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In the driver's seat of satisfaction: investigating the impact of the digital assistant type on customer satisfaction in the automotive industry's customer service: the moderating role of the service outcome.

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Introduction

In the last decades, the automotive industry has been experiencing a significant transformation driven by the rise of countless digital trends. These trends completely revolutionized the industry's process and structure, making the automotive sector unrecognisable from what it was initially long ago. Companies of the new millennium are focusing their efforts on aligning their offerings to the changing dynamic preferences of their consumers, leading them to reshape their business to a customer-centric model. In fact, the increasingly interest in consumer habits, tastes and needs has led companies to refine or integrate new customer touchpoints within the customer journey to offer a high-level customer experience. Customer service, which encompasses all the efforts that the company makes in order to assist customers before buying or using products or services, is pivotal nowadays and it is not only about solving the customer's problem but in offering immediate and proactive support. In order to provide insights into the significant changes affecting this industry, this work aims to disentangle the complex interactions between digital trends and the development of customer service in the automotive industry.

The first chapter provides an overview of the automotive industry, introducing the main players in the market and highlighting the digital trends that are shaping the evolution of this sector. Next, the fundamentals of AI were provided, and then how artificial intelligence is actually being integrated with customer service and the respective benefits and threats from its implementation. the end of the first chapter provided some case studies of well-known companies that are adopting customer service chatbots in a number of different forms.

The second chapter initially identified the research gap found in the literature and defined how the present work seeks to fill it. Subsequently, an outline of the customer service evolution was provided, investigating in detail the literature regarding the existing relationship between customer satisfaction and customer service initially, the construct of service quality and its digital declination of E-service quality, the comparison between human and AI-delivered customer service, and the existing literature regarding live chat customer service. This led us to the definition of the first research hypothesis. Subsequently, the literature on customer service outcome effects was analysed, leading to the development of the second research hypothesis.

Within the third chapter, the experiment performed by the author was shown in order to test the hypotheses developed at the end of the second chapter. Specifically, the structure and composition of the questionnaire used in order to collect the data useful to validate the hypotheses, the sample to which the experiment was submitted and how it was identified, the scales used and the results of the experiment were reported.

Finally, in the last section concerning the conclusions, the author first briefly summarised the results of the experiment, then provided evidence of how the present study contributes to the existing literature, managerial implications arising from results and limitations and future research to be addressed.

1.1 The Automotive Industry

1.1.1. Evolution of the Industry and its main players

According to Statista's research, in 2021 the value of the global automotive manufacturing market was approximately 2.86 trillion US dollars[1]. Furthermore, in 2022 global car sales reached 67.2 million units, about one million more than the previous year, and forecasts expect a continuous further increase in 2023. In addition, the overall growth rate of vehicles sales is expected to reach a 2 percent CAGR through 2025[2].

Over the last few years the automotive sector has been heavily stressed by the COVID-19 pandemic first and the Russia-Ukraine war later, but the market has been reacting extremely positively and a further favorable result is expected for next year. Before the pandemic, it was estimated that by 2025 international car sales would reach 80 million[3].

The automotive sector is an extremely complex market in which large multi-brand groups are the biggest players in the industry. Toyota, which had a market share of almost 11.5 percent in 2022, was at the top of the list of the biggest automakers worldwide. The Volkswagen Group was the previous leader in the automotive industry until Toyota Motor Corporation of Japan overtook it in 2020 and became the largest motor vehicle manufacturer in the world[4]. After Toyota and VG, Honda and Hyundai are respectively in third and fourth place in the global sales ranking followed by Kia, Nissan, BMW and Mercedes which present extremely similar Market shares. The automotive industry encompasses companies and institutions engaged in the design, development, manufacture, marketing and modification of motor vehicles and represents one of the largest industries by revenue worldwide. As a matter of fact, data shows that it counts for 16% of the total revenues generated in France and even 40% of the total revenues generated in Slovakia.

Despite being a thriving industry, evolving consumer preferences are radically changing this market, generating both threats and opportunities that need to be taken into account. Automotive manufacturers are

[1] IBISWorld. (2023). Global car manufacturing industry revenue between 2019 and 2022 (in trillion U.S. dollars) [Graph]. In *Statista*. Retrieved July 2, 2023, from https://www.statista.com/statistics/574151/global-automotive-industry-revenue/
[2] Hensley, R., Laczkowski, K., Möller, T., Schwedhelm, D. Can the automotive industry scale fast enough?.(n.d.).*McKinsey & Company*.Downloaded July 2, 2023. https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/can-the-automotive-industry-scale-fast-enough

[3] Scotiabank.2023). Number of cars sold worldwide from 2010 to 2022, with a 2023 forecast (in million units) [Graph]. In *Statista*. Retrieved July 2, 2023, from https://www.statista.com/statistics/200002/international-car-sales-since-1990/
[4] Statista. (2023). Global automotive market share in 2022, by brand [Graph]. In *Statista*. Retrieved July 2, 2023, from https://www.statista.com/statistics/316786/global-market-share-of-the-leading-automakers/

faced with a number of brand-new issues as a result of rising environmental consciousness and expanding initiatives to connect automobiles. Connected cars, the Internet of things, shared mobility and autonomous vehicles are among the most emerging trends that are shaping the entire automotive industry, creating glimpses of new great opportunities.

1.1.2. Digital trends in the Automotive industry

The Automotive industry is no longer what we once knew it to be. Indeed, we are currently engaged in the next evolution of the automotive industry: the mobility ecosystem. Connected cars and autonomous vehicles, the switch from hardware to software-defined cars, the focus on sustainability and dynamic customer expectations are today's megatrends, which are challenging traditional OEMs (Original Equipment manufacturer) while also opening up exciting new prospects. As a result, companies need to be innovative in the way they reconfigure their goods, organize their business, employ new technologies, and reinvent the customer experience according to their evolving behaviours[5]. Indeed, consumers of today compare a car's experience with that of its favourite digital device, the smartphone. The smartphone entertains us, allows us to book holidays, connects us with our friends and places our food orders. Even though at the beginning these two kinds of experiences were not even remotely comparable, now times have changed and, with software-defined cars, automobiles are expected to act more like smartphones. As a counter-evidence, the Chinese car market has already achieved a high adoption rate of connected cars and digital services, leading brands to no longer compete solely on the car's intrinsic features and rather to compete on the best customer-experience provided[6].

The rapid growth of Electric Vehicles (EVs) in this sector is supported and boosted by several evidence. Studies reveal that EVs considerably lower greenhouse gas emissions, with emissions reductions of more than 50% in areas with battery energy systems[7]. In addition, Electric Vehicles are becoming more appealing and affordable thanks to advancements in battery technology, including increased energy density, faster charging and lower costs[8]. As demonstrated in Norway, where EVs are accounted for more than 54% of new car sales in 2020, government restrictions and incentives, such as subsidies and tax rebates, have hastened EV adoption.

[5] *Get beyond the wheel*.(n.d.).*Accenture*. *Retrieved July 2, 2023, from* https://www.accenture.com/us-en/industries/automotive-index

[6] Moving into the software-defined vehicle fast lane(n.d.). *Accenture*. *Retrieved July 2, 2023, from* https://www.accenture.com/us-en/insights/industry-x/software-defined-vehicles

[7] Driving cleaner. (2022). *Union of Concerned Scientists*. *Retrieved July 2, 2023, from* https://www.ucsusa.org/resources/driving-cleaner#:~:text=New%20UCS%20analysis%20finds%20that,comparable%20gasoline%20or%20diesel%20vehicle.

[8] Electric vehicles - IEA. (n.d.). *IEA*. *Retrieved July 4, 2023, from* https://www.iea.org/reports/electric-vehicles

Indeed, carmakers are being forced to develop more efficient engines by regulations on fuel economy and CO2 emissions[9].

Changes in consumer preferences, such as greater environmental concern and lower running costs, are rising the demand for EVs[10]. From research carried out by Statista, it emerges that in 2030 58 million new self-driving cars are going to be added to the worldwide fleet and around 26% of all new car sales are expected to be electric vehicles[11]. Another trend that is becoming increasingly popular in the automotive industry is the one concerning connected vehicles, through which telematics and information technology will soon have complete control over all the aspects of automotive mobility. The connected car changes how users use and interact with their automobiles by introducing new digital features. Connected vehicles are sensor-equipped car enabled to send and receive signals, perceive the surrounding reality and interact with other cars through internet connection[12]. They bring a wide range of opportunities aimed at boosting revenue as well as to improve, expand and redefine consumer interaction, and could indeed enhance the consumer experience by providing tailored services and products but also by improving the driving experience through a lessening of the number of accidents or an alleviation of traffic[13].

Furthermore, in recent years shared mobility, which enables people to temporarily rent a car without owning it, has become very common. Up to ten percent of cars by 2030 will be shared vehicles, rising to thirty percent by 2050. Early indications suggest that private vehicle ownership is already declining, whereas there has been an exponential increase in the use of car-sharing services[14]. Last but not least, autonomous vehicles are becoming more and more common. In 2019, there were around 31 million vehicles with at least some level of automation. In 2024 their population is expected to reach 54 million. Despite the brave claims made by OEM of autonomous vehicles, totally autonomous cars are quite far away and one of the key reasons is that the technology required is not yet available on the market[15].

In conclusion, as we have seen in the previous sections, the automotive industry is leading big industrial sectors to embrace digital transformation; as a matter of fact, recent studies have highlighted that the automotive sector

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[9] Cars 2025. (n.d.).*Goldman Sachs*. *Retrieved July 2, 2023, from* https://www.goldmansachs.com/intelligence/technology-driving-innovation/cars-2025/#:~:text=By%202025%2C%2025%25%20of%20cars,to%20comply%20with%20new%20standards.

[10] Electric vehicles Setting a course for 2030. (n.d.). *Deloitte*. *Retrieved July 2, 2023, from https://www2.deloitte.com/content/dam/insights/us/articles/22869-electric-vehicles/DI_Electric-Vehicles.pdf*

[11] IBISWorld. (2023). Global car manufacturing industry revenue between 2019 and 2022 (in trillion U.S. dollars) [Graph]. In *Statista*. Retrieved August 29, 2023, from https://www.statista.com/statistics/574151/global-automotive-industry-revenue/

[12] Connected cars worldwide - statistics & facts. (2021). *Statista*. *Retrieved July 2, 2023, from* https://www.statista.com/topics/1918/connected-cars/#topicOverview

[13] Digital transformation in the automotive industry. (n.d.). *IBM GLobal Business Services*. *Retrieved July 2, 2023,* https://www.ibm.com/downloads/cas/LVDZDXOA

[14]Gao, V., Kaas, H., Mohr, D., Wee D. Automotive revolution – perspective towards 2030. (2016). McKinsey & Company. Retrieved July 2, 2023, from https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/disruptive-trends-that-will-transform-the-auto-industry/de-DE

[15] Placek M. Autonomous vehicles worldwide - statistics & facts. (2022). *Statista*. Retrieved July 2, 2023, from https://www.statista.com/topics/3573/autonomous-vehicle-technology/#topicOverview

is now spending the most on digital transformation and plans to spend more than 200 billion dollars annually by 2030[16].

1.2. AI and customer service

1.2.1 AI fundamentals

This section is aimed at briefly introducing the fundamentals of artificial intelligence by providing basic concepts which are believed to be necessary to understand the entire work.

In the coming decades the AI market is set to grow exponentially. As a matter of fact, according to a study by Next Move Strategy Consulting, the current value of around 100 billion USD is expected to grow by twenty times by 2030[17]. But what is artificial intelligence? Artificial intelligence is a subfield of computer science that uses intelligent machines and a variety of applications to carry out activities with or without the assistance of human cognitive processes, such as understanding speech, playing games and identifying patterns. In general terms, artificial intelligence (AI) refers to a programmed machine with human-level intellect that is equipped with a wide range of cognitive skills and that is trained to carry out several different activities[18]. Indeed, by gathering information through data, organizing it and learning from what is stored, AI enables computers to perform tasks that would typically need human intelligence. It can be thought as a data-fueled engine that consumes data, spots patterns in data, gains knowledge from all those findings, and then acts in response to them. For this reason, leaders across sectors are learning that having solid data is essential for achieving more reliable and insightful AI forecasts, which in turn boosts their company operations[19].

