use of digital channels inevitably favored the speeding up of digital transformation within automotive firms. Since its origins, the automotive industry has been characterized by a distribution model based on physical sales by dealership, but after the COVID-19 outbreak, companies were forced to offer a comprehensive online customer experience.

The COVID-19 pandemic led to lockdowns, social distancing and reduced foot traffic in physical dealerships. The challenge of replicating the physical contact with customers has compelled automotive companies to improve the online in-store experience. Consequently, these companies have heightened their dependance on online channels for customer interactions.

> We definitely need to apply technology to enable effective relationships and provide the same outstanding experience that we have been provided for years through face-to-face engagement [. . .], because, in the end, replicating a physical experience digitally has been the most difficult challenge faced in the COVID era. (Key informant 6)

Customer data have experienced rapid growth due to digital tools. As such, automotive firms have intensified the utilization of CRM tools for efficiently managing customer information, inquiries and requests for new product features.

> COVID-19 pandemic has brought to light the vast amount of data generated by digital tools, which we now need to manage in order to harness our marketing strategies, especially for CRM activities. Previously, we mainly used CRM to manage our database to extract all those to whom, for example, send some emails [. . .], but today it requires much more. (Key informant 7)

Secondary data showed that at the end of 2020, despite the dealerships' reopening, the online channel has become as the globally preferred touchpoint for purchasing cars across most age groups (McKinsey, 2021).

Nonetheless, few automotive players currently use e-commerce platforms providing an end-to-end user experience. As reported by the key informants, most firms allow customers to pre-order a car on their websites; however, they still do not permit making a sales transaction online. This is essentially because purchasing a car involves a well-thought-out decision, given the investment it requires; indeed, the automotive product itself represents a barrier for companies to digitalize the distribution model. Several professionals stated that automotive firms need to provide a "phygital" customer journey, since the physical experience will remain to view the car or make a test drive before proceeding with a purchase. At the same time, all interviewed companies expressed that digital touchpoints are seen as an increasing priority to meet customer needs by offering a better purchase experience:

> Today, customers choose a brand mainly based on the experience, which is offered by the company, rather than based on product quality. (Key informant 14)

Thus, automotive firms are striving to cultivate a customer-oriented approach with a digital culture led by the top management. The interviewed managers declared that firms increased investments in digital projects to counteract declines in sales and physical visits at dealership stores during lockdowns. Furthermore, our results show that internal organization restructuring and inter-dipartimental coordination are effective responses to changes in the external environment. The managers stated that communication among internal functions is crucial both for planning activities and obtaining performance results. In this regard, Key informant 5 stated: "A successful CRM system relies on changed management processes."

Automotive firms have created new specific departments and intensified cooperation between sales and marketing functions with IT departments to better manage the digital transformation, as well as foster internal sharing of customer data:

> The new department that we created allows us to optimize the development of cross-functional digital projects, including the one relating to the transition to online sales channel. (Key informant 13)

All these factors have contributed to developing a digital culture strongly oriented toward online customer needs, driven by the social conditions imposed during the pandemic. Technological progress has been embraced by automotive companies, permeating down to individual daily activities and reflecting a broader understanding of market demand. It came to involve shifting the view of cars from "pieces of iron to actual relationships with people" (Key informant 12).

4.2 Digital tools to build business relationships

The second aggregate dimension highlights several benefits for automotive firms in the usage of digital marketing tools as they permit the gathering of a considerable quantity of data, enabling a more thorough study of customer needs.

> The digital transformation allows us to precisely track online customer behavior in real time. (Key informant 5)

Several interviewed firms anticipated leveraging the increasing volume of data from various sources, including connected cars—a current trend in the automotive industry. The managers reported that connected cars present an intriguing opportunity to offer a unique customer experience while simultaneously boost revenues and reduce costs by monetizing vehicles data. The hardware and software installed inside connected cars prove valuable in collecting data on driver behaviors. For instance, as Key informant 12 reported, connected-car data that track customers' preferred locations and journeys help firms understand their needs or verify the vehicle's current condition, identifying any necessary repairs.

Moreover, several interviewees highlighted the importance of CRM and BDA in the field of sustainable mobility. For instance, firms use data to target specific client clusters for communication about EVs. As reported by Key informant 2, CRM is a fundamental tool for supporting customers at an educational level.

