



IDENTITÀ, INNOVAZIONE E IMPATTO DELL'AZIENDALISMO ITALIANO.

Dentro l'economia digitale

ATTI DEL XXXIX CONVEGNO NAZIONALE
ACCADEMIA ITALIANA DI ECONOMIA AZIENDALE - AIDEA

- Torino, 12 e 13 settembre 2019 -



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UNIVERSITÀ DEGLI STUDI DI TORINO
DM DIPARTIMENTO
DI MANAGEMENT



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IMPATTO DELL'AZIENDALISMO ITALIANO.
Dentro l'economia digitale**

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ISBN: 9788875901387



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PREFAZIONE

Da tempo e con continuità gli aziendalisti italiani hanno saputo interrogarsi sulla rispettiva identità e sul ruolo da ricoprire in un contesto generale, che per definizione è ritenuto dinamico e in continuo divenire. L'accelerazione intervenuta nel contesto tecnologico mondiale, che è evoluto nella direzione di una profonda rivoluzione digitale, sta innovando i modelli aziendalistici del passato e impone oggi nuove sfide e riflessioni alla nostra Accademia. Infatti, il processo in atto, innescato e alimentato principalmente da tre fattori interconnessi - la diffusione dei sistemi operativi e delle interfacce user-friendly, la rapida affermazione di Internet e del World-Wide Web e la convergenza di quattro settori di business precedentemente distinti (computer, software, comunicazione, media e intrattenimento) - oltre a introdurre nuovi modelli di business, modifica sempre più profondamente quelli tradizionali ed impone verifiche e cambiamenti negli schemi teorici di analisi dei fenomeni aziendali.

Intelligenza artificiale, Internet of Things, Internet of You, interfacce, social media, stampa 3D, cloud computing e dispositivi mobili in rete hanno contribuito alla diffusione di nuovi business model e alla generazione di ricchezza e valore economico. Inoltre, la digitalizzazione ha favorito l'introduzione di importanti modifiche nei processi produttivi tradizionali (come, dove, quando e con chi lavorare), accelerando la comparsa di nuove forme d'intelligenza organizzativa, attraverso la raccolta e l'analisi di big data. La velocità dei processi operativi, la flessibilità del processo decisionale, il modo di formulazione e implementazione delle strategie, le soluzioni con cui conseguire l'efficienza produttiva sono continuamente impattate da questi strumenti tecnologici, senza che nessuna dimensione delle moderne attività aziendali rimanga oggi immutata.

I Big Data e i flussi informativi oggi disponibili sono diventati sempre più rilevanti e fonte di *business intelligence* per le aziende. Le ricerche online e la raccolta di informazioni sul processo decisionale di acquisto permettono di tracciare i processi personali di scelta e valutazione. Questo bagaglio di dati - generalmente non economico-finanziari -, ove raccolto e analizzato, può supportare efficacemente le aziende nel definire gli approcci dei clienti e condizionare, di conseguenza, le scelte strategiche e le forme organizzative da adottare.

A questi cambiamenti tecnologici se ne sono aggiunti di ulteriori, legati all'ambiente economico, fisico, culturale e sociale, che hanno portato le aziende a prestare attenzione ai temi dello sviluppo sostenibile ed alle esigenze di accountability.

Innovazioni e cambiamenti nella gestione aziendale, cui si affiancano rinnovati aspetti di responsabilità sociale e necessari nuovi approcci orientati alla sostenibilità ambientale, in una radicale riconfigurazione dei processi di formulazione delle strategie aziendali, delle forme organizzative e delle modalità di comunicazione, rilanciano il ruolo degli aziendalisti e impongono una ridefinizione degli approcci concettuali tradizionali e l'individuazione di nuovi schemi interpretativi. Infatti, i nuovi modelli di business e le novità nei processi gestionali presuppongono "innovazioni" nel ruolo delle figure aziendali e nei processi strategici e operativi tesi alla creazione di valore, coinvolgendo tanto gli aspetti più tipicamente tecnico-industriali quanto quelli amministrativi, finanziari, d'informazione e controllo.

Alla luce di questa acquisita consapevolezza, l'Accademia Italiana di Economia Aziendale, con il convegno dal titolo "Identità, Innovazione e Impatto dell'Aziendalismo Italiano. Dentro l'Economia Digitale", che si è tenuto presso l'Università degli Studi di Torino il 12 e 13 settembre 2019, ha inteso invitare gli studiosi, italiani e stranieri, di discipline economico-aziendali a riflettere, forti della loro identità, sulla direzione che le scienze aziendalistiche devono intraprendere sin dal presente, specie alla luce delle profonde e dirompenti trasformazioni che stanno rapidamente modificando i contesti e i modelli competitivi. Questa pubblicazione contiene il frutto di tali riflessioni e offre un'opportunità per la generazione e diffusione di conoscenza su questi temi.