Despite what one might think, artificial intelligence is already part of our daily lives: from the instant you wake up, turn your phone on, and binge any Netflix recommended series, you are unconsciously using AI to its fullest potential. Siri, Alexa, Google Maps and live chatbots are just a few of the countless AI tools that we constantly use in our days. The goal of AI science is to develop a computer system that can simulate human

[16] Auto Industry Leads In Digital-Transformation Investments. (2022). *Forbes*. Retrieved July 2, 2023, from https://www.forbes.com/sites/dalebuss/2022/11/30/auto-industry-leads-in-digital-transformation-investments/?sh=1a483e924e90

[17] Next Move Strategy Consulting. (2023). Artificial intelligence (AI) market size worldwide in 2021 with a forecast until 2030 (in million U.S. dollars) [Graph]. In *Statista*. Retrieved August 29, 2023, from https://www.statista.com/statistics/1365145/artificial-intelligence-market-size/

[18] What Is Artificial Intelligence (AI) And How Does It Work? (2023). *Forbes*. Retrieved July 5, 2023, from https://www.forbes.com/advisor/in/business/software/what-is-ai/

[19] Understanding What Artificial Intelligence Is, And What It's Not. (2023). *Frobes*. Retrieved July 5, 2023, from https://www.forbes.com/sites/forbesbusinesscouncil/2021/04/14/understanding-what-artificial-intelligence-is-and-what-its-not/?sh=2f9f569c48cd

behaviour and be utilized to solve complicated problems using human-like thought processes. AI tools operate by combining large data sets with clever processing algorithms to complete several jobs fast and efficiently [20].

Over the past few months, the launch of ChatGPT has made generative AI, a branch of artificial intelligence, a hot topic. Generative AI, a subfield of computer science, employs both unsupervised and semi-supervised techniques that let computers build new content from existing data such as text, music videos and images. It has the potential to alter the nature of work of the coming decades by enhancing the ability of individual employees through the automation of some of their ad hoc tasks. In addition, generative AI can radically change the entire customer management function, boosting and augmenting agent skills while raising customer satisfaction and agent productivity through digital self-service[21].

Chatbots, such as ChatGPT, are programs that carry on a conversation with a user in normal language, interpret the user's purpose, and respond in accordance with the business rules and data of the organization. Artificial intelligence is used by these chatbots to process language, allowing them to comprehend human conversation; they can interpret verbal or written inquiries and offer replies with the necessary information or guidance. There are two different types of chatbots nowadays: Scripted bots and Artificial Intelligence (AI) bots. Scripted bots are particular chatbots that behave like a guided dialogue based on rules and acts, like a decision tree where each action taken by the user causes the bot to act or respond; AI bots, instead, are based on machine learning (ML) and natural language processing (NLP) tools, which can learn and gather thousands of information in order to provide really high-quality and not defaulted replies[22].

1.2.2 Ai in customer service

According to an in-depth study by Accenture, by 2025 an estimated 95 % of customer interactions will occur through AI tools[23]. Over the past few years, business-to-consumer (B2C) has become increasingly focused on how to attract customers and keep them engaged in an extremely complex and dynamic landscape, in which the introduction of digital platforms is transforming traditional business models[24]. At the same time companies

[20] What Is Artificial Intelligence (AI) And How Does It Work? (2023). *Forbes*. Retrieved July 5, 2023, from https://www.forbes.com/advisor/in/business/software/what-is-ai/

[21] *The economic potential of generative AI: The next productivity frontier*. (2023). McKinsey & Company. Retrieved July 5, 2023, from https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-economic-potential-of-generative-ai-the-next-productivity-frontier#introduction

[22] Conversational Chatbots – Let's chat. (2017). *Deloitte*. Retrieved July 5, 2023, from https://www2.deloitte.com/content/dam/Deloitte/in/Documents/strategy/in-strategy-innovation-conversational-chatbots-lets-chat-final-report-noexp.pdf

[23] Enhancing customer service with AI. (n.d.). *Accenture*. Retrieved July 5, 2023 from https://www.accenture.com/us-en/services/applied-intelligence/solutions-ai-customer-engagement

[24] The next frontier of customer engagement: AI-enabled customer service. (2023). *McKinsey & Company*. Retrieved July 5, 2023 from https://www.mckinsey.com/capabilities/operations/our-insights/the-next-frontier-of-customer-engagement-ai-enabled-customer-service

are steadily abandoning the business model that has characterized them for years: they are shifting from a brand-centric model to a customer-centric model, giving more and more relevance to customers and their interests, preferences and habits.

As stated by Forbes, although 'the customer comes first' is an old mantra that has been seen over and over again, it is nowadays still extremely relevant and, indeed, only those companies that have a 360-degree view of their customers are able to achieve the greatest results[25]. A customer-centric approach presupposes the development of both internal and external processes as well as structures that have as one common denominator to provide an extremely high-quality customer experience. With 'customer-experience' we refer to the customer's response whenever direct or indirect contact with the brand occurs. Specifically, by direct contact we encompass all those touchpoints that occur directly between brand and customer such as the purchase, the usage or the service, whereas indirect touchpoints include those 'unplanned' interactions such as reviews, word of mouth or advertising[26]. As can be readily understood, the customer experience is shaped by the various points of contact with the brand that are deployed throughout the customer journey, which starts with the awareness stage and ends with the loyalty and advocacy phase. To ensure a successful customer experience overall, mapping all touchpoints within the customer journey and how they integrate with each other becomes vital[27].

A touchpoint along the customer journey companies are increasingly investing in is 'customer service', which encompasses all the efforts that the company makes in order to assist customers before buying or using products or services provided by the company. Customer service has evolved over the years, being nowadays no longer just about solving a customer's problem and closing the ticket, but also immediate and proactive support regardless of the channel used. But why are many companies focusing more and more on customer service in recent years? The answer is retention. Several studies show that 80% of customers are willing to leave a retailer after having had three negative customer service experiences, while in the case of a positive experience, happier customers are more prone to continue choosing you[28]. Moreover, it is known that keeping an existing customer of the brand is much cheaper than acquiring a new one[29].

In everyday reality, nobody wants to need to call support, but when they do, having a lousy customer service experience may make the situation even worse. As a result, providing excellent customer service is now

[25] Panel, E. (2021). 15 Ways To Leverage AI In Customer Service. *Forbes*. Retrieved July 5, 2023 from https://forbes.com/sites/forbesbusinesscouncil/2021/07/22/15-ways-to-leverage-ai-in-customer-service/?sh=41e9536a20bb
[26] Schwager, A. (2023). *Understanding customer experience*. Harvard Business Review. Retrieved July 5, 2023 from https://hbr.org/2007/02/understanding-customer-experience
[27] The role of customer care in a customer experience transformation. (2018). *McKinsey & Company*. Retrieved July 5, 2023 from https://www.mckinsey.com/capabilities/operations/our-insights/the-role-of-customer-care-in-a-customer-experience-transformation
[28] What is customer service? (n.d.). *Salesforce*. Retrieved July 5, 2023 from https://www.salesforce.com/resources/articles/what-is-customer-service/
[29] Kumar, S. (2022). Customer retention versus customer acquisition. *Forbes*. Retrieved July 11, 2023 from https://www.forbes.com/sites/forbesbusinesscouncil/2022/12/12/customer-retention-versus-customer-acquisition/?sh=3fa181c01c7d

essential, not merely a priority. Whether they phone, browse a website, or use your mobile app, your clients expect you to provide quicker, more individualized, more intelligent experiences[30]. The trend of digitization we have been experiencing in recent decades, fueled also by the advent of the pandemic, has changed several processes and activities including the customer service. Indeed, the COVID-19 pandemic has not only revolutionized the brand-customer relationship towards digital channels, but has also had a huge impact on the role and mode of customer service. Whereas customer service used to take place predominantly in traditional offline channels, recently there has been a migration to digital service channels as the 'first point of contact'[31].

Specifically, customer service activities are increasingly being provided by sophisticated artificial intelligence tools, which allow a significant reduction of the workload on the workforce in the first place. From McKinsey's global survey, aimed at investigating the level of AI adoption in business processes, it emerged that the deployment of AI tools is increasing across businesses and that, since the popularity of such tools increases, best practices on how to use them will become correspondingly more sophisticated. In addition, the survey shows how the adoption of AI has expanded mostly in businesses with headquarters in developing nations, such as China, the Middle East and North Africa[32].

There are several reasons that justify the emerging trend of using artificial intelligence tools in the field of customer service and, as a matter of fact, today the quickest and most efficient way for businesses to provide personalized, proactive experiences that increase customer engagement is through AI-enabled customer service. Previous research shows that two-thirds of millennials and 75% of all customers demand real-time support and a consistent cross-channel customer experience; moreover, the addition of more highly-trained workers to provide excellent customer service isn't a valuable option, since cost constraints are increasing as swiftly as service standards. In any case, the organization could get a lot of value from AI-enabled customer service transformation, which would result in better service, improved customer satisfaction and higher levels of customer engagement[33].

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[30] AI for Customer Service.*IBM*. (n.d.). Retrieved July 11, 2023 from https://www.ibm.com/ai-customer-service

[31] The next frontier of customer engagement: AI-enabled customer service. (2023). *McKinsey & Company*. Retrieved July 11, 2023 from https://www.mckinsey.com/capabilities/operations/our-insights/the-next-frontier-of-customer-engagement-ai-enabled-customer-service

[32] The state of AI in 2021. (2021). *McKinsey & Company*. Retrieved July 11, 2023 from https://www.mckinsey.com/capabilities/quantumblack/our-insights/global-survey-the-state-of-ai-in-2021

[33] The next frontier of customer engagement: AI-enabled customer service. (2023). *McKinsey & Company*. Retrieved July 11, 2023 from https://www.mckinsey.com/capabilities/operations/our-insights/the-next-frontier-of-customer-engagement-ai-enabled-customer-service

1.2.3 Benefits and risks from AI implementation

As seen in the previous chapter, companies adopting AI tools in customer service are rising at a fast pace, showing big financial gains as well. A McKinsey study shows that the impact of AI on revenues is accelerating, assigning at least 5% of earnings before interest and rates (EBIT) to investments in AI tools[34]. Over the last period, increased awareness of customer-centricity has led to a corresponding increase in the adoption of these advanced tools with the purpose of enhancing the customer experience. Although the number of companies showing AI applications within their customer service is progressing, there are still many companies that are skeptical about their effectiveness and concerned about the risks related to their implementation. This chapter undertakes to illustrate the main benefits and risks characterising the implementation of AI tools in the field of customer service, which may entice or dissuade their possible adoption.

The main benefits that have been identified are:

- **Big data collection**

Thanks to frequent human and non-human interactions and system integrations, AI tools can collect a huge amount of data, which will be analysed, processed and delivered to provide a clear and exhaustive output.

- **Addressing users' most common questions**

The employment of tools such as chatbots enables the answer to the most frequently asked questions from customers; it also enhances the user experience while reducing costs for the company by resolving over 50% of customers' most common questions. This allows employees to be relieved of repetitive tasks and use their time in their core competencies such as customer interactions and empathy[35].

- **Understanding the behaviours of your customers**

AI can be employed for identifying trends in customer actions with the purpose of predicting behaviours in accordance with those patterns. According to the time and date of past activities, these tendencies can be leveraged in order to wisely propose the most likely service options or information[36].

- **Accelerating response time**

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[34] The state of AI in 2021. (2021). *McKinsey & Company*. Retrieved July 11, 2023 from https://www.mckinsey.com/capabilities/quantumblack/our-insights/global-survey-the-state-of-ai-in-2021

[35] Impact of AI for Customer Experience (CX). (n.d.). *Capgemini*. Retrieved July 11, 2023 from https://www.capgemini.com/wp-content/uploads/2019/06/Point-of-view_Impact-of-AI-for-CX_Final.pdf

[36] Panel, E. (2021). 15 Ways To Leverage AI In Customer Service. *Forbes*. Retrieved July 5, 2023 from https://forbes.com/sites/forbesbusinesscouncil/2021/07/22/15-ways-to-leverage-ai-in-customer-service/?sh=41e9536a20bb

Chatbots can easily accelerate client response times. They deliver the greatest possible customer service by clearly identifying the customer's needs and giving them proper information.

- **Monitoring customers wait times**

Closely related to what has just been said, AI allows to measure client's wait times. In particular sectors such as restaurants or service, customer's wait time has a really huge impact both on satisfaction and on financial terms. Today AI adoption has made it possible to track customer's wait times through collecting useful information from every encounter and use that acquired knowledge to enhance the customer service.

- **Higher customization opportunities**

The ability to collect, analyze and apply tailored customer data efficiently give businesses a competitive edge. AI can be used to bring consistently new valuable insights to achieve a comprehensive understanding of the customer, as it provides high customized services and products[37].

- **Improving human-AI interaction**

The optimal use of AI is to improve human interaction and lessen obstacles in the customer experience, but not to replace human interaction; indeed with the aid of AI agents may communicate with clients more successfully. For instance, building a recommendation system that proactively offers the next steps for agents based on previous interactions.