According to a recent BCG's (2023) forecast, by 2026 electrified vehicles will account for more than half of light vehicles sold globally and zero-emission vehicles will replace internal combustion engines just after 2035. In this fast shift toward EVs, the managers recognized the need to raise awareness among their customer base through an "evangelization" on sustainable mobility based on CRM activities and customer insights from BDA. In other words, the goal is to reach customers by explaining them the potential benefits that electric cars might generate, both for the individual customer and the whole society.

> Nowadays, the challenge for CRM is to understand whom to communicate messages about electric vehicles in order to encourage their purchase and break down sustainable mobility's barriers, such as premium price and inadequate charging infrastructures. Communication must be tailored according to the target that has been studied thanks to customer data, especially from digital channels [. . .]. Customized messages are important, along with in-depth knowledge of customers, even though they may remain anonymous. (Key informant 10)

During the interviews, all key informants highlighted the relevance of dealership in the marketing process. Since dealers operate closer to local customers than OEMs do, they provide an in-depth understanding of customer preferences at the international level by sharing information with firms' headquarters through digital platforms.

Indeed, dealers are responsible for managing and documenting the actions of customers and/or prospects, from generating the lead on the website to visit dealerships' stores and require a quotation. Once all this information is shared with OEMs' headquarters, the latter can determine, for instance, the stage of the customer lead or, when the lead management cycle is completed, whether a lead has been converted into an actual sale; in this sense, dealers are considered as "eyes and ears of the company" (Key informant 8).

The key informants reported that automotive firms utilize outputs produced by analyzing the data on CRM platforms, such as Salesforce, Oracle, SAP or Microsoft Dynamics, in order to customize products and aftersales services, as well as to develop one-to-one communication to strengthen their customer relationships. Key informant 3 stated:

> The use of traditional marketing tools is decreasing since digital tools allow companies to reach customers in a more targeted way.

Automotive firms aim to cultivate brand awareness through digital channels, foster exceptional customer engagement and collect data in order to develop a customized communication strategy. Through the observation of interactions, "it is easier to create personalized marketing strategies that offer the most added value for those [customers] on the other side" (Key informant 3). The key informants expected that digital marketing activities and CRM processes would become increasingly interdependent, even from an organizational perspective. Companies

identify potential customers and understand existing customers' behavior through inputs from digital marketing functions. They then deepen relationships through CRM strategies:

> The trick here is called "behavioral marketing": we plan our brand communication and marketing campaigns based on the online customer behavior. (Key informant 14)

Most key informants reported that an effective CRM system enables firms to monitor customer relationships over time, establishing continuous engagement processes based on a long-term digital marketing strategy. CRM platforms help companies follow their customers at all stages of the customer journey, identifying appropriate solutions for a better customer experience. For instance, CRM facilitates firms and dealers to aggregate and analyze data, such as the number of quotes, finalized sales contracts and workshop visits, as reported by Key informant 16.

Indeed, CRM tools are extremely useful to support customer decision-making during the initial car purchase as well as throughout the product life cycle, up to the next car purchase:

> Let's remember that doing CRM is not only about trying to sell products but also about accompanying customers when they already own a car. (Key informant 4)

In this context, the key informants stressed that involving human resources with specialized digital competences is a must within the company, since cars are becoming highly technological and also because technology is part of marketing activities as never before. Therefore, as business models undergo digital transformation, automotive firms' know-how needs to be updated. Digital marketing and CRM tools have been proven powerful in managing all customer data.

4.3 CRM and BDA to support TQM

Regarding the last aggregate dimension, our research suggests that CRM and BDA not only support the marketing activities but also TQM. Specifically, the key informants emphasized that CRM-driven KPIs (e.g. click-through-rate, lead conversion rate and loyalty rate) are necessary to develop corrective actions by using a proactive business approach.

> Generally, we set a business growth goal and then we work backwards by planning an ad-hoc CRM strategy to reach that business goal. (Key informant 9)

The adoption of CRM and BDA leads to a higher effectiveness and efficiency in business processes. For instance, analyzing consumers' behavior and market needs by the use of innovative digital tools allows firms to gain advantages in supply chain operations. Automotive companies and dealers benefit from digitization as a source of opportunities to perform faster and analyze data related to logistics and fulfillment more effectively. As reported by Key informant 18, for instance, AI allows organizations to precisely study changes in market prices, competitors' activities, raw material costs for car production and, consequently, properly adjust budget allocation as well as pricing strategy.