Francesca Culasso – Presidente del Comitato Scientifico del Convegno AIDEA 2019

Michele Pizzo – Delegato AIDEA e membro del Comitato Scientifico del Convegno AIDEA 2019

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12. Automotive Aftermarket Business Model Evolution in the era of Digital Transformation

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Abstract

Digital transformation is accelerating and intervening the automotive aftermarket business model. The digital development is breaking down the traditional barriers of the industry, providing more cooperative environments, embracing organizational ambidexterity, improving customer relationship and value offerings. As a consequence, many academics and practitioners are emphasizing the need to rethink the existing business models in the light of digitalization. However, the recent researches are mainly focused on the technological development and less on business models evolution through the integration of new technologies, platforms and innovative digital services. The purpose of this paper is to understand how digitalization affects the business model of automotive aftermarket by applying qualitative case study approach through 26 in-depth interviews within automotive companies. Moreover, the research illustrates the future picture of pillar business model elements which are evolving in the era of digital transformation.

Keywords: Business Model, Digital Transformation, Automotive, Aftermarket.

1. Introduction

Digitalization is expected to play a fundamental role in the coming years. The emergence of digital innovations is resulted in radical changes of all business activities which may refer to in short as Digital Transformation (DT) (Henriette et al., 2015). DT, also known as digitalization, is defined as changes in ways of working, roles, and business offering as a result of applying advanced technologies such as big data, cloud computing, the internet of things, robotics, artificial intelligence, and impressive communications (Parviainen et al., 2017). In this regards, the automotive industry provides a particularly interesting research context for examining the impact of DT since recent digital innovations like self-driving cars, ride sharing platforms, new telematics services, and social networks are fundamentally revolutionizing this industry (Hanelt et al., 2015). Moreover, automotive aftermarket is facing several industries – specific trends towards DT such as connectivity and digitally-enabled services (Bernhart et al., 2012). As a consequence, companies are required to be aware of these technologies' disruptive character (Riasanow et al., 2017), and also adjust their business models in order to deal with the emerging of pervasive changes (Chanias and Hess, 2016). Prior studies have already started to observe some of the impacts of DT in automotive industry. However, they are mainly focused on the technological development and less on business models evolution through the integration of new technologies, platforms and innovative digital services. In order to address this gap, this paper focuses on examining the DT on the automotive aftermarket industry providing insights on the following research question: "What is the impact of innovative digital technologies on the automotive aftermarket's business models and how business model elements will be reshaped by leveraging on new technologies? To answer this questions, a theoretical analysis has been conducted on academic papers and consulting reports to better understand the impact of DT on automotive aftermarket. Thereafter, the study applies qualitative research approach within 26 companies encompassing automotive manufacturers, service assistance centers and other industry players such as technology providers and logistic companies.

The remainder of this research paper is structured as follows. In the next section we analyse the underlying literature of DT and shed light on existing studies on automotive industry in the digital age. In section 3 the adopted research design and methodology are presented. Then, section 4 depicts the research findings emerging from a qualitative analysis and consequently section 5 reports the discussion of results. Finally, in section 6 conclusions are presented together with the identification of limitations and possible further developments of the study.

2. Theoretical background

2.1 Introduction to digitalization and digital transformation

DT, also known as digitalization, is defined as the use of digital technologies to enable major business improvements (Fichman et al., 2014). Bharadwaj et al (2013) describe digital technologies as "combinations of information, computing, communication, and connectivity technologies" that enable rapid innovation of products and services, shorter product life cycles and also cross-boundary industry disruptions which drives dramatic changes in the structure of many organizations (Setia et al., 2013). The shift of value from physical

artefacts to “smart” products (Klötzer and Pflaum, 2017) and combination of hardware, sensors, data storage, microprocessors, software and connectivity results in reshaping business activities (Henriette et al., 2015). In this context, the exponential development of data and connectivity, the implementation of smart products and Cyber-Physical System (CPS) as the technical foundation of Internet of Things (IoT) are expected to redesign the future of business operations and processes as well as organizational structures (Reis et al., 2018).