- **Improving customer experience through Natural Language Understanding**

Businesses can benefit from AI also because it enables Natural Language Understanding (NLU). AI can understand and analyze the communication between the consumer and the customer service through real-time processing of customer service calls and chats. This process is aimed at improving the recognition skills of customers' mood and develop a different response strategy based on that.

- **The use of speech analytics**

Speech analytics provides management with information on which calls are more successful and what operational and training adjustments can improve customer service[38].

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[37] Impact of AI for Customer Experience (CX). (n.d.). *Capgemini*. Retrieved July 11, 2023 from https://www.capgemini.com/wp-content/uploads/2019/06/Point-of-view_Impact-of-AI-for-CX_Final.pdf

[38] Panel, E. (2021). 15 Ways To Leverage AI In Customer Service. *Forbes*. Retrieved July 5, 2023 from https://forbes.com/sites/forbesbusinesscouncil/2021/07/22/15-ways-to-leverage-ai-in-customer-service/?sh=41e9536a20bb

Now that the benefits of adopting AI in customer service have been discussed, the other side of the coin will be shown, which is represented by its risks. There are indeed many risks and worries that discourage the adoption of these technologies, leaving companies stuck with human traditional customer service.

The most dissuasive drivers towards the implementation of AI in customer service are:

- **Cybersecurity**

A study related to the stage of AI showed that cybersecurity still ranks first among the main risks from its development. Although this issue has been in vogue for years, it remains a current topic as many companies are still unaware of the degree to which they are exposed to the risks of AI[39].

- **Privacy**

As can easily be imagined, the privacy theme is always pivotal. When responding to customer concerns about data, security and privacy, businesses must be open and honest. This implies that, besides having to be compliant with data management regulations (e.g. GDPR), they have to communicate transparency and convey trust to customers[40].

- **Need for human interaction**

There are many companies that are discouraged from implementing new technologies because of the presence of a large pool of customers who are skeptical about AI. Many customers would rather talk to a person than a machine and a small percentage would even give up using a service or product if they found a BOT on the other side instead of a human being. Furthermore, when the matter of the conversation is delicate, the customer's tendency to prefer human contact increases even more[41]. An additional emerging theme is the lack of clarity in the interaction perceived by customers. Whenever consumers interface with customer service, they would like organisations to make it explicitly clear that they are interacting with a machine[42].

- **Machine-based interaction**

In the uncertain age we are living in, customers need to experience direct, empathetic, warm relationships, like the ones they have with other human beings. Customers therefore demand that the interaction with the machine arouses the same emotions that they would experience with a human being and, as a consequence, want AI to be more human like, able to handle sensitive conversations and contribute with valuable information.

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[39] The state of AI in 2021. (2021). *McKinsey & Company*. Retrieved July 11, 2023 from https://www.mckinsey.com/capabilities/quantumblack/our-insights/global-survey-the-state-of-ai-in-2021

[40] Majorel. (2020). *Artificial intelligence and satisfied customers - Majorel*. Retrieved July 11, 2023 https://www.majorel.com/future-customer/science-and-research/artificial-intelligence-and-satisfied-customers/

[41] Majorel. (2020). Artificial intelligence and satisfied customers - *Majorel*. Retrieved July 11, 2023 https://www.majorel.com/future-customer/science-and-research/artificial-intelligence-and-satisfied-customers/

[42] Impact of AI for Customer Experience (CX). (n.d.). *Capgemini*. Retrieved July 11, 2023 from https://www.capgemini.com/wp-content/uploads/2019/06/Point-of-view_Impact-of-AI-for-CX_Final.pdf

Specifically, human characteristics such as human-like voice, human-like intellect, empathy and human-like personality are required.

- **Skepticism among employees**

A large proportion of workers who have already experienced AI as a support in their tasks believe that it has had very little impact on their work and also on customer experience. Moreover, their implementation is often seen as a threat as they could replace humans in a number of tasks, generating uncertainty in their lives[43].

After delving into the reasons that may or may not incentivize companies to introduce AI within their customer service processes, it is now necessary to investigate on the requirements for a successful AI implementation, which will be dealt with in the next paragraph.

1.2.4 Requirements for a successful AI implementation

In order to ensure a successful AI implementation, it is necessary to put the customer first. Indeed, In the phase of adopting AI in business processes, a customer driven approach must be followed, in order to ensure its satisfaction and possibly stimulate retention and advocacy. Companies must consider how to design the flow of a specific moment, the information required as well as the cross-channel interactions required to properly complete the interaction. This is more than just a tech arranging or path mapping exercise: it involves creating the customer flow as the front-end side and the fuel for the advanced experience engines as the back-end[44].

The first step for a successful rollout is to rethink the data infrastructure and the integration of AI with existing platforms and humans. Leading technology companies are totally redesigning their data architecture to convert customer data signals into AI-driven suggestions that boost customer success throughout the customer lifecycle[45]. Furthermore, complementary to the redefinition of the data infrastructure is the transformation of business operations that are aligned with and integrated into the new AI technologies[46].

The key will be to improve human and machine collaboration establishing a company culture of absolute trust in machines while involving company specialists and frontline employees to help design them. Companies will need to be extremely careful with how they communicate the introduction of AI tools into their business

[43] Majorel. (2020). Artificial intelligence and satisfied customers - *Majorel*. Retrieved July 11, 2023 https://www.majorel.com/future-customer/science-and-research/artificial-intelligence-and-satisfied-customers/
[44] Edelman, D. C. (2022). *Customer experience in the age of AI*. Harvard Business Review. Retrieved July 13, 2023 from https://hbr.org/2022/03/customer-experience-in-the-age-of-ai
[45] Customer success: the next frontier of AI. (2023). *Bain.* Retrieved July 13, 2023 from https://www.bain.com/insights/customer-success-next-frontier-of-AI-tech-report-2022/
[46] Fueling the AI transformation: Four key actions powering widespread value from AI, right now. (2023). *Deloitte*. Retrieved July 13, 2023 from https://www2.deloitte.com/content/dam/Deloitte/us/Documents/deloitte-analytics/us-ai-institute-state-of-ai-fifth-edition.pdf

processes to their own employees, emphasizing in particular the complete integration of machine and human rather than, as common thought, the replacement of the latter. Incorporating AI tools can really bring great business opportunities, but it requires that all the information acquired are converted into useful insights for customizing products or services offered to customers. In addition, in order to give product developers immediate access to client feedbacks and allow them to take them into account when making upgrades and redesigns, product development should be integrated more closely into the infrastructure for customer support.

Last but not least, the approach with which AI is implemented is essential. According to a questionnaire provided by Capgemini, only 9% of companies implement AI tools focusing on consumer preferences, while the vast majority prioritized the cost of implementation and expected return on investment rather than customer experience[47]. Although the high cost of its implementation may discourage companies from investing, data shows that among those who have already implemented AI, the return is even faster than expected[48].

1.2.5 Customer service chatbots – cross industry review

Despite the potential risks mentioned above, an increasing number of companies have started adopting AI tools in their customer service due to the great benefits observed both in terms of performance and cost savings. One of the leading AI tools used by companies to deliver customer service is the chatbot, which provides consumers with an automated live chat function they can interact with to obtain the help they need when they need it, making 24/7 support easy and convenient. In addition, chatbots are not only used to relieve customer service, but also to expand businesses' customer base, generate and qualify leads before handing them over to the sales team, and serve customers in their favorite language[49]. Given that today a multitude of companies belonging to different industries are adopting chatbots to provide customer service and this section is intended to present the main cases in which chatbots have been employed by companies.

One of the largest beauty product retailers in Europe, Sephora, pioneered the use of messaging bots in 2016 with a chatbot on Kik, a Canadian instant messaging app aimed at young people. After implementing the chatbot, Sephora found that, through Kik's chatbot, users were sending ten messages per day on average. Through Sephora's chatbot, today customers can ask about make-up lessons, videos and pictures, and receive a quick and seamless response. The Kik chatbot can also provide support in finding cosmetics mentioned in

[47] Impact of AI for Customer Experience (CX). (n.d.). *Capgemini*. Retrieved July 11, 2023 from https://www.capgemini.com/wp-content/uploads/2019/06/Point-of-view_Impact-of-AI-for-CX_Final.pdf

[48] Fueling the AI transformation: Four key actions powering widespread value from AI, right now. (2023). *Deloitte*. Retrieved July 13, 2023 from https://www2.deloitte.com/content/dam/Deloitte/us/Documents/deloitte-analytics/us-ai-institute-state-of-ai-fifth-edition.pdf

[49] Shweta. (2023). What Is A Chatbot? Everything You Need To Know. *Forbes*. Retrieved August 16, 2023 from https://www.forbes.com/advisor/in/business/software/what-is-a-chatbot/#:~:text=Chatbots%20can%20help%20businesses%20automate,when%20actual%20people%20are%20not.

Sephora's tutorials and even suggest the most popular items in a given category. In addition, the chatbot can be used in-store, where, by entering any product name, it will quickly provide its reviews and ratings left by peers. Finally, thanks to this AI messaging bot, customers can now arrange makeup appointments, making it quicker and simpler to book make-up appointments for its valued clientele.

Nike has not missed the opportunity to adopt an automated artificial intelligence system for online messaging as well: Nike's Stylebot assists consumers in finding the precise items they're looking for, whether it's new athletic shoes or gym equipment; if you upload a photo for the being examined by the bot, it can propose outfits that match the shoes you wear. In addition, it is also possible to develop personalized shoes just by sending a photo of the chosen sneakers and selecting a colour combination from the 24-tone NIKEiD palette to match them. This Nike chatbot option is an ideal illustration of how to tailor a product to the customer's taste[50].

Another example is Uber, which is a global transport giant that provides a private transport service through a mobile application. Uber has created its own chatbot, which enables users to utilize Messenger to book a ride without installing the Uber app. The chatbot also allows users to visualize receipts, ride updates and share details of the current Uber ride with their friends on Facebook Messenger in order to be tracked and ensure safety. Uber is currently developing an AI-powered chatbot to be integrated into the app, joining a long list of users who are no longer present only on Facebook Messenger[51].

Another company that has decided to rely on artificial intelligence to offer a high level of customer experience is Spotify, which is a digital playback service for music, podcasts and videos with instant access to millions of tracks and other content. Spotify's chatbot helps users make playlists directly from Facebook. The clever robot quizzes the user about their musical preferences before making playlists recommendations based on their hobbies, activities, and preferred genres and moods. In addition, the chatbot enables users to send albums, songs, and playlists to online chatroom buddies as well as explore the Spotify catalog[52].

In the automotive sector, several car manufacturers are implementing chatbots to talk to their customers/prospects. Some of them, such as Audi, Mercedes Benz and Maserati, use a two-tier customer service system in which there is a live chat with a qualified human operator during working hours and a chatbot out of business hours, while brands such as Toyota and Lamborghini rely completely on chatbots to provide 24/7 automated assistance. Given the increasing need for a high-quality customer experience, it is likely that more and more car manufacturers will start developing customer service chatbots within their website.

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[50] Saiteja. (2023). Use cases of Conversational AI in eCommerce - DeepConverse. *DeepConverse Blog*. Retrieved August 16, 2023 from https://blog.deepconverse.com/use-cases-of-conversational-ai-in-ecommerce/

[51] Uber is developing an AI-Powered chatbot to integrate into app (2023). *BNN Bloomberg*. Retrieved August 16, 2023 from https://www.bnnbloomberg.ca/uber-is-developing-an-ai-powered-chatbot-to-integrate-into-app-1.1953552

[52] Spotify is launching a Messenger bot for sharing song clips with friends. (2017). *TechCrunch*. Retrieved August 16, 2023 from https://techcrunch.com/2017/04/18/spotify-is-launching-a-messenger-bot-for-sharing-song-clips-with-friends/?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAMUJNBAlo0hRl-XksDzkczSvV-HmBf-vLiPPHG69HI0UIVjiGuz-vr5XZcMY-Ll4ALXYuu92sUitSECwedc4qfbiazx0B8oh1Q1Rw7Ta35_m9evGdL0x84MVVhzAWzkOFfSlznHDiyT7Q2NPt8WnXjIBlPSN1SGjKDR0bx6ZNA7f

CHAPTER 2 – Literature Review

2.1 Research gap and research question

The first chapter has provided a thorough examination of the automotive sector, covering both its fundamental components and the digital developments that have arisen within its dynamic environment. The incorporation of chatbots is a notable example of how Artificial Intelligence (AI) has had a significant impact on customer service paradigms. The chapter in question has carefully examined the benefits AI offers to customer service and outlined its perks like improved efficiency, tailored interactions, and round-the-clock accessibility. The adoption of AI-driven customer service has also been examined for potential hazards, with a focus on data protection, algorithmic biases, and the delicate balance between automation and human touch. Moreover, a thorough investigation has been made into the requirements needed for the deployment of AI-driven customer service, taking into account elements like data infrastructure, company culture, and smooth connection with current operational models.