Several companies reported that they standardize CRM processes in different markets by implementing a single global cloud system to gather customer data. This means that headquarters align CRM processes by using easily comparable data. In this regard, Key informant 14 declared that "a winning strategy for international automotive firms involves adopting a centralized management for CRM processes that historically were not aligned across individual markets: this translates into optimization of resources, testing, people and budget allocation." Accordingly, automotive firms collect and monitor international customer data and production costs, so that they can get a bigger picture of what happens within the industry and implement appropriate marketing strategies. The interviewed managers added that standardized CRM processes are more efficient since they reduce global operating costs and hence, increase profit margin.

At the same time, companies need to take into account different international consumer preferences and adapt global marketing strategies to each individual market's features. An appropriate solution appears to be implementing local communication and marketing strategies, since "the more you can be local, the more this helps you achieve your business goals thanks to a better budget management" (Key informant 12). Therefore, data analytics is critical for developing appropriate CRM activities that avoid "one-shot" marketing communications based on generic messages, which tend to ignore differences in the customer base preferences. Indeed, the interviewed managers reported that data-driven decision-making positively contributes to customer segmentation. More in detail, our results underscore that BDA from digital tools and the analysis of CRM-driven KPIs constitute key resources for developing successful business strategies.

> We use customer data to measure return on marketing investments. In this sense, CRM strategies and processes translate into cost reductions and revenue increases. (Key informant 11)

The interviewees highlighted that CRM activities are aimed at getting to know both prospects and existing customers to reach higher performances through the sales funnel–from brand awareness to sales conversion–and generate profits:

> CRM acts on three levers that represent a great starting point for increasing company's profits: generating brand awareness, reaching customer loyalty, gaining new customers. (Key informant 4)

CRM strategies together with BDA and marketing automation processes lead to a tangible flow of sales conversions, with a potential increase in revenues that emphasizes the relationship between CRM and overall business performance. For example, Key informant 10 stated that the conversion rate increased by approximately 2.5% following the activation of automated lead nurturing processes, as opposed to the conversion rate derived from traditional marketing activities.

5. Discussion

The presented findings show that automotive companies have reinforced their digital culture with a strong emphasis on meeting the evolving needs of the new digital consumer. As in the results of Hoeft's (2021) study on Asian firms, also automotive companies in Italy suffered a drastic drop in sales during the initial COVID-19 lockdown. Meanwhile, firms experienced a considerable increase in user visits on their websites and online showrooms; therefore, they bolstered the use of digital touchpoints and innovated their business models to adapt to the acceleration of digital transformation. After the COVID-19 outbreak, automotive firms and dealerships had to rethink their existing sales and marketing strategies. Leveraging customer data was crucial to better understand how the market would have evolved during the following months, how purchasing behaviors would have changed and which CRM capabilities would have been required to address emerging customer needs. In this context, companies have focused on listening attentively to fast-changing customer behaviors by analyzing data from digital channels on a large scale (PwC Strategy&, 2020).

Our results indicate that BDA has been employed to conduct in-depth analyses of online customer behavior, empowering companies to tailor marketing campaigns and offers more effectively. In answering our research question, the integration of CRM and BDA within the marketing strategies of automotive firms is accomplished through agile decision-making based on real-time insights, adapting to changing market dynamics, as well as using multiple touchpoints to manage relationships with different stakeholders. Regarding the contact with customers, which was severely affected by the COVID-19 pandemic, automotive firms that adopted CRM ensured consistent communication support during uncertain times (Alt and Reinhold, 2020). An intelligent data-driven approach is useful to enhance customer

experience, since it allows to monitor customer information across the entire organization, by performing structured analysis and data interpretation to derive meaningful customer insights. Moreover, OEMs might benefit from partnerships across industries, especially with leading tech companies (e.g. Google, Apple . . .), to share technological skills and customer data. In this way, automotive companies will embrace more forward-looking digital solutions through a "customer value first" approach (Prashar, 2023).

This study confirms that following COVID-19, the durable goods industry, which includes the automotive one, experienced acceleration in digital tools' adoption (Hu and Olivieri, 2023).