A holistic analysis carried on extant definitions of DT highlights 26 unique definitions illustrated through 28 sources (Vial, 2019). Furthermore, DT definitions through literatures are categorized into three distinct elements: 1) Technological – DT is based on new digital technologies, 2) Organizational – DT requires a change of organizational processes or the creation of new business models, 3) Social – DT is influencing all aspects of human life by enhancing customer experience (Reis et al., 2018). In this context, establishing management practices will be a vital approach in order to govern the emerge complexity towards DT (Matt et al., 2015). Among different definitions proposed by both academic and business communities, DT can be defined as the modification or adaptation of business models through offering smart products and services, optimizing internal and external processes, improving customer relationship, and creating new value networks (Ibarra et al., 2018; Kotarba, 2018).

2.2 Digital transformation in the Automotive Industry

Drawing on the automotive industry, recent digital innovations like self-driving cars, connectivity, big data and social networks are leading trends that have fundamentally revolutionized the automotive industry (Riasanow et al., 2017) since “the future of car has been described as a sit-in mobile device” (Henfridsson and Lindgren, 2005). Furthermore, the automotive industry is in transition, shifting from a traditional manufacturing to a high-tech industry where vehicles are being manufactured with more electronics and digital components and the amount of data related to vehicles and drivers is expected to grow. The industry has been overrun with technology and data since vehicles will be data – generating engines in the near future (Delhi, 2016). In this regards, valuable knowledge could be acquired from collected data that leads to create value-added offerings such as predictive maintenance, remote control of driving habits, exchange information about road conditions and traffic situations, remote diagnostics, and usage-based insurance (Gao et al., 2016).

According to the Delphi study conducted by Piccinini et al (2015) with industry experts, the emerging challenges which come in line towards DT of the automotive industry can be competing with an expanding range of new rivals and non-industry rivals and entrants, building new partnership among different players in ecosystem, and improving information flows and exchange between business ecosystem partners to create new digital value and enable seamless customer experience. Furthermore, the rapid digital advancements from automotive manufacturers forces the automotive aftermarket to increase their digital presence in order to stay relevant in their business environment and keep customer satisfaction at a high level and securing long term profitability (Riasanow et al., 2017). Thus, we analysed the DT of the automotive aftermarket from the holistic perspective of its business model aim to picture the future shape of business model elements.

2.3 Business Model

Based on the body of literature, business model is substantial to any organisation as it provides a concrete avenue to understand, analyse, communicate, and manage strategic, operational and economic decisions (Osterwalder et al., 2005; Shafer et al., 2005). Definitions of business model available in the literature can be generalised into three main views: 1) it is an overarching concept that can describe all real-world business; 2) it addresses a set of businesses with common characteristics; 3) it describes different aspects of or a conceptualization of a particular real-world (Orellano et al., 2017). Although researchers have indicated different views about the notion, structure and evolution of business models, all such contributions have converged on the fact that business model explains how a business creates and delivers value to customers (Al-Debei and Avison, 2010). Moreover, as stated by Timmers (1998) business model can be defined as “an architecture for the product, service, and information flows, including a description of the various business actors and their roles; a description of the potential benefits for the various business actors; a description of the source of revenues”.

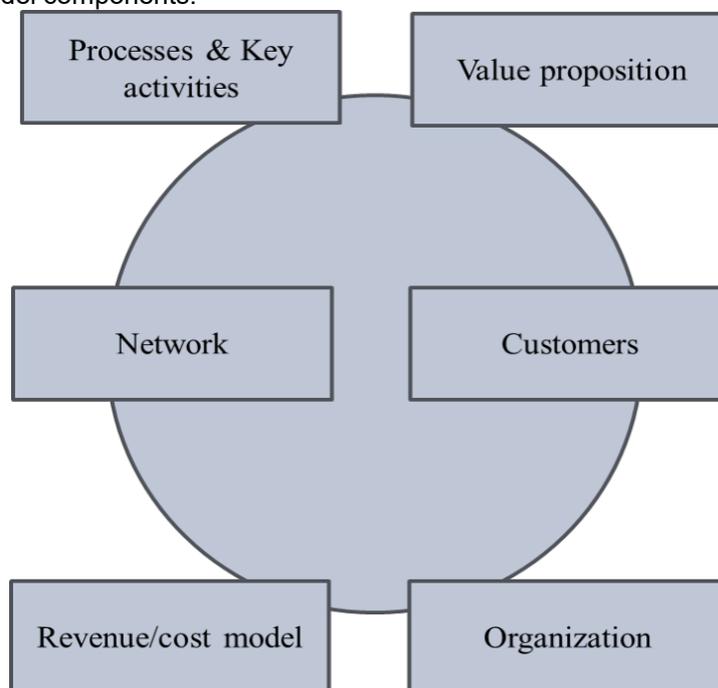
Summarizing the different contributions of literature, it can be stated that more than fifty-four different elements may compose business model (Aziz et al., 2008). According to Shafer et al. (2005); these elements can be categorised into four major categories: Strategic choices, Creating value, Capturing value, and Value network. A recent research carried out to prioritize the business model components, on the basis of the level of agreement in the literature regarding their use, suggested that value proposition, customer, internal competences, and revenue model are considered as the most common elements included in a BM framework (Adrodegari and Sacconi, 2017). In particular, the business model CANVAS with its nine components proposed by Osterwalder and Pigneur (2010) has been identified in the literature as the most suitable tool which can be used to describe, analyze, and design business models. Nevertheless, some studies provided different business model frameworks with generic and relevant elements in regards to both product-centric firms and pure service players (Storbacka et al., 2013; Kindström, 2010; Nenonen and Storbacka, 2010). In this regards,