The extensive background work established in the previous chapter prepares the stage for a targeted study into the uncharted territory of AI-driven customer service in the automotive sector, identifying research gaps and leading to the formulation of a crucial research question. Initially, Huang et al. (2018) through empirical evidence demonstrated that artificial intelligence can be effectively used to replace or substitute humans in certain services and also that the ability to perform intuitive and empathic tasks they will be equipped with in the coming years will enable AI to fully integrate with humans in the provision of services[53]. Then, given their growing substitution rate nowadays, many evidence-based studies have placed a specific focus on customer service by comparing human to robot-provided customer service. As a matter of fact, Choi et al. (2020), developed an empirical study to compare and examine hotel guests' perceptions of the quality of customer service provided by human and robotic service staff[54]. Song et al. (2022), instead, analysed how consumers' adoption intention changes depending on the type of service agent deployed and the perceived differences in

[53] Huang, M. H., & Rust, R. T. (2018). Artificial intelligence in service. *Journal of service research*, *21*(2), 155-172.
[54] Choi, Y., Choi, M., Oh, M., & Kim, S. (2020). Service robots in hotels: understanding the service quality perceptions of human-robot interaction. *Journal of Hospitality Marketing & Management*, *29*(6), 613-635.

the communication capability towards a service chatbot or a human[55]. However, the two aforementioned studies are aimed at investigating customer service in hospitality (Choi et al.'s) or in the retail industry (Song et al.'s), thus requiring further analyses in different industries to allow a generalisation of the results. Moreover, part of the existing literature has gone further to analyse consumer's different responses to the outcome of the service provided by humans or robots and the attributions of responsibility for the service result to the agent. Through an analysis involving two different experiments (reception service in a hotel and waiter service in a restaurant), Belanche et al. (2020) explored the different attributions of responsibility for service outcomes (failure vs success) to robots and humans[56]. From the future research of this study, it emerged the need to verify the results using other kinds of robots and in other contexts, apart from hospitality. Instead, research by Leo et al. (2020) studied the extent to which people attribute responsibility to robots or human service providers and focused only on the service failure, conducting two experiments regarding the hospitality and healthcare industry[57]. Even in the future research section of Leo et al.'s academic research, it has been suggested to explore how people attribute responsibility to the service provider using other AI applications and to include the case of a positive service outcome in the research as well. Finally, Pozharliev et al. (2023) examined consumer responses towards a negative or positive service outcome provided by an autonomous vehicle or human agent in the mobility service industry[58]. This research addresses future research to take into consideration other contexts in order to validate the results obtained and proposes to examine how other types of communication involved may influence consumer responses. Based on the existing literature, much research has already been addressed to examine the difference in consumer responses to the customer service provided by a robot or a human, but to the best of the author's knowledge, an investigation aimed at comparing consumer responses to customer service provided by chatbots and live chats in the automotive sector has not been addressed in the literature yet.

This leads to the formulation of the following research question: *"How does the use of a different agent type (Chatbot vs Live chat) influence customer satisfaction in the automotive industry's customer service?"*

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[55] Song, M., Xing, X., Duan, Y., Cohen, J., & Mou, J. (2022). Will artificial intelligence replace human customer service? The impact of communication quality and privacy risks on adoption intention. *Journal of Retailing and Consumer Services*, *66*, 102900.

[56] Belanche, D., Casaló, L. V., Flavián, C., & Schepers, J. (2020). Robots or frontline employees? Exploring customers' attributions of responsibility and stability after service failure or success. *Journal of Service Management*, *31*(2), 267-289.

[57] Leo, X., & Huh, Y. E. (2020). Who gets the blame for service failures? Attribution of responsibility toward robot versus human service providers and service firms. *Computers in Human Behavior*, *113*, 106520.

[58] Pozharliev, R., De Angelis, M., Donato, C., & Rossi, D. (2023). Do not put the blame on me: Asymmetric responses to service outcome with autonomous vehicles versus human agents. *Journal of Consumer Behaviour*, *22*(2), 455-467.

2.2 From the concept of offline vis-a-vis customer service to that of online customer service

2.2.1 Customer satisfaction and online customer service

Customer satisfaction is undoubtedly a key construct in marketing research and has indeed received considerable attention from researchers for more than two decades[59]. Countless studies have attempted to investigate both the antecedents and the effects of customer satisfaction in different contexts or from different perspectives, and for this reason, this section is intended to review the existing literature on this theme.

Johnson and Fornell (1991) defined customer satisfaction as a "customer's overall evaluation of the performance of an offering to date"[60]. According to many scholars, one of the key outcomes of marketing activities is customer satisfaction, which enables the linkage between the consumption or purchase stage to post-purchase phenomena like attitude shift, repurchases, and brand loyalty[61]. Indeed, as marketing thought has evolved, a fundamental change in the founding philosophy has taken place, leading to the recognition that the focal point of all marketing efforts is the customer and not sales[62]. With that being said, the following question arises: why are companies increasingly focusing their marketing initiatives on enhancing customer satisfaction?

Differently from what one might imagine, achieving high customer satisfaction has not only a positive impact on the customers' positive attitude towards the brand but also triggers a virtuous circle capable of bringing even more benefits. Luo and Homburg (2007) identified customer satisfaction results into four main categories: customer-related, employee-related, efficiency-related, and overall performance-related outcomes[63]. The "overall performance-related outcomes" category involves general performance results, which are closely related to financial outcomes. According to several research in the literature, customer satisfaction is an important driver of a company's profitability[64]. For instance, Anderson, Fornell, and Lehmann (1994) identified a positive impact of customer satisfaction on financial KPIs, such as ROI (Return

[59] Luo, X., & Homburg, C. (2007). Neglected outcomes of customer satisfaction. *Journal of marketing*, *71*(2), 133-149.

[60] Johnson Michael D., and Fornell Claes (1991). A Framework for Comparing Customer Satisfaction Across Individuals and Product Categories. *Journal of Economic Psychology*, 12 (2), 267–86.

[61] Churchill Jr, G. A., & Surprenant, C. (1982). An investigation into the determinants of customer satisfaction. *Journal of marketing research*, *19*(4), 491-504.

[62] Kumar, V. (2016). Introduction: is customer satisfaction (ir) relevant as a metric?. *Journal of Marketing*, *80*(5), 108-109.

[63] Luo, X., & Homburg, C. (2007). Neglected outcomes of customer satisfaction. *Journal of marketing*, *71*(2), 133-149

[64] Bolton Ruth N., Lemon Katherine N., and Verhoef Peter C. (2004). The Theoretical Underpinnings of Customer Asset Management: A Framework and Propositions for Future Research. *Journal of the Academy of Marketing Science*, 32, 271–92.

On Investment) or ROA (Return On Asset)[65]. Recently, researchers discovered the positive impact of satisfaction on shareholder value by accelerating cash flow growth and lowering its volatility[66]. The remaining three categories are more precise and offer reasoning for how customer satisfaction increases corporate profitability. Regarding "customer-related outcomes", empirical studies showed a positive relationship between customer satisfaction with loyalty and repurchase intention, yielding significant returns for companies able to provide a high level of satisfaction[67]. Pricing is another method by which satisfaction can increase profitability. According to research, clients that are extremely satisfied are more likely to pay premium prices and less price sensitive[68]. Moving to efficiency-related outcomes, efficiency is defined as the ratio of organisational resource inputs to desired objective outcomes[69]. Anderson, Fornell, and Rust (1997) found that customer satisfaction has a favourable impact on the ratio of sales to employees[70]. In addition, customer satisfaction induces behaviour like free word-of-mouth, and, as a consequence, firms with higher customer satisfaction may be more efficient in future investments in marketing communications. Customer satisfaction allows also to save expenses for warranties, defective goods, field service costs and complaints management[71]. Finally, there have been studies showing a positive influence of customer satisfaction on employee satisfaction. Companies showing high customer satisfaction rates are considered to be more attractive, leading to the possibility to hire better employees; as a result, these companies can benefit from superior human capital performance[72]. Another explanation for a rise in company human capital performance is linked to a more serene environment in businesses with satisfied and loyal customers, making workers more satisfied and consequently more efficient[73].

Once the literature on customer satisfaction has been shown, the relationship between customer satisfaction and customer service needs to be examined by deeply investigating the existing literature. Shumaker and Brownell (1984) identified customer service as an individual who provides resources or materials to another individual in order to benefit the recipient by solving or supporting his or her request[74].

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[65] Anderson Eugene W., Fornell Claes, and Lehmann Donald R. (1994). Customer Satisfaction, Market Share, and Profitability. *Journal of Marketing*, 56, 53–66.
[66] Fornell Claes, Mithas Sunil, Morgeson Forrest, and Krishnan M.S. (2006). Customer Satisfaction and Stock Prices: High Returns, Low Risk. *Journal of Marketing*, 70, 3–14.
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[68] Homburg C., Koschate N., and Hoyer Wayne D. (2005), "Do Satisfied Customers Really Pay More? A Study of the Relationship Between Customer Satisfaction and Willingness to Pay," *Journal of Marketing*, 69(April), 84–97.
[69] Bucklin Louis P. (1978). "Productivity in Marketing". Chicago: American Marketing Association
[70] Anderson Eugene W., Fornell Claes, and Rust Roland T. (1997). Customer Satisfaction, Productivity and Profitability: Differences Between Goods and Services. *Marketing Science*, 16(2), 129–45.
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[72] Dess Gregory, and Shaw Jason (2001), Voluntary Turnover, Social Capital, and Organizational Performance, *Academy of Management Review*, 26(3), 446–56. Crossref.
[73] Reichheld Frederick F., and Earl Sasser W. Jr. (1990). Zero Defections: Quality Comes to Services. *Harvard Business Review*, 68(5), 105–111.
[74] Shumaker, S. A., & Brownell, A. (1984). Toward a theory of social support: Closing conceptual gaps. *Journal of social issues*, *40*(4), 11-36

From the definition provided by Levy and Weitz (2007), customer service is "all of the retailer activities that increase the value received by consumers when shopping"[75]. According to this statement, providing customer service activities increases the value perceived by customers. Berman and Evans (2007), instead, conceptualised customer service as those identifiable, but sometimes intangible, actions made by a retailer in addition to the essential products and services it offers[76]. Finally, Haugeland et al. (2022) described customer service as all the activities aimed at providing information and support to a service provider's customer[77].

Consistent with the findings presented in the first chapter, the implementation of quality customer service leads to huge business opportunities and, especially in this competitive environment, customer service is becoming an indispensable attribute. Successful customer service involves the effective and efficient resolution of customer complaints or requests[78]. Beyond providing efficient request solutions, firms also aim to deliver customer services that are capable of generating positive emotions in customers, seeking to satisfy, engage and surprise them by exceeding their own expectations[79].

In order to guarantee companies a sustainable business advantage and differentiation from rivals, customer satisfaction and loyalty have been crucial in the retail sector[80]. According to the existing literature, many factors are involved in creating customer satisfaction and loyalty, and one of them is undoubtedly customer service. Kursunluoglu (2011) defined customer service as "tangible or intangible value-increasing activities which are directly or indirectly related with products or services to meet customer expectations and finally to provide customer satisfaction and loyalty"[81]. Hence, customer satisfaction can be achieved by fulfilling customer expectations, and in order to meet these expectations, retailers must provide excellent customer service. As a matter of fact, Martin *et al*. (2015) found that providing a high level of customer service leads to positive outcomes including fewer complaints, good word-of-mouth, greater satisfaction and higher repurchase intentions[82].

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[75] Levy, M. and Weitz, B.A. (2007). Retailing Management. *McGraw Hill*, New York, NY.
[76] Berman, B. and Evans, J. R. (2007). Retail Management. *McGraw Hill*, New York, NY.
[77] Haugeland, I. K. F., Følstad, A., Taylor, C., & Bjørkli, C. A. (2022). Understanding the user experience of customer service chatbots: An experimental study of chatbot interaction design. *International Journal of Human-Computer Studies*, *161*, 102788.

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[79] Berry, L.L., Carbone, L.P., Haeckel, S.H. (2002). Managing the total customer experience. *MIT Sloan Manag*. Rev. 43 (3), 85–89.
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[81] Kursunluoglu, E. (2011). Customer service effects on customer satisfaction and customer loyalty: a field research in shopping centers in Izmir city – Turkey", International Journal of Business and Social Science, Vol. 2 No. 17, pp. 52-59.
[82] Martin, J., Mortimer, G., & Andrews, L. (2015). Re-examining online customer experience to include purchase frequency and perceived risk. *Journal of retailing and consumer services*, *25*, 81-95.