Nonetheless, findings suggest that digital transformation involves significant organizational changes implemented by the firm leadership. Indeed, the distinguishing factor between less advanced companies and those poised to embrace new technologies is the profound belief of top management in the benefits of adaptating to the external environment. This involves investing in new tools as well as staff training. As reported by Li *et al.* (2022), a "top-down" decision-making structure leads to determine larger goals that also engage lower-level employees, representing a positive approach regarding the extent to which managers exploit external opportunities for business transformation. Brewis *et al.* (2023) found that leveraging new technologies and big data requires deep changes within organizations; therefore, whether the objective is to optimize existing assets or create a future-oriented business, it remains a leadership's decision. Thus, the support of top management is fundamental to encourage new business processes and practices, reducing organizational resistance against digital transformation (Schiavone *et al.*, 2023). Given the importance of customer experience for all firm's departments, it might be beneficial to appoint a Customer Experience Officer (CXO) (Yohn, 2019) to both improve the end-to-end customer journey and support digital transformation within the organization, thereby reinforcing the connection between employees' performance and customer experience.

The COVID-19 pandemic also led automotive firms to strengthen their collaboration with dealerships as a prerequisite to intensify customer data sharing and improve overall CRM results. In particular, automotive firms have extended the digitization to dealers by offering digital training and platforms, aiming to deepen their understanding of customer needs. This study shows that dealerships continue to play a crucial role within the contemporary automotive customer journey, serving as the touchpoint that delivers products to the final customer. Contextually, the positive contribution of dealerships involves the collection of local customer data, made possible by the proximity of dealers to consumers.

As the key informants highlighted, incorporating CRM tools and BDA into marketing strategies provides automotive companies with a comprehensive "toolset" to better understand, engage and serve their customers, ultimately leading to increased revenues and sustained business growth. For instance, targeted marketing campaigns driven by BDA result in higher engagement rates and increased ROI for CRM and marketing activities, thanks to a holistic view of lead pipelines and customer journeys.

Firms that effectively leverage CRM and BDA gain a competitive advantage by understanding market trends and predicting changing consumer preferences. This contributes to boosting various CRM-driven KPIs, such as customer loyalty and customer retention, as satisfied customers are more likely to become loyal (Kumar and Reinartz, 2018; Shah and Murthi, 2021).

To stay competitive and secure their market position, our results suggest that automotive firms are also driving a shift in customer preferences toward sustainability in vehicle purchasing by activating multiple communication touchpoints. When communicating the company's initiatives related to sustainability, automakers strive to be clear and direct through different channels, targeting diverse audiences to improve sales.

Regarding supply chain operations, digital technologies can assist firms in achieving data-driven quality management and improving the overall performance of supply chain

management (Clancy *et al.*, 2023). Moreover, BDA can favor the implementation of green practices operations in supply chain (Khan *et al.*, 2022). Ultimately, CRM tools and BDA offer new opportunities to automotive firms for value creation (Athanasopoulou *et al.*, 2019) with customers and other stakeholders.

6. Conclusion

6.1 Theoretical contributions

This paper seeks to contribute to the literature on digital transformation in the automotive industry by providing empirical insights into the implementation of CRM and BDA by car manufacturers that aim to enhance marketing and business performance after COVID-19. As highlighted by Conti *et al.* (2023), empirical investigation of marketing activity digitalization in manufacturing companies is rarely conducted.

Although leading firms had already launched marketing and sales automation platforms (Buttle and Maklan, 2019; Nasir, 2015) before the COVID-19 pandemic, most automotive firms have fully understood the advantages of such tools only after the health emergency. In the 2000s, car manufacturers reacted to technological advances by preparing for main trends, e.g. autonomous driving, e-mobility, connected cars and shared mobility platforms (Llopis-Albert *et al.*, 2021). However, it is only over the last decade that more advanced tools have become central to continuously engage with customers, facilitating the transmission of information about products and services (Candelo, 2019) in a more direct way. In particular, our results show that, following COVID-19, firms have expanded the functionalities of their websites, trasforming them into e-commerce platforms for cars sales. Previously these platforms were predominantly viewed as communication rather than sales channels.