we considered business model proposed by Adrodegari and Sacconi (2017) which is more aligned within service firms and comprises typical business model components: strategy, finances, value proposition, revenue model, resources, service provision, customer and network.

3. Research approach

Considering the interplay between theory and empirical phenomena (Dubois and Gibbert, 2010), this paper follows an inductive approach, looking at specific cases to underpin further development of the DT in the automotive aftermarket. A comprehensive literature review was initially carried out to improve understanding of digitalization and DT concepts. We started with the inclusion criteria by using the “Digital Transformation” and other similar terms (e.g. digitization, digitization, digitation), and afterward combined with “automotive industry”. Furthermore, according to the realignment of DT and business model (Solis et al., 2017), also a comprehensive literature review was carried out to identify the main definitions of business model as well as its components. The search was focused on recent studies on academic papers and consulting reports considering journal articles, conference papers, books, and material available on the internet through interdisciplinary search engines such as Google Scholar, SCOPUS, JSTOR. Based on the literature review, we developed a research framework which depicts business model and its components, illustrated in Figure [1].

Figure 1. Business model components.



Thereafter, we conducted several workshops with targeted people and experts from automotive industry aimed to identify the research questions. After defining the work structure and clarifying the objectives of the analysis, a questionnaire was built up based on the main business model elements which were already suggested by both industry experts and previous literature. An in-depth qualitative analysis based on a case study approach was employed towards 26 semi-structured interviews including 5 automotive manufacturers, 14 service assistance centers and other 7 industry players such as technology providers and logistic companies. The interviews were conducted following a three steps process: selection of interviewees, execution of interview and transcription to outline the results. The interviewees were selected among CEO and service managers; each interview lasted between 90 and 120 minutes, was done face-to-face by two researchers and was recorded in order to increase the internal reliability of the study. The consistency of the collected information and their adherence were evaluated independently and cross-checked by the researchers, to converge to a general consensus (Baxter and Jack, 2008). The findings based on qualitative analysis are presented in the reminder of paper (Section 4).

3. Findings

Here, we presented main research findings based on our qualitative case study approach to shed light on the evolution of automotive aftermarket business model in the era of DT. Findings are presented for each business model component.

Value proposition. Using digital technologies enable companies to reconfigure their value proposition. Thanks to increasing the information and connectivity, Original Equipment Manufacturers (OEMs) will be able to improve their offerings, using big data in an innovative way to optimize the total cost of ownership (TCO).

“The most important thing is to reduce the total cost of ownership. Sustainability is important not only from an environmental point of view, but also from economic side” (Company 3)

“The main opportunity of DT will be to improve our customers' satisfaction by reducing the total cost of ownership and improving our efficiency” (Company 8)

In particular, telematics systems will become an integral part of the vehicles, thus allowing the provision of real-time information on their conditions, traffic, and load capacity leading to the optimal performance in fleet management.

“Telematics technology offers the opportunity for a complete and efficient monitoring of vehicles and their drivers (usage behaviour)” (Company 3)

“As long as the driver's behaviour can be monitored (e.g. to find out who is the most fuel-efficient driver), there will be several ways and opportunities to motivate and encourage drivers to drive better” (Company 5)

Moreover, digitalization will also support OEMs to improve the reliability and quality of products and services, increase the fuel consumption efficiency, ameliorate the level of road safety through emergency assistance systems, and enhance the customer satisfaction associated to maintenance notification systems.

“The technologies linked to products and services that have recently been developed mainly concern two areas: the first is the fuel efficiency, while the second refers to services and, in particular, to actions aimed at reducing unplanned downtime by the customer” (Company 3)

“With Driver Times we continuously monitor driving times and can see who needs to take a rest, thus increase the safety” (Company 5)

“[...] this change on the type of maintenance which is no longer on demand, but becomes proactive, results in increasing the customer satisfaction” (Company 13)

Again, connectivity will lead service assistance centres to simplify the process of communicating with customers and enable a better understanding of their needs.