Considering the relationship found between these two constructs, a lot of businesses are working on allocating large amounts of resources to offer clients high-quality customer service[83]. Delivering a high level of customer service is not trivial and there are plenty of different aspects to focus on. First and foremost, it is essential to comprehend customer wants and preferences through in-depth market research and customer feedback. Relevance and satisfaction are guaranteed when goods and services are customised to fulfil these needs. Secondly, spending money on hiring sympathetic and well-trained customer service staff promotes productive encounters, since building trust and loyalty with customers requires quick responses to their questions and effective problem-solving[84]. Thirdly, integrating technology and automation may speed up procedures for clients while also delivering convenience, such as the introduction of live chats as a customer service platform[85]. Finally, a client-centric strategy is ensured by routinely tracking customer satisfaction measures and pursuing continual improvement based on input[86].

The automotive sector, like many others in the retail industry, is considerably striving to ensure high customer satisfaction rates. Research has shown that customer satisfaction in the automotive sector is a function of the expectation-performance ratio that customers experience during the four main purchase stages encountered: the after-sale service phase, which encompasses maintenance and repair services; the sales processes, that refer to the dealer's ability to manage the sales process which goes from product presentation to price negotiation; the quality of the car sold, intended as design and performance; and finally the level of service provided, conceived as the quality of information provided and timeliness of dialogue[87]. In addition, the emerging trend of alternative mobility, car sharing, and the growing environmental concern has led car manufacturers to a shift in the focus towards offering additional services rather than car sales[88]. Nevertheless, businesses must constantly modify their service portfolios because it is essential for organisations to maintain a dynamic service portfolio that is adapted to different customer needs, while considering that their concerns will be varying and change over time[89]. Additionally, automakers should modify their service offerings to reflect changes in the market, such as rising consumer mobility, shifting customer needs for goods and services,

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[83] Chattaraman, V., Kwon, W. S., & Gilbert, J. E. (2012). Virtual agents in retail web sites: Benefits of simulated social interaction for older users. *Computers in Human Behavior*, *28*(6), 2055-2066.

[84] Mittal Vikas, and Kamakura Wagner (2001). Satisfaction, Repurchase Intent, and Repurchase Behavior: Investigating the Moderating Effect of Customer Characteristics. *Journal of Marketing Research*, 38, 131–42.

[85] Lv, Z., Jin, Y., & Huang, J. (2018). How do sellers use live chat to influence consumer purchase decision in China?. *Electronic Commerce Research and Applications*, *28*, 102-113.

[86] Fornell Claes (1995). The Quality of Economic Output: Empirical Generalizations About Its Distribution and Relationship to Market Share. *Marketing Science*, 14(3), 203–211.

[87] Nassiri Pirbazari, K., & Jalilian, K. (2020). Designing an optimal customer satisfaction model in automotive industry. *Journal of Control, Automation and Electrical Systems*, *31*, 31-39.

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[89] Johnson, M.D. and Selnes, F. (2004). Customer portfolio management: toward a dynamic theory of exchange relationships. *Journal of Marketing*, Vol. 68 No. 2, pp. 1-17.

customization, the development of a non-ownership mentality, brand sensitivity, the growth of ICT, and other trends.

In conclusion, the rise of competition in the automotive sector and the increasing customer concern for high-quality customer service have encouraged car manufacturers to rely on services as a means to ensure financial and strategic advantages and thus to remain competitive in the market[90].

2.2.2 E-Service Quality

Over the past decade, the service sector has grown at an incredible rate, generating much interest in the service quality topic and in the importance of the service sector nowadays, leading to a wide range of empirical research aimed at investigating in depth these phenomena.

Several businesses are being forced to reevaluate their customer service strategies due to increased competition, high levels of customer education, and improving living standards. As we saw in the previous chapter, since retaining an existing customer costs considerably less than acquiring a new one, many businesses are putting more effort into keeping their current clientele. Consequently, service providers are strategically positioning themselves more successfully in the market by offering a higher level of service quality[91]. Furthermore, studies in the area of service quality have demonstrated a relationship between the quality of service provided and customer satisfaction[92].

But before delving into the topic of E-service quality, it appears necessary to provide background evidence from past research concerning service quality. From extensive research in the literature, it has been discovered that service quality is a topic that has generated a lot of attention and discussion due to the challenges in measuring and defining it, reaching no clear consensus on either[93]. The term "service quality" has been used in a broad range of contexts and has several different definitions, but two broad conceptualizations of service quality can be identified in the literature: one referring to the disconfirmation approach and the other based on the performance-only approach.

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[90] Godlevskaja, O., van Iwaarden, J., & van der Wiele, T. (2011). Moving from product-based to service-based business strategies: Services categorisation schemes for the automotive industry. *International Journal of Quality & Reliability Management*, *28*(1), 62-94.

[91] Arora, P., & Narula, S. (2018). Linkages between service quality, customer satisfaction and customer loyalty: A literature review. *IUP Journal of Marketing Management*, 17(4), 30.

[92] Zeithaml V. A., Berry L. l., Parasuraman A. (1996). The Behavioral Consequences of Service Quality. *Journal of Marketing*, 60(2), 31-46.

[93] Wisniewski M. (2001). Using Servqual to Assess Customer Satisfaction with Public Sector Services, *Managing Service Quality: An International Journal*, 11(6). 380-386.

According to the disconfirmation approach, the term "service quality" refers to the degree to which a service satisfies the needs or expectations of customers[94]. Parasuraman *et al.* (1985) conceptualised a definition of service quality as being "the overall evaluation of a specific service firm that results from comparing that firm's performance with the customer's general expectations of how firms in that industry should perform". As a result, service quality, understood as the discrepancy between what customers expect from a service and the perceived service, determines to conclude that if expectations are above the service provided, service quality is not satisfactory and hence customer dissatisfaction occurs[95]. Alternatively, high service quality arises when customer perceptions of service performance are better or at least equal to expectations[96].

Within the disconfirmation paradigm, Parasuraman et al. (1988) identified five dimensions to describe service quality, which is better known as SERVQUAL. These five dimensions can be summarised into: Tangibles, as the look of physical facilities, machinery, employees and communication materials; Reliability, as the capacity to reliably and accurately provide the promised service; Responsiveness, as the ability to assist clients and timely deliver the service; Assurance, as the capability of the employees to convey trust and knowledge; Empathy, as providing clients tailored care and attentions[97]. Although the SERVQUAL scale has been the leading performance measurement scale in the service literature, Cronin and Taylor (1992) suggest the presence of issues with the adoption of that theory to measure this phenomenon. More specifically, they claim that if it's true that service quality is akin to an attitude, as supported by Parasuraman et.al (1985), its explanation could be improved through attitude-based conceptualisation. As a consequence, they introduced another service quality paradigm: the performance-only approach[98]. According to this new type of paradigm, the scale is aimed at measuring the performance-only of the Service quality, which is named SERVPERF[99]. As the name suggests, the latter theory, unlike SERVQUAL, does not compare perceptions of the service received with expectations, but maintains only perceptions of service quality[100].

After having covered service quality extensively, it appears interesting to delve into its digital declination. In accordance with the massive expansion of internet usage, computer-aided services have increased in both importance and number. The development of e-services, also known as web-based self-services, has increased

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the significance of the service industry in contemporary economies[101]. Focusing on E-service has become a key success factor to survive in the current competitive electronic environment, and only by offering high-quality E-services can enhance customer satisfaction and favourable behavioural intentions[102]. The challenge that companies are facing nowadays is represented by the quality of electronic service (e-service) offered by business websites and other digital media[103]. Indeed, the company website's quality has turned into a crucial indicator of a company's capacity to guarantee customer satisfaction[104]. Furthermore, the quick rise in e-customer expectations and sophistication is an additional brand-new challenge.

Consistent with what has been observed for service quality, E-service quality has also been defined in several forms over the years, depending on the respective context. According to the definition provided by Santos (2003), E-service quality is "the overall customer perceptions, judgments and evaluations of the quality of service obtained from a virtual marketplace"[105]. Zeithaml (2002) instead describes E-service quality as the degree to which a company website simplifies purchasing and delivering in an organised and efficient manner for its customers[106]. Zhang and Prybutok (2005), finally, associate the E-service quality concept with that of website service quality[107]. These definitions provide evidence that the E-service quality concept includes both the pre-purchase phase (product details, ordering description) and post-purchase stage (shipment information, customer care, compliance and refund policy)[108]. E-service quality has been considered to have not only the possibility to bring strategic benefits, but also to increase operational effectiveness and profitability. In addition, it is now widely acknowledged that E-service quality is the most significant factor influencing E-retailer's long-term performance and success[109]. Many researchers have expanded research on the E-service quality construct, proving a significant association between E-service quality with customer satisfaction and

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repurchase intentions[110]. Moreover, E-service quality may boost competitive advantage online by enhancing attractiveness, hit rate, retention and positive WOM[111].

As previously highlighted, doubts have been raised in the past regarding the suitability of the five SERVQUAL dimensions in the context of E-services. As a matter of fact, E-service appears to be pretty different from traditional service, especially under the following main aspects: the lack of salespeople, the absence of conventional tangibles components and the complete autonomy on the customers' side during the purchase stage[112]. Parasuraman (2000) defined enjoyment, flexibility, efficiency and convenience as the prominent positive aspects in the online environment, whereas impersonalisation, absence of control and legal aspects as the major negative themes affecting it[113].

Yang (2002) conceptualised the following dimensions with the aim of explaining the online Service quality; these dimensions have been aligned by the author with those of the SERVQUAL scale: (i) Reliability, (ii) Responsiveness, (iii) Access, (iv) Ease of use, (v) Attentiveness and (vi) Credibility[114]. Gefen (2002), instead, applied a tailored SERVQUAL instrument to the online services context and identified a drop from the five SERVQUAL dimensions to three; more specifically, (i) Tangibles, (ii) a combination of responsiveness, reliability and assurance, and (iii) empathy become the main new dimensions to investigate the online quality service[115].

2.2.3 Human vs AI customer service

In the previous two paragraphs, the already existing literature concerning customer service first and service quality later has been summarised, highlighting their impact on several dimensions such as customer satisfaction, loyalty and repurchase intention. This section, on the other hand, is aimed at examining the different ways in which companies deliver customer service and the related consumer responses depending on the type of channel adopted. Over the past few years, the advent of technology has played an active role in shaping the customer experience and, indeed, ongoing technological advances have radically transformed all

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the various touchpoints with the customer, including customer service. The traditional offline customer service model decided to innovate and to integrate online interactions, changing how businesses connect with their customers. Face-to-face interactions and tangible touchpoints have long been the cornerstone of customer service in the offline world. In offline customer service, clients receive individualised service and support from qualified personnel who can accommodate their unique needs and preferences. The human touch of these encounters makes it easier to empathise with the customer and comprehend his or her issues. In addition, offline customer service allows the consumer requesting support to personally witness the personnel solving their problem, ensuring transparency and clarity throughout the operations, and enhancing customer satisfaction and trust in turn. Face-to-face contacts also make it easier for customers and business representatives to form emotional bonds, which increase customer loyalty and advocacy. Offline customer support does, however, have some drawbacks. It could have a limited geographic reach, making it harder for users living in areas outside the physical location. Also, the timeliness of service may be impacted by the staff's availability during operating hours. On the other hand, internet's and digital technology's explosive expansion has changed how customer service is delivered through online interactions. Any contacts that take place through digital platforms including websites, mobile applications, social media platforms, email, or live chats are included in online customer service. Customers can contact online customer service 24/7 and request assistance or information whenever it's convenient for them. Indeed, customers may interact with the company more easily thanks to its accessibility, which takes different time zones and client preferences into account. Also, the potential customer base would be expanded as businesses can now provide services to clients anywhere in the world via the Internet. Additionally, online customer support can be scaled and automated to handle a lot of enquiries at once, which lowers wait times for clients and makes it more cost-effective for businesses.

Following a thorough analysis of the fundamentals of online and offline customer service, an emphasis will be placed on the different approaches between human and AI customer service. In recent years, businesses have begun to leverage IT-enabled digital technologies to provide customer service to boost consumer satisfaction. Chatbot technology, which consists of an AI conversational agent that engages with clients, is one of those that has gained greater popularity[116]. Generally speaking, companies employ virtual conversational agents to carry out a variety of customer service functions, such as resolving complaints, finding products for purchase, giving accurate information, and providing recommendations[117]. As a matter of fact, customers who experienced both online and offline customer service, found online service to be effective and also cost and

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time-saving[118]. Several different sectors, including health[119], education[120], and work assistance, have witnessed the emergence of chatbots. However, due to its promise to offer a cost-effective, readily available, and accessible service provision, customer service continues to be one of the primary application areas[121]. The luxury sector is one of the early adopter's industry of digital services offering 24-hour customer service via Chatbots. Louis Vuitton in first place, provides a chatbot service that delivers details about offline stores across the world, access to personal care agents, and conversational interfaces that highlight the quality of the products[122]. Even the automotive sector has not missed the opportunity to integrate chatbots into their operational processes, providing both the customer and the car manufacturer/dealer with several advantages.