This study points out that digitization enables marketing innovation by means of new distribution channels (Purchase and Volery, 2020). This marks a revolution for the automotive distribution model (Lempp and Siegfried, 2022), which historically relied on traditional channels with physical touchpoints. This stands in contrast to other industries (e.g. fashion or consumer electronics) that have embraced e-commerce platforms for several years.

Moser (2021) stressed that deep customer knowledge represents a relevant prerequisite for successful CRM systems. As customers engage with brands across multiple platforms in digital and physical worlds, managing the current omnichannel business ecosystem becomes increasingly complex (Natarajan and Veera Raghavan, 2023). On the one hand, as emerged in our case study, automotive firms still need insights developed by dealerships thanks to their direct interactions with customers in physical stores. On the other hand, given the acceleration of digital transformation after the pandemic, online channels facilitate data collection from multiple sources and contribute to improve customer experience.

In the digital era, the automotive industry views big data as a stronger asset to leverage than in the past (Candelo, 2019); indeed, our study reveals that organizations develop CRM strategies based on a data-driven approach to maximize value both for customers and companies. Specifically, business strategies rely on BDA systems to quantify CRM results in terms of profits. In other words, firms are becoming more granular in their CRM metrics and tend to link business performance to the effectiveness of CRM initiatives. According to most interviewees, "customer centricity" entails the development of highly customized products and services aimed at enhancing customer satisfaction and fostering customer loyalty. Furthermore, the use of BDA within CRM processes may lead to positive impacts on international marketing strategies (Bertello *et al.*, 2021; Kumar and Reinartz, 2018) as the data collected from multiple countries help to predict customer expectations at the global, regional and national levels. In detail, our results show that customer data enables automotive companies to drive marketing decisions by calculating the value of each customer, taking into

account not only car sales but also the entire customer journey, including after-sale activities. This confirms that the implementation of digital technologies allows for the optimization of existing business processes through more efficient coordination, as well as the creation of additional customer value by improving customer relationships (Conti *et al.*, 2023). Indeed, focusing on customers' data enables firms to better identify existing and potential customers and the revenue they generate by estimating future investment opportunities (Zineldin *et al.*, 2005).

At the organizational level, developing a mix of a digital-oriented culture and skills can positively influence digital transformation (Brunetti *et al.*, 2020). In this process, it is essential for firms to involve different stakeholders, including customers, suppliers and dealers. By capitalizing on collaboration with dealerships in the digital era, automotive companies can improve CRM processes and performances, relying on intraorganizational and interorganizational efforts (Bohling *et al.*, 2006). In line with the results of Zoppelletto *et al.*'s (2020) study, our findings support that digital transformation represents a critical source of business network success and quality performance improvement.

6.2 Practical implications

Our study provides several managerial implications for automotive firms on how to integrate CRM and BDA into their marketing strategies. While there is a widespread awareness about the importance of activating digital touchpoints within the customer journey to better meet changing customer needs, the overall culture of automotive companies should become more customer-centric (Scherpen *et al.*, 2018). The most effective response for companies depends on the ability to put customer expectations at the center of the organization, which means quickly identifying external market opportunities and constantly adapting the value for customers through a customer-oriented approach (Candelo, 2019). Indeed, this research highlights that an optimal approach to tackle disruptions like COVID-19 encompasses developing a digital culture that involves the entire organization. As pointed out by Brunetti *et al.* (2020), it is not possible to achieve digital transformation in the absence of a digital-oriented culture and specific skills, which are essential prerequisites for building new human–machine relationships. In this study, the key informants stressed that transformation is not exclusively related to investments in new technological tools, but it also implies a considerable commitment from a management point of view, which is transferred into new departments to develop cross-functional projects based on leveraging customer data. These latter aspects prompt organizations to enhance TQM through a focus on cross-functional teams, heightened responsiveness to customer needs and an overarching committment to quality, steering away from a strict reliance on functional departments and operational rules (Jabnoun, 2005).

Thriving in CRM involves bringing customers in the design process, encouraging them to share feedback and ideas, thereby ensuring that new offerings are aligned with their needs. Thus, the insights provided by customer data can reduce time in product development introducing new car models at shorter time intervals (Rossato and Castellani, 2020).