“The main objectives will be to simplify the activities of operators to create new business opportunities. [...] collected data from vehicles and customers support us to better understand the customer needs” (Company 10)

“The way we do maintenance has been changed. The customers no longer have to go to the reception to ask for an intervention, but it is the company that contacts them directly” (Company 13)

Finally, predictive maintenance and remote diagnosis will facilitate the prevention of breakdowns, creating the basis for efficient visits leading to improve customer experience and loyalty.

“With e-TRUCK, we have the possibility of constantly monitoring the status of the vehicle remotely, managing predictive maintenance and, an absolute novelty, performing adjustment functions that allow you to restore the optimal condition of the vehicle” (Company 10)

“Another service is remote diagnosis via upgrade systems without the need to connect physical cables. This brings considerable advantages in terms of time and productivity” (Company 3)

“Technology, if well used, helps to build customer loyalty to the brand” (Company 9)

Processes and key activities. Digitisation will increase the efficiency and quality of repair and maintenance processes. The internal activities will be automated such as entrance check, workplace adjustment, and documentation of service tasks with the aim of simplifying daily business.

“Anticipating the arrival date of customers, supports us to become more prepared and improve our efficiency” (Company 15)

“With digitisation you can shift with fewer hours of work and create more efficiency. You can also see the historical background of all operators, customers, and vehicles” (Company 26)

Adoption of digital technologies will thus eliminate complexity from the process, reduce manual tasks and lead time (Parviainen et al., 2017).

“We don't have any robots at the moment, but we hope there will be this possibility in the future to make the activities more easier and less tiring for the operators” (Company 14)

“Now, thanks to systematically connected equipments, the vehicle data and repair history are already available and automatically transfer among the service devices and can be stored. Before it was the workshop acceptors who had to keep in mind everything, but now check the data on the tablet” (Company 9)

“With digitization, work is done in less time and processes are shortened, make it possible to manage your tasks faster and more efficient” (Company 14)

The Customer journey will change in turn, as the service will be seamlessly integrated into people's daily life and customers will be able to enjoy the services, without going directly to the workshop. Such “Invisible service” will create transparency, as information will be delivered in real-time through digital channels (Schmidt et al., 2018). Consequently, the service networks configuration will move from expensive storefront in premium location to outside the city or in strategic areas characterized by a few large service centres (the so-called service factories).

“The ability to access and collect data in an integrated way with a single application and without passing through the workshop, has facilitated to offer invisible service and improve the customer journey” (Company 25)

“We are starting to use the app launched by the OEM to improve our customer experience from arrival to delivery of the vehicle, thus making the service faster and more comfortable” (Company 8)

Network. Companies in the automotive sector will operate in a more complex market with low market barriers entry. In particular, the entry of new players from outside the automotive industry, such as technology giants Google and Apple, will increasingly change the network collaboration of aftermarket landscape. Indeed, service aggregators will have the potential for tremendous impact on the e-retailing and service market (Setia et al., 2013). Websites, such as RepairPal and AutoMD, operating with the same logic as Expedia or TripAdvisor, will aim at directly connecting consumers and service providers, thus disrupting traditional operators.

“The area of competition is becoming complex and the boundaries for market entry are becoming increasingly blurred. We as a technology supplier have maintained our leading position by offering a complete package of technologies and product synergies: devices, tools, software, etc. Other competitors are able to offer a piece of cake while we offer the customer the whole cake” (Company 23)

“New players have entered the aftermarket such as providers of telematics solutions and fleet management services. However, competitive pricing is the way that allows to survive in competitive environment” (Company 5)

“TEXA, a world leader of multi-brand diagnostic tools, offers a wide range of high level remote diagnosis devices to trucks” (Company 8)

Digitization will thus open the pave to distinct competition dynamics characterized by the so - called "co-competition" models, in which players from converging industries will develop strategies of cooperation, rather than competition (Becker et al., 2018).

“I know there are already new form of cooperation. Volkswagen and Audi have created partnerships with Google. I think because the OEMs are afraid that in the near future there may be a loss of marginality because of these new players. So these forms of collaboration are necessary” (Company 16)

“Competition has turned into cooperation and collaboration to reduce investment and costs” (Company 21)

Indeed, it is expected that in the near future a new cooperation model will emerge where some industrial groups will consolidate their position through acquisitions or mergers (M&A) to reach a critical mass and a widespread presence on the territory (Breitschwerdt et al., 2017).