Before proceeding further, it seems necessary to dwell on the nature of chatbots. According to Folstad and Brandtzaeg (2020)'s definition, chatbots are "machine agents that users interact with in natural language"[123]. Lee et *al.* (2017) defined chatbot as a "virtual conversational service robot that can provide human-computer interaction"[124]. Whenever chatbots provide customer support without the aid of a human agent, they can be intended as a self-service technology (SST)[125].

Nowadays, there are several relevant classifications for chatbots which are based on a variety of different criteria. According to the response mechanisms deployed, there are two main mechanisms of replies intended by chatbots: the rule-based model, also called the template-based model, and the generative AI model[126]. The rule-based chatbot incorporates a set of predefined answers which are stored from a huge collection and are presented during the conversation. These are chatbots in the simplest basic version. The generative AI chatbots instead, create replies from scratch through machine learning and an artificial intelligence system, making it

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unnecessary to predefine a range of possible answers[127]. According to the nature of the interaction, it is possible to identify: customer service chatbots that are designed to provide information, help, advice, or suggestion; personal assistant chatbots used on a daily base for any kind of need or request (e.g., Alexa); content curation chatbots, which provide users access to helpful data (e.g., weather, news); and chatbots aimed at teaching and guiding the user with specific tasks (e.g., Education, therapy)[128]. Finally, depending on the nature of the conversation, a set of different conversation types are supported by chatbots. Chatbots can be grouped in two main families: chatbots with a narrow goal orientation and dialogue chatbots for an in-depth treatment of a topic. As introduced by Shevat (2017), task-led conversation chatbots are goal-oriented, aimed at addressing a problem, whereas topic-led conversation chatbots involve long conversations exploring a topic of interest in depth[129]. Considering the three classifications just mentioned, this work deals only with generative AI chatbots, specialised in providing customer service and with a goal-oriented nature of conversation. Indeed, customer service chatbots are built to hold narrow goal conversations[130]. Moreover, research on chatbots for customer care frequently focuses on chatbot attributes that enable task completion[131].

From the findings so far, implementing a customer service activity delivered through AI chatbots apparently seems to be the best strategy that businesses can adopt nowadays. Indeed, 24/7 availability, fast responses, reduced staff costs, collection of valuable data, and automated routine tasks are just some of the many benefits of adopting this new technology. On the other hand, customer service has always been provided through human contact and therefore it would be useful to better understand consumers' feelings and perceptions regarding the shift from human to chatbot-delivered customer service. According to Brehm's (1996) psychological reactance theory, people form expectations based on prior experiences[132]. As a result, people tend to compare their offline customer service interactions with service professionals (conducted in person or by telephone) to online environments[133]. Therefore, people expect to be able to interact and experience the same level of service whether they are online or offline[134]. In addition, as conceptualised by

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Nass et *al.* (1996) in the social response theory, whenever technology has a set of human-like traits, a person's response to the technology will appear as social behaviour, leading them to respond to it with social rules[135]. Moreover, existing research demonstrated that when a person interacts with a computerised agent that plays a social role or displays social cues, the user experiences a similar psychological response as they would with a real person[136].

Although humans may experience a similar reaction whether interacting with a chatbot embodied with human cues or with a real person, some huge differences are present when dealing with humans or computers, mainly based on physical characteristics. As shown by Brave et *al.* (2005) physical attributes, voice, and non-verbal communication strongly influence human-computer interaction and their outcomes[137]. Consequently, due to the lack of empathic perception, users usually show a negative attitude towards chatbots compared to human beings[138]. Despite the lack of empathy embedded in the nature of chatbots, developers sought to infuse chatbots with human-like characteristics, as studies demonstrated that users expect to find them in customer service chatbots (e.g., friendliness)[139]. It has been discovered that the appearance of human likeness in chatbots helps users' sense of anthropomorphism and social presence. Anthropomorphism has been defined as "the attribution of human-like qualities to non-human entities such as machines, animals, and other objects"[140]. However, only in a few cases, designing technology that is more human-like has been successful in boosting user's pleasure and trust; in fact, most of the time introducing human-like social cues has had unfavourable effects like social anxiety[141] and reduced cooperation[142]. For instance, even if clients might have more faith in an autonomous human-like agent, they also might see operational inefficiency and decide to deal with a different provider[143]. Furthermore, users pointed out that social content in customer service chatbots, including humour and

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pleasantries, could be perceived as unclear or inappropriate during the interaction, leaving consumers annoyed[144]. Chatbots can generate adverse emotions in users due to excessive anthropomorphism as well[145]. The type of conversation may also influence the users' perception regarding the chatbot's human likeness. Topic-led conversation chatbots resemble the interaction with human beings, as evidenced by the predominance of these dialogues in relationship-building and engagement situations. Conversely, goal-oriented conversation chatbots (e.g., customer service chatbots) are more likely to be conceived as having a strong pragmatic quality, since the attainment of a goal is prioritised over possible similarities with humans[146].

Another issue that deserves special attention is how consumers' perception of communication quality has changed from the transition of human customer service to chatbot-delivered customer service. In addition to the benefits listed above, chatbots can leverage machine learning algorithms through which they analyse incoming texts and identify keywords, proving to be useful not only to reply to the user request but also to predict his or her behaviour[147]. However, miscommunication is frequent in human-chatbot interaction and, despite their increasing implementation, they frequently fail to meet users expectations, due to the inability to understand the input of customers[148]. Communication is considered to be of high quality by customers upon fulfilment of several requirements such as fluency, timeliness, efficiency, and accuracy of responses[149]. Studies showed that customers are primarily interested in the accuracy of the information received, information that should ensure that customers feel understood and that service agents accurately diagnose their issues and provide them with the requested information[150].

Since the accuracy of information is the main driver of the quality of communication and chatbots are often unable to satisfy users requests, due to the relatively high frequency of meaningless answers, unclear

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purpose or lack of usability, users remain dissatisfied with their performance[151]. In conclusion, the lack of empathy found in their usage, the unfavourable effects from the perceived sense of anthropomorphism through the appearance of human features, and the low quality of communication led users to form negative attitudes towards chatbots, pushing them to maintain a strong desire to interact with humans.

2.2.4 Live chat customer service

As pointed out in the previous section, because of the computer-mediated and rather distant nature of the Internet, it has been hard for service providers to communicate feelings of social presence and empathy when interacting with chatbots. At the same time, the timeliness of the response and the possibility of obtaining customer service from the comfort of home has considerably enhanced the performance of both the consumer and the service provider[152]. Among all the available tools for providing customer service, live chat seems to be the only one able to meet both of these conditions. Indeed, live chat systems provide users the online equivalent of offline communication with customer service employees, allowing customers to request service support based on their needs[153].

The live chat service arose in the late 1990s and was developed to allow librarians to easily manage their book loans and answer questions from users[154]. From the limited use that was previously being made of it, live chats have now become extremely widespread and have come to be a must-have service for today's businesses. Indeed, several businesses now use instant messaging platforms, also called 'live chat', to provide customer service and online support[155]. Thanks to the presence of a human service person who responds through such media, these services enable customers to request service-related information from an organisation via online-based synchronous media[156]. According to Chattaraman *et al.* (2012), live chat facilities have three main

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functions: first, they support search; second, they support navigation; and third, they help basic decision-making[157].

Although live chats allow for the instantaneous transmission of messages between the user and the service representative, using a live chat service does not represent exactly the same experience enjoyed by the user in a face-to-face contact with the service staff[158].

As shown above, customers show a negative attitude towards the service provider when, during customer service, they perceive a lack of empathy or human-like characteristics. In the conventional face-to-face service context, people frequently rely on facial expressions to judge the understanding and emotional display of a service provider; when conversing online, though, this judgement is impossible. However, studies have shown that users often rely on textual references to assess the real meaning of the text message[159] and thus, service providers employing 'emoticons' in messages can communicate emotions to increase the feeling of empathetic behaviour[160]. Moreover, visual representations of customer support representatives may improve the perception of social presence in an online setting, positively affecting attitudes regarding the utilisation of a live chat feature[161]. Also, according to Steinbrueck, Schaumburg, Duda, and Krueger (2002), people believe that "pictures do not lie", making them have a good impact on consumers' trust[162].

According to the literature just mentioned, through live chats, service providers are able to convey empathy and social presence in the same way as they do when offering the service offline, and thus live chat customer service can be considered as the same service offered face-to-face by the human being.

As a result, given that live chats consist of human assistance offered to users via the Internet, and, unlike chatbots, succeed in conveying empathy, and since empathy implies a positive attitude, we hypothesise:

H1: Customer service provided through live chat with human agents (vs. chatbots) leads to higher (vs. lower) customer satisfaction.

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2.3 Negative-positive outcome effect in customer service

Consistent with the previous paragraphs, research showed that successful customer service is characterised by efficient and effective resolution of users problems. Indeed, as stated by Chakrabarty (2014) service agents are the key to solving customer problems[163]. Unfortunately, the service provider is not always able to solve the problem raised by the user. According to a study by Haugeland et al. (2022), consumers perceive humans to be better communicators than chatbots, since it emerged the inability of the latter to solve users' problems due to the relatively high frequency of meaningless answers[164]. Instead, as stated by Shankar (2018), chatbots through the use of machine learning, deep learning, and natural language processing are able to both identify the keywords in a customer's request, allowing them to respond with a coherent message, and progressively improve their responses whenever used, making chatbots good tools for solving customer problems[165]. Consistent with what has just been highlighted, service outcome failures can occur regardless of whether customer service is provided by a human or a chatbot, and whenever a service failure occurs users seek to explain this circumstance[166]. According to the attribution theory, individuals want to understand the reasons behind specific events in order to prevent them from happening again[167]. When individuals experience negative outcomes, they automatically look for the reasons for these outcomes and who or what is responsible for them[168]. Hence, the attribution theory enables us to investigate how users assign blame in case of a service failure[169]. Within the attribution theory, this concept refers to the attribution of responsibility, which explains the perceived cause of the service outcome[170].

Existing literature has already investigated attributional thoughts in service outcomes (failure vs. success) by comparing the service delivered by a robot and the one delivered by a human in different contexts, but to the best of our knowledge, this kind of analysis lacks in the automotive sector.

According to the attribution theory, researchers assert that consumers' perception of a robot service provider's controllability compared to a human service provider influences how they assign blame for a service

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failure. Generally speaking, it is believed that since service robots are driven by computer algorithms programmed by humans, robot service providers will have less influence over the service outcome than human service providers[171]. In addition, the high frequency of technical problems with the robots' hardware and software systems results in low controllability of service outcomes by robots [172]. Leo *et al*. (2020) through two different experiments (Robot vs Human pharmacist; Robot vs Human chef) have demonstrated that people attribute less responsibility to a robot than to a human for service failure, because people perceive robots as less controllable over the task[173]. From a study conducted by Merkle (2019) aimed at analysing consumers' perception of the hotel check-in service provided by a robot vs. a human, he found that in the case of service failure, customers were significantly more satisfied with the service robot than with the front-line employees[174]. Indeed, in the failure scenario, customers depicted the human as rude, moody or deliberately uncooperative, negatively affecting overall satisfaction. Finally, the study by Pozharliev *et al*. (2023) analysed how customer satisfaction varies according to the type of agent offering the mobility service (human vs. Autonomous Vehicle) with respect to the service outcome (success vs. failure). Specifically, it showed that, compared to the human agent, autonomous vehicles generate greater satisfaction when the service fails due to higher competence and blame attributed to the human agent[175].

The lower controllability of the service outcome, due to decisions based on algorithms that have been pre-developed by humans, the numerous hardware and software-related issues, the lower perceived competence and the more complex attribution of blame make customers perceive the chatbot as less 'guilty' than the human in case of service failure. Since the live chat is a "human-intermediated assistance offered to users through the internet", it is possible to extend this consideration to live chats as well.

Based on what has emerged so far, it is possible to formulate the second hypothesis:

H2. In the case of a negative (vs. positive) service outcome, customers will show higher customer satisfaction when customer service is provided by the chatbot (vs. live chat).