As our results highlighted, implementing new tools and processes to ensure successful adoption by teams across the organization is not sufficient. Automotive firms also require human resources with data analysis skills to derive meaningful insights from CRM and BDA; therefore, upskilling or on-boarding skilled experts is necessary. Moreover, the challenge regarding data quality arises following the increased usage of digital tools and the large-scale collection of customer data. As a result, automotive companies need to efficiently merge data from online sources with inputs from the dealership network. Integrating all this customer data empowers firms to implement a highly personalized customer engagement strategy.

Indeed, BDA captures numerous insights that can aid organisations' efforts to improve customer experience (Holmlund *et al.*, 2020).

A recent opportunity is represented by connected cars, which allow to develop data-driven services, such as remote vehicle diagnostic, thanks to the large amount of data regarding vehicles and the sorrounding environment they capture (Kaiser *et al.*, 2021). More generally, digital services, which are seamlessly integrated into an ecosystem of infrastructure providers (e.g. parking systems) and technology providers (e.g. smartphone companies), allow automotive firms to generate value by leveraging shared customer data. For instance, data services are useful to predict car maintenance, where value is created through the processing and use of vehicle data.

According to the interviewed managers, customer relationships will be increasingly disintermediated by digital tools in the near future. Therefore, automotive firms will need to provide outstanding customer experience to maintain relationships in the long term.

However, our results make clear that replicating physical experiences on digital platforms is one of the most significant challenges this industry has faced due to the COVID-19 pandemic. Automotive firms should engage customers by adopting an omnichannel strategy (Kim *et al.*, 2022) that combines digital channels and traditional touchpoints (i.e. dealership) to boost sales and build customer relationships in the long term. Digitization might bring significant improvements to the OEM's value chain by creating efficiencies, reducing costs and generating a higher customer engagement based on a business-to-consumer model, as customer experience has been and will continue to be a key differentiator in the automotive industry (Llopis-Albert *et al.*, 2021). The rapid development of digital tools makes supply chain management more systematic, informed and effective; consequently, supply chain management is evolving into a comprehensive strategy of global manufacturers in response to digital transformation (Li and Liu, 2019). In more detail, using big data for supply chain management allows firms to gain a competitive advantage over other players by improving product quality, ensuring speed, timeliness, flexibility and reducing the overall cost of operations (Mondal and Samaddar, 2023). In the light of disruptive events like COVID-19, digitalization can reinforce resilience in supply chain management (Cherrafi *et al.*, 2022).

Finally, our results support that CRM and BDA may prove beneficial in raising awareness within the EV products category, which emerged as one of the primary objectives for automakers amid stricter government regulations related to fuel-efficiency and CO2-emissions over the last years. The present findings suggest that automotive firms have been increasingly targeting customers interested in sustainable mobility to showcase themselves as EV innovators and also convince skeptical buyers about an electrically charged future (Forbes, 2022). Targeted campaigns are implemented by automotive firms to enhance EV awareness and overcome barriers associated with purchasing in this product category.

Overall, automotive firms benefit from implementing CRM within their marketing strategy. In detail, companies incorporating a customer-oriented approach, leveraging BDA and implementing omnichannel strategies as core resources are likely to improve their business performance. An appropriate innovation strategy and a culture focused on customer relationship management emerge as two key aspects for automotive companies to survive in such a dynamic environment, maintaining and increasing their competitive advantages.

6.3 Limitations and future research

In conclusion, our study points out that CRM is a fundamental element of a customer-oriented approach for business success within the current changing market. Moreover, as emphasized by Guerola-Navarro *et al.* (2021) in their research, business process innovation is directly linked to the company's ability to adapt to the external environment. Indeed, the use of CRM

technology represents one of the best practices for obtaining useful information to generate a positive impact on business performance and TQM improvement.

Since this study adopted a qualitative methodology that involved a restricted number of automotive firms operating in a specific market, i.e. Italy, findings might not be generalizable. In the future research, to generalize the findings of this explorative study, quantitative analyses should be conducted to measure automotive firms' marketing performances based on the implementation of CRM and BDA. Moreover, customers' point of view should be considered to understand their perception of the usage of CRM systems in the customer experience. Future studies could explore additional aspects of digital transformation in the automotive industry not covered in this paper, e.g. how firms employ technologies to seamlessly connect their vehicles with the surroundings, such as car parks, gas stations and service providers.

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