“[...] the highest pressure for consolidation is on the parts distributors to leverage economies of scale. Pursuing M&A strategy will support to increase size and level of internationalization” (Company 20)

In addition to consolidation, open and superordinate platforms will be created in order to bundle digital solutions by hosting the various players located upstream and downstream of the supply chain. This is an example of the new paradigm called “platformization” through a virtual cloud ecosystem (Kromhout et al., 2017), which allows end-consumers, digital giants, traditional service providers, auto manufacturers, and suppliers of IT solutions to be connected through a virtual connection, balancing their decision-making power.

“The TruckOn platform works like Booking.com (digital booking platform) for truck services where independent repair auto shops put their various services related to repair and maintenance in order to receive bookings” (Company 22)

“The platforms could be operated by different actors in the value chain, such as OEMs, distributors or rather technical support centers” (Company 22)

Customers: It is common opinion among experts that digitalization will lead to new and changing customer requirements as well as accelerate the demand for additional and more personalized services. Furthermore, the transition in customer behavior and preferences from a perspective of possession (ownership) to a perspective of sharing (renting, leasing, pooling) can be another major trend influenced by digitalization (Kempf et al., 2018).

“There are generations of drivers who are very much in favor of new technologies. In addition, these types of customers are more demanding, much more aware and prepared” (Company 19)

“There is a shift from ownership to shared mobility, from private to fleet” (Company 25)

Thanks to the new digital platforms, customer segmentation will move towards “segment of one” with the aim of enhancing customer centricity, offering options that are customized to individual customers and create segment-specific value propositions in the area of connectivity-enabled services (Mohr et al., 2016). Indeed, through the influence of social media, customer communication can be achievable in real-time in order to receive customer feedback and comments (Henning-Thurau et al., 2010). Customers are increasingly turning to online reviews to improve their purchasing decisions on the basis of the recommendations reported in chats, blogs, and forums.

“We’re on Facebook and Instagram. In particular, we use Instagram to promote events and propose new cars arrived in the dealership” (Company 17)

“The physical showrooms are no longer necessary and sufficient, but it will necessary to manage the virtual showrooms” (Company 9)

"Communication with customers is shifting to the social media since the generation of customers is changing" (Company 13)

Digital technologies will also change the customer relationships in the way that spare parts and services will increasingly be provided through multiple platforms with the aim of improving customer experience.

"We have undergone the evolution of digitization, especially with regards to the used cars, which today are sold only online. In fact, in the past, customers came to us to test and buy the vehicle, while now, thanks to the Internet, they visit and collect information online through websites such as Autoscout.it and Automobili.it." (Company 19)

Moreover, thanks to the use of big data as well as the convergence of mobile connectivity and telematics, it will be possible to make services more proactive (Bharadwaj et al., 2013) and also develop a complete online services such as, location-based services (LBS) and last-mile delivery ("Click and Collect").

"Artificial intelligence (AI) allows to leverage customer data in order to offer the right offerings to the right customers" (Company 10)

"The market is increasingly oriented towards e-commerce. We are witnessing the advent of after-sales services such as "click and collect" and last-mile logistics" (Company 10)

Revenue/cost model: The DT will change the cost/revenue model of the automotive aftermarket. The digital ecosystem and "digitally-enabled" services will consider as the main source of revenue in the near future (King and Lyytinen, 2005). Indeed, the possibility of integrating digital products and services for specific customer segments and introducing of innovative telematics services will act as routs into revenue-generating activities.

"We can benefit from the generated data and it will bring a great opportunity for us to offer digital services and consulting activities that open up a new income model" (Company 1)

Additionally, the strengthening of digital network will enhance the level of knowledge on customer needs and results in lost sales reduction, due to inability of interpreting customer needs correctly.

"It is possible to reduce the risks of "lost sales" due to the inability to correctly interpret needs" (Company 4)

Finally, online channels will increase price transparency as well as quick access to information on the prices (Breitschwerdt et al., 2017). On the other hand, machine learning systems and big data will allow large amounts of data to be analyzed in real time, thus providing the possibility of having dynamic and sophisticated pricing systems (shifting from cost-based to value-based pricing approach) leading to optimization of pricing strategy.

"Thanks to advanced technologies such as machine learning, there will be other pricing approaches with respect to what has traditionally been applied" (Company 21)

"Pricing is no longer a function of costs. [...] online platforms enhance the price transparency and customers have the opportunity to make comparisons" (Company 1)

"The pricing strategy changes from a 'cost based' to a 'value based' logic. Companies should therefore consider the value they can offer" (Company 20)

Organization: DT will require new skills and competences at all levels of the organization. In future, technicians will more interface with digital devices leads to enhance IT-focused activities an app for diagnostic codes or product details that increasingly raising the needs for more mechatronics and IT skills.