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[174] Merkle, M. (2019). Customer responses to service robots–comparing human-robot interaction with human-human interaction.
[175] Pozharliev, R., De Angelis, M., Donato, C., & Rossi, D. (2023). Do not put the blame on me: Asymmetric responses to service outcome with autonomous vehicles versus human agents. *Journal of Consumer Behaviour*, *22*(2), 455-467.

2.4 Conceptual Framework

The model of this thesis consists of one independent variable, one moderator, and one dependent variable. The independent variable is the agent type. The use of live chats in customer service in the automotive industry is expected to show greater customer satisfaction (the dependent variable), rather than customer service chatbots. Service outcome is the moderator, which enhances the relationship between the agent type in the customer service and the customer satisfaction in the automotive industry. It is expected that in the case of a negative service outcome, in the automotive industry customers will show higher customer satisfaction when the customer service is provided by chatbots rather than live chats.

To summarise it, this study will examine whether the use of Chatbot or Live chat, intended as tools for providing customer service, influence customer satisfaction in the automotive industry and how this relationship is strengthened or diminished through the service outcome.

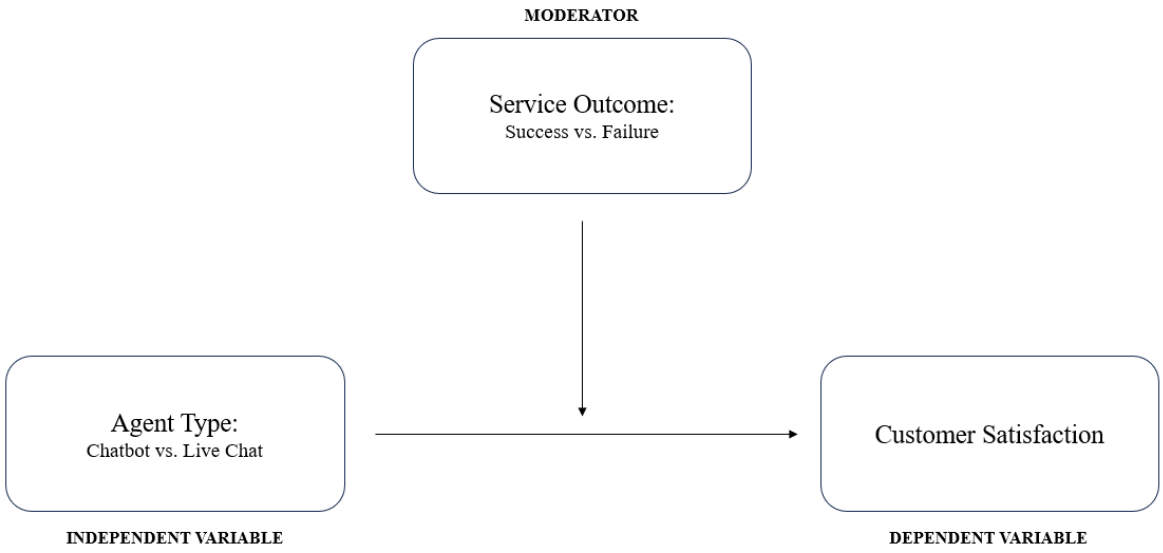

Figure 1 Conceptual model

CHAPTER 3 – Methodology and Data Analysis

3.1 Method and Research Design

In order to support the research hypotheses identified at the end of the previous chapter, an empirical study has been conducted with the aim of testing the relationships between the variables illustrated in the conceptual model depicted above (Figure 1). In particular, the first hypothesis (H1) is aimed at verifying the main effect of the independent variable (agent type: chatbot vs. live chat) on the dependent variable (customer satisfaction). The second hypothesis (H2), on the other hand, aims to demonstrate the existence of a moderating effect exerted by an additional variable (service outcome: failure vs. success) on the main relationship between the independent variable and the dependent variable. In practice, this experiment examines customer satisfaction after respondents have been presented with a fictitious conversation with a customer service provider of an imaginary car manufacturer.

Quantitative research was carried out by constructing a 2 (chatbot vs. live chat) x 2 (failure vs. success) experiment between subjects, in which the participants were randomly assigned to one of four experimental conditions. These, obtained through the manipulation of the independent variable and of the moderator, have been depicted in Figure 2. The stimuli were submitted to the participants in a randomised manner. One significant advantage is the reduction of systematic biases and confounding factors, which might possibly impair the study's internal validity.

Service outcome

	Chatbot success	Chatbot failure

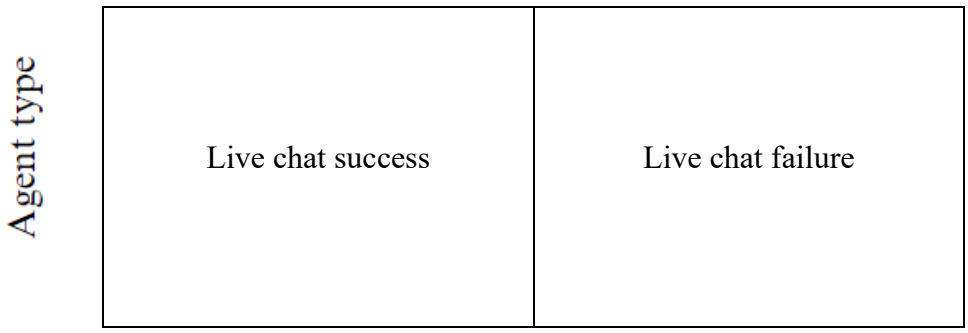

Figure 2 - 2 x 2 Matrix of experimental conditions

The study initially gave participants a description of the circumstance they were facing: they were informed that while they were driving toward their best friend, they had experienced a problem with their car and had, therefore, contacted the customer service of the car manufacturer's website to seek support. Subsequently, in order to provide all respondents with the basic knowledge needed to answer the questionnaire, the definitions of chatbot and live chat were shown before presenting them with the stimuli. Then, participants were asked to carefully read the conversation held with the customer service provider, in which they had explained the problem encountered with their car and had received, in turn, support from the customer service agent. Finally, participants were asked to answer some questions about the customer service received.

Now, each section of the questionnaire will be briefly shown.

The initial description of the circumstance they were facing was as follows: "*Imagine you are travelling by car on your way to join your best friend at the beach. After a few kilometres you realise that a warning light has turned on the dashboard of your car. There are still 120 km left to your destination and you don't feel safe driving with a light on, so you decide to stop at a lay-by to assess the severity of the situation. Not knowing what the warning light means and not having the owner's manual at hand, you decide to rely on and ask for support from the car manufacturer's customer service using the website's chat.*"

The reason why the author chose to depict this scenario is because it seems to be a very plausible situation one could encounter while driving a car, since it is likely that a warning light comes on in the car's dashboard and the driver is not able to assess the severity of the problem on its own. In addition, with the advancement of technology and the changed preferences of consumers, using a customer service messaging chat that can solve the problem for free and instantaneously is the method that best represents the current new scenario. Finally, several studies point out that there is a gap in this field regarding both the implementation of customer service systems in the automotive sector and the adoption of different levels of automation in the customer service provider.

After having provided the respondents with a brief description of the situation, the definitions of chatbot and live chat for customer service developed by Forbes were displayed[176].

Once the respondents understood the circumstance the driver was experiencing and familiarised with the definitions of chatbot and live chat, they were shown one of four randomised stimuli representing the conversation between themselves and the car manufacturer's customer service chatbot.

Two of the four stimuli showed depicted the conversation that took place between the customer service chatbot and the driver, in which the latter explained the problem encountered with his/her car and the chatbot provided support for the request. The two stimuli diverged from each other based on the service outcome. In the first scenario (Appendix 1.1.1) the chatbot was unable to provide an answer to the driver's issue, leading to a failure in the service outcome, whereas in the other stimulus (Appendix 1.1.2) the chatbot properly delivered the response and solution to the problem, thus representing a success in the service outcome.

On the other hand, the remaining two stimuli depicted the same kind of conversation held with the chatbot, but in this case, the driver no longer interacts with the chatbot but rather with the live chat. Similarly, to the case previously mentioned, even in the conversation held with the live chat, the agent led to a different service outcome depending on the scenario shown. Indeed, the first scenario (Appendix 1.1.3) evidences the inability of the live chat operator to accurately answer the question raised by the driver, resulting in a service failure, whereas in the second stimulus (Appendix 1.1.4), the live chat operator is able to correctly answer the questions asked and solve the driver's problem, making the outcome of the service provided successful.

Then, the questionnaire was followed by a set of questions aimed at investigating the respondent's degree of satisfaction with the customer service provider for the service received, both in the successful and unsuccessful scenario.

Finally, some demographic questions were asked in order to get a picture of the collected sample.

3.2 Sample and data collection

Before releasing the questionnaire for the main study, the author conducted a pretest study aimed at validating the correct identification of the service provider in the scenarios that would later be used for the main studies. The pretest data were collected in August 2023, via an online questionnaire developed on Qualtrics Online Platform and released in Italian to the author's university colleagues, co-workers and friends. The pre-test questionnaire was composed of the description of the situation experienced by the driver, the definitions of

[176] What Is A Chatbot? Everything You Need To Know. (2022). *Forbes Advisor*. Retrieved August 14, 2023, from https://www.forbes.com/advisor/business/software/what-is-a-chatbot/

the chatbot and live chat customer service agent and the different scenarios depicted above, followed by a few questions aimed at ensuring the correct understanding of the type of customer service agent shown.

Moving on to the main study, data was collected in September 2023 through an online between-subject experiment, which was created again using Qualtrics Online Platform. The experiment was conducted in the form of a questionnaire, proposed in Italian to ensure better understanding by the public and to reach a wider audience in the author's capacity. In fact, the experiment was launched in Italy by disseminating the questionnaire to the author's close people and their nearest friends. In addition, it was posted and shared on social media platforms such as Facebook, Instagram, WhatsApp. In order to obtain valid results from the experiment, consumers with a high level of technological innovativeness were recruited. By distributing it via the author's social media channels, the study was made available to people in the age group of interest, such as friends, family members, university students and young workers, since it is well known indeed that younger generations are the most technologically advanced. This sampling method is called convenience sampling.

Since the scenario depicted an online customer service carried out via artificial intelligence tools (e.g. chatbots) or live chat, the questionnaire was mainly sent to people aged between 20 and 30. Furthermore, neither the study's goal nor the chance of being exposed to one of four alternative randomised situations were made known to the participants. This choice was made in order to avoid influencing the course of the investigation. Since the questionnaire's responses were all anonymous, users could respond honestly without worrying about being judged. The questionnaire was estimated to last 2-3 minutes to complete.

3.3 Procedure

The objective of the experiment was to identify whether the outcome of the customer service in the automotive industry moderates the relationship between the type of agent providing the customer service and customer satisfaction. The experiment, conducted via the Qualtrics XM platform, was structured in sections to ensure a clear and smooth structure and to promote fluidity. Initially, there was an introductory section with a brief description of the purpose of the study and the maximum duration of the experiment. In addition, the complete anonymity of the responses and the absence of correct and incorrect answers was specified (Appendix 1.2).

Moreover, there was a section in which the hypothetical situation the respondent was experiencing was described. As already explained in the previous section, the aim of the narrative was to make the respondent fully empathise with the depicted situation.

In the following section of the questionnaire, the stimuli described above were inserted in a randomised manner.

In order to test the moderating effect of the customer service outcome on the type of customer service agent and customer satisfaction in the automotive sector, the conditions were manipulated and took the form of a conversation with the customer service agent and the outcome of the service provided. As reported above, to prevent other variables from influencing the results, the skeleton of the conversation was kept constant in terms of visual appearance; the only difference concerned the type of agent providing the customer service and the outcome of the service. In fact, according to the design used, an online experiment between subjects, participants were randomly assigned to one of the four conditions seen above (Figure 3). In addition, to ensure that participants read carefully both the scenarios, the initial explanation of the situation, and the definitions provided, each block was stuck for 14 seconds. After exposure to the scenarios, the respondents were asked to rate customer satisfaction through a pre-validated scale of 1 to 7 items. In the next section, the scales will be explained in more detail.

3.4 Measurements

In the present section of chapter three, the measurement scales used for this study will be discussed. Regarding the pre-test, in order to verify that the respondents had correctly identified the service provider in the presented scenario, participants were asked to indicate the degree to which they perceived the presence of robots in the conversation shown through a four-items-7 points Likert scale (1=Strongly disagree, 7=Strongly agree) developed by the author (Appendix 1.3.1).

Moving on to the main study, customer satisfaction was investigated. Concerning the variable of customer satisfaction, since this study deals with customer service, a pre-validated scale on customer satisfaction with the service provided was used. Following the scenario, customer satisfaction was measured through a three-items-7 points Likert Scale (1=Strongly disagree, 7=Strongly agree) adapted from Voss et al. (1998)(Appendix 1.3.2)[177].