"Today, technicians in workshop must know how to work with remote diagnostic technologies and other digital repair tools. [...] the radical change from classical mechanics to mechatronics" (Company 13)

"Traditional skills will change, for example, staff who are now only responsible for calibration should in future be experts in preparing more sophisticated report. [...] the operators will increasingly behave proactively rather than reactively" (Company 22)

"No role will disappear while everyone should embrace digitalization as means to improve the way they do business" (Company 14)

"Technology enhancing and augmenting the workforce as well as attracting and developing new types of talent" (Company 20)

The choice of make or buy of competences will be another critical aspect to consider, as some competences can be outsourced to external innovative parties under a partnership contract that might be time saving and give cost advantages (Berret et al., 2017).

"Some competences could be outsourced to innovative external partners under a partnership contract" (Company 1)

Organizations should allocate responsibilities to allow and oversee the technology development as well as its governance. Furthermore, organizational structures should transform from a functional structure to a cross-functional collaboration, in order to create a collaborative, human-friendly work/life environment.

"Inside our company we allocate a responsible who follows the whole process of digitization and coordinates with a group of fifteen people belonging to different areas" (Company 12)

"In order to deal with complexity risen by digitalization, workforces should be multi-task and able to collaborate from different functional areas and / or departments" (Company 5)

Furthermore, demographic change will drive companies to create more diversity in the workforce since the use of diverse teams is the key to success in digitalization. Indeed, future-ready corporate culture, high level of commitment and the right mind-set among the workforce are vital prerequisite towards digitalization.

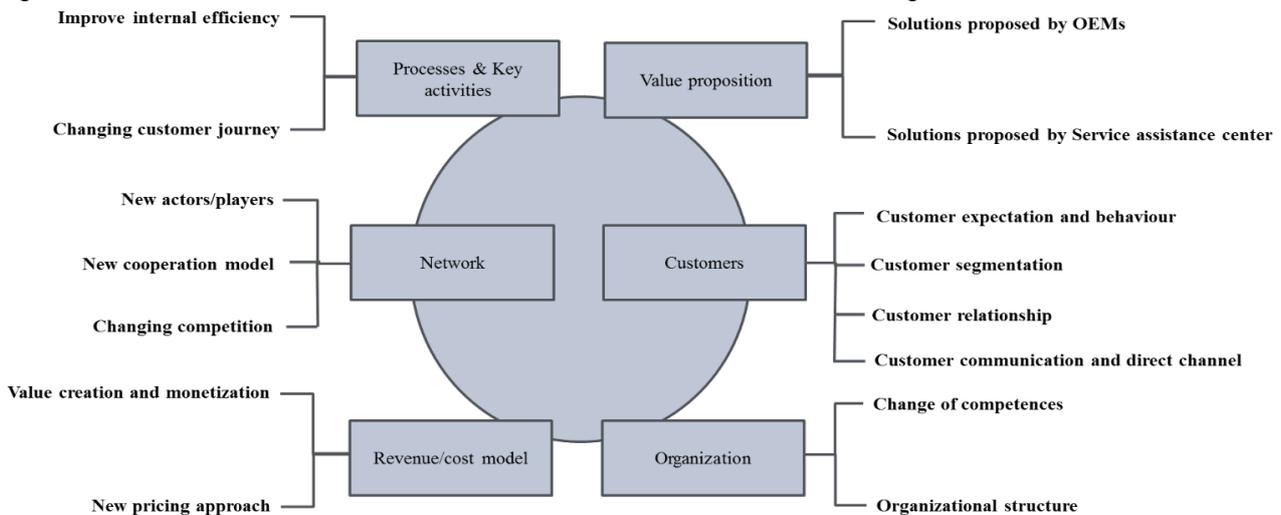
“Our company is composed of young and experienced staff, which has allowed us to quickly and without too much loss of time change the working method and the channels on which we interface with end customers” (Company 17)

“[...] it's a cultural change that we need to make in the company. We must change mind-set with respect to the traditional way that we had in past” (Company 3)

5. Discussion

As our research findings show, automotive aftermarket is reacting to the increasing diffusion of digital technologies by reshaping its business model elements compatible to the digital world. Enabling digital technologies will allow OEMs and service assistance centres to refine their current value proposition and provide new offerings. Moreover, the internal processes will be simplified and more efficient while the customer journey is under significant change towards “invisible service”. Novel cooperation model will emerge since various players in the automotive value chain are required to collaborate in open platform to remain competitive. Also, the rise of “co-ompetition” instead of competition is another important trend arising in the era of DT. In addition, the digital development will change customer behaviour and preferences since they are interacting in a more digital way. Enhancing customer relationship, real-time communication and increasing the level of personalization are pursuing through digital channels. Thanks to advanced technologies such as machine learning, pricing strategy will be more dynamic and shift from cost-based to value-based method. Digital ecosystem together with other “digitally-enable” services generate the main source of revenue. Furthermore, DT requires a radical change in organizational culture and competences in order to benefit of the ongoing development of new technologies. Our research findings can be condensed in Figure [2].