Regarding the manipulation check, the perception of the respondents about the agent type and the service outcome was analysed, based on the scenario seen. Firstly, participants were asked to indicate whether the service provider was a chatbot or a Live chat using a seven-point differential semantic scale anchored with 1 as " Customer service was provided via chatbot" and 7 as " Customer service was provided via Live chat ". Then, in order to identify whether they perceived the outcome of the service properly, they were asked what the outcome of the customer service was using a seven-point differential semantic scale anchored with 1 as " The service outcome was a failure" and 7 as " The service outcome was a success".

[177] Voss, G. B., Parasuraman, A., & Grewal, D. (1998). The roles of price, performance, and expectations in determining satisfaction in service exchanges. *Journal of Marketing*, 62(4), 46–61

Two additional variables such as a covariate and a descriptive variable were also included in the study. The covariate included in the study is represented by the need for human interaction, a variable measured using the scale developed by Ashfaq et al (2020)[178]. This scale is measured with three items- 7 points Likert scale (1=Strongly disagree, 7=Strongly agree)(Appendix 1.3.3).

Finally, as anticipated, the level of technological innovativeness was included as a descriptive variable. The scale used to measure technological innovativeness is a four -items-7 point Likert scale (1=Strongly disagree, 7=Strongly agree) developed by Parasuraman (2015)(Appendix 1.3.4)[179].

3.5 Data analysis

Once the number of questionnaire participants for both the pre-test and main study had been reached, the data collected by Qualtrics XM was imported into the SPSS statistical software. In fact, all statistical analyses related to the experiment were carried out on this platform.

The pre-test was conducted on a sample of 62 respondents, 53 of which completed the questionnaire and whose data was considered for the analysis. The sample consisted of 26 males, 26 females, and one who preferred not to disclose his/her gender (Appendix 2.1.1). The respondents were mainly young people in their 20s and 30s, since they are more confident with new technologies. Indeed, the pre-test sample was particularly young Mage=26.88 SD=7.88 (Appendix 2.1.2). In particular, 25 respondents were subject to the “chatbot” condition and 28 people to the “live chat” condition.

First, since the scale aimed at measuring the perceived presence of robots was developed by the author, it was necessary to proceed with a factor analysis in order to ensure that all items represented the underlying phenomenon. From the table of the total explained variance, it was possible to identify the number of factors in the scale. In fact, the eigenvalues criteria demonstrated the presence of only one factor with eigenvalues greater than 1.0 for which the cumulative percentage of variance extracted reaches a satisfactory level (Appendix 2.2.1). Then, through the component matrix used to analyse the validity of the scale and the labelling, it emerged that all items of the scale presented high value factor loadings, leading the items to belong to the same factor (Appendix 2.2.2). Subsequently, all the four items showed high communalities (>0.5) (Appendix 2.2.3). Finally, the correlation matrix and KMO and Bartlett's test of sphericity were analysed. The

[178] Ashfaq, M., Yun, J., Yu, S., & Loureiro, S. M. C. (2020). I, Chatbot: Modeling the determinants of users’ satisfaction and continuance intention of AI-powered service agents. *Telematics and Informatics*, 54, 101473.

[179] Parasuraman, A. and Colby, C.L. (2015),. An updated and streamlined technology readiness index: TRI 2.0. *Journal of Service Research*, Vol. 18 No. 1, pp. 59-74.

correlation matrix showed that all items of the perceived presence of robots were highly correlated with each other (Appendix 2.2.4) and the KMO and Bartlett's test of sphericity confirmed the sampling adequacy measure by showing a value > 0.8 (Appendix 2.2.5).

Once the factor analysis had been run, the reliability analysis was carried out. The reliability analysis is used to verify whether a measure produces similar results under consistent conditions. Reliability is assessed through the Cronbach's alpha index, which must assume a value > 0.5 in order to be considered acceptable. The Cronbach's alpha value for the perceived presence of robot scale is equal to 0.974 (Appendix 2.3.1). As Cronbach's alpha is greater than 0.9 for the scale, it can be considered highly reliable. Finally, via the Item-total Statistics table, it was verified that there is no item whose removal would lead to a significant increase in Cronbach's Alpha index (Appendix 2.3.2).

After performing both factor analysis and scale reliability analysis and having found positive results, the scale introduced above was used to assess whether the respondents' perception of the type of agent who provided the service in the scenario shown was accurate or not. For this purpose, a variable called 'Mean Perceived Robot Presence' was created, in which the values taken are the average of the values assigned by each respondent to the four questions on the scale. In addition, a variable called 'scenario' was created, which assumed a value equal to 1 if the respondent was exposed to the chatbot scenario and 0 if the respondent was exposed to the live chat scenario.

In order to test whether in the conversation held with the chatbot the robot was perceived as significantly more present than in the conversation held with the live chat, an independent-sample t-test was performed with the agent type as the dependent variable. The assumptions of normality and homogeneity of variance were fulfilled for the t-test performed in this study (F=3.859; p=.055) (Appendix 2.4.1). Since p=0.055 > .05, then we cannot reject H0, thus variances are constant for chatbot and live chat. Thus, we should use t-tests with equal variances to make conclusions. In this case, since the t-test for equality of means results < 0.001, we can reject H1 (Appendix 2.4.1).

As expected, the results of the pretest revealed that in the conversation with the chatbot, the robot was perceived to be significantly more present than in the conversation with the live chat (M_Chatbot = 6.08, SD = 1.01; M_LiveChat= 2.58, SD = 1.52; t = 9.68, p<.001) (Appendix 2.4.2). It can be concluded that the manipulation of the agent type was perceived correctly by the respondents.

Now, the analysis related to the main study will be deepened. The main study was conducted on a sample of 128 respondents, who all completed the questionnaire and thus 128 answers have been considered for the analysis. The sample consisted of 76 males, 48 females, 3 non-binary and one person who preferred not to reveal his/her gender (Appendix 3.1.1). Similarly to the pre-test, the respondents were mainly young people in their 20s and 30s, as they are more confident with new technologies. In fact, the sample of the main study showed a particularly young age Mage=26.83 SD=8.81 (Appendix 3.1.2). Moreover, almost the entire

sample is Italian, in fact 95% of the sample declared to be Italian (Appendix 3.1.3). Turning to the scenarios, since they were randomised, the different scenarios were submitted to the respondents a similar number of times. In particular, 32 respondents were subjected to the 'chatbot success' condition, 31 people to the 'chatbot failure' condition, 34 people to the 'live chat success' condition and finally, 31 people to the 'live chat failure' condition (Appendix 3.1.4).

In order to confirm that the respondents correctly perceived the agent type that provided the service and the outcome of the customer service, two manipulation checks were included. Before proceeding with the two independent sample t-test, two dummy variables called 'AgentType' and 'ServiceOutcome' were created, which assumed values 0 and 1 depending on what the respondent was exposed to. The variable 'AgentType' assumed a value equal to zero if the respondent had been exposed to the live chat scenario and 1 if the respondent had been shown the scenario with the chatbot, whereas the variable 'Service Outcome' took on a value equal to 0 if the service outcome shown was a failure and 1 if it was a success. The results of two independent sample t-tests showed that participants perceived the chatbot and live chat correctly in the different scenarios ($M_{chatbot} = 1.71$, $SD = 1.17$ vs. $M_{livechat} = 6.06$, $SD = 1.74$; $t = -16.47$, $p < .001$) (Appendix 3.2.1) and rated the outcome of the scenarios correctly, with the negative one reporting lower scores ($M_{failure} = 1.76$, $SD = 1.28$ vs. $M_{success} = 6.38$, $SD = 1.01$; $t = 22.56$, $p < .001$) (Appendix 3.2.2), allowing the four selected scenarios to be used in the main studies.

Moving on to the scale aimed at measuring customer satisfaction, since this was a pre-validated scale, only the reliability analysis was performed. The assessment of the reliability of the scale is based on the value of Cronach's alpha. As Cronbach's alpha is greater than 0.9 for the customer satisfaction scale, it can be considered highly reliable (Appendix 3.3.1). Finally, it was verified via the Item-total Statistics table that there is no item whose removal would lead to a significant increase in Cronbach's Alpha index (Appendix 3.3.2). Once the reliability of the scale was tested, a variable called 'MeanCustomerSatisfaction' was created, whose values were the average of the scores assigned by each respondent to the three questions concerning their perceived satisfaction with the service. Subsequently, in the same manner performed for customer satisfaction, the reliability of both the covariate and the descriptive variable was tested. With regard to the descriptive variable, i.e. "technological innovativeness", this showed a Cronbach's alpha of 0.924 (Appendix 3.4.1) and through the Item-total Statistics table emerged that there is no item whose removal would lead to a significant increase in Cronbach's Alpha index (Appendix 3.4.2). The variable Mean_TechInn was calculated as the average of the scores assigned by the respondents to the four questions aimed at measuring the respondents' level of technological innovativeness.

Finally, the same test was carried out for the covariate 'need for human interaction'. Even this variable exhibited a high Cronbach's alpha of 0.867 (Appendix 3.5.1) but, although it appeared that removing the last item would have lead to a further increase in Cronbach's alpha index, the author decided to retain the full three-items scale as the improvement would not have been significant and scales with only two items are not recommended

(Appendix 3.5.2). Again, an additional variable called Mean_NHI was created, which takes as its value the average of the values assigned by the respondents to the questions designed to measure the need for human interaction.

In order to gain a complete view of the sample of the experiment, their level of technological innovativeness was calculated. The respondents showed an average level of technological innovativeness equal to 4.7, demonstrating a high level of knowledge regarding new technologies and expertise in the field (Appendix 3.5.3).

3.6 Hypotheses test

First of all, in order to test H1 (*Customer service provided through live chat with human agents (vs. chatbots) leads to higher (vs. lower) customer satisfaction*) and H2 (*In the case of a negative (vs. positive) service outcome, customers will show higher customer satisfaction when customer service is provided by the chatbot (vs. live chat)*), a two-way ANOVA was performed considering the nature of our variables. Within the two-way ANOVA, the agent type, which is nominal, was used as the independent variable. The moderator service outcome was manipulated and therefore also nominal. Finally, customer satisfaction, a measurable variable, played the role of the dependent variable. Performing a two-way ANOVA is useful to verify the moderating role of the service outcome (success or failure) on the relationship between the type of customer service provider (chatbot or live chat) and customer satisfaction. The basic assumptions for this test (homogeneity of variance, normality) were met (Appendix 3.6.1).

Once the basic assumptions were tested, the effects of the independent variable on the dependent variable, the moderator on the dependent variable, and the moderating effect of the service outcome on the relationship between the independent and dependent variable were analysed.

Hereafter we briefly describe the outcomes. The main effect of agent type on customer satisfaction is not significant, so it cannot be extended to the population that the customer satisfaction of the customer service is higher when the service is provided via a live chat, rather than via chatbot (Mlivechat = 3.95, SD =2.32; Mchatbot= 3.87, SD = 1.82; F = .006; p=.941) (Appendix 3.6.2). On the other hand, results showed a significant effect of service outcome on customer satisfaction. This suggests, as expected, that customer satisfaction with successful customer service outcome is higher than customer satisfaction with unsuccessful customer service outcome (Msuccess = 5.63, SD =1.10; Mfailure = 2.08, SD = 1.06; F = 359,65 ; p <.001) (Appendix 3.6.2).

Furthermore, the interaction between agent type and service outcome had a significant effect on customer satisfaction (F = 10.13, p = .002). More specifically, in the case of a 'failure' service outcome, satisfaction was

higher when customer service was provided via chatbot rather than via live chat (MfailureChatbot = 2,37, SD = 1,17; MfailureLivechat = 1,79, SD = 0,87), while in the case of a successful service outcome, satisfaction was higher when customer support was provided via live chat compared to when it was provided via chatbot (MsuccessLivechat = 5.93, SD = 1.18; MsuccessChatbot = 5.32, SD = 0.94)(Appendix 3.6.2). The second hypothesis (*H2: In the case of a negative (vs. positive) service outcome, customers will show higher customer satisfaction when customer service is provided by the chatbot (vs. live chat)*) has been therefore confirmed.

In order to test the second hypothesis, according to which the service outcome moderates the relationship between agent type and customer satisfaction with the inclusion of the need for human interaction variable, an ANCOVA was performed where agent type and service outcome were selected as independent variables, need for human interaction as covariate and customer satisfaction as dependent variable.

Basic assumptions for the test (homogeneity of variance, normality) were met (Appendix 3.7.1). The need for human interaction does not significantly affect customer satisfaction (F=2.5 p=0.116), demonstrating that customer satisfaction for the service is not influenced by the respondents' need for human interaction. Even in this analysis