Figure 2. Evolution of automotive aftermarket business model in the era of Digitalization.



In addition, Table [1] illustrates the pervasive description of aforementioned business model components.

Table 4. Evolution of automotive aftermarket business model in the era of Digitalization.

Business model components	Elements found in the empirical analysis
Value proposition	<p>Solutions proposed by OEM</p> <ul style="list-style-type: none"> • Total Cost of Ownership (TCO) Optimization • Telematics – based fleet management services • Warranty and quality • Fuel efficiency • Emergency assistance systems • Maintenance notification systems <p>Solution proposed by Service assistance centers (Workshop)</p> <ul style="list-style-type: none"> • Simplifies communication processes • Predictive maintenance and remote diagnosis • Robust understanding of customer requirements • Improve user experience and customer loyalty

Processes and key activities	<p>Improve internal efficiency</p> <ul style="list-style-type: none"> • Enhance efficiency and quality • Highly automated manner • Removing complexity • Reducing manual steps • Reducing lead time <p>Changing customer journey</p> <ul style="list-style-type: none"> • Invisible service • Transforming the configuration to “Service Factory”
Network	<p>New actors/players</p> <ul style="list-style-type: none"> • Fading border between the automotive and IT sectors • Decrease market entry barriers <p>New cooperation model</p> <ul style="list-style-type: none"> • Consolidation among part distributors • Platformization <p>Changing competition</p> <ul style="list-style-type: none"> • A status of Co-ompetition
Customer	<p>Customer expectation and behaviour</p> <ul style="list-style-type: none"> • Demand for additional after sales services • Ownership vs. Sharing <p>Customer segmentation</p> <ul style="list-style-type: none"> • Serving segment of “One-to-One” <p>Customer relationship</p> <ul style="list-style-type: none"> • Omni-channel retailing • Big data retailing • Last-mile delivery <p>Customer communication and direct channel</p> <ul style="list-style-type: none"> • Digital channels • Real time touch point
Revenue Model	<p>Value creation and monetization</p> <ul style="list-style-type: none"> • Digital ecosystem • “Digitally-enabled” services • Digital network <p>New pricing approach</p> <ul style="list-style-type: none"> • Price transparency • Dynamic pricing/ price optimization
Organisation	<p>Change of competences</p> <ul style="list-style-type: none"> • Improving the skills of existing roles • New types of skills and roles • “Make or buy” of competences <p>Organizational structure</p> <ul style="list-style-type: none"> • Individualize the organizational responsibilities for the technology development • From functional structure approach to inter-functional • Establish the right “Generation Mix” • Change in organizational culture

In this regards, to summarize main findings form our empirical research, the following lessons learnt can be reported in order to succeed in the era of DT:

1. Rethink the overall strategy in order to both capture new growth opportunities and consolidate the market around the existing portfolio.
2. Define a long term technology roadmap.
3. Define a strategic positioning in the value chain regarding both product and service offering.
4. Implement a lower operating cost base, through efficient process management.
5. Ensure sufficient financing for the upcoming transition toward digitalization.
6. Adapt organizational structure and governance model in order to successfully manage new emerging technologies and competencies.
7. Create a new company mind set and culture to foster innovation.

8. Build up new partnerships and collaborative network to facilitate new ways to innovate and remain competitive.

6. Conclusion

DT is a debate topic in many industries, including automotive industry. However, the existing studies lack a comprehensive insights regarding digitalization in the automotive aftermarket. Therefore, that is still a not very considered context in academic management research. This paper bridge the gap by investigating the evolution of automotive aftermarket business model in light of digitalization and shed light on the nature of DT in this industry. With our analysis and discussion, we contribute to picture the future of automotive aftermarket business model by examining the impacts of DT trends.

Our research findings may advance theorization in the field of the impacts of digital technologies on business models, and give useful advice to both companies and institutions on the main benefits and risks of digitalization. However, this study has some limitations typical of qualitative research, such as the limited sample of analysis while a future quantitative research based on a survey on a wider sample could be useful to test and generalize. Moreover, we analysed a single industry, however, it could be of interest to extend the empirical analysis to different sectors to embrace the significance of the DT in various industrial arenas, increasing a robustness of our results.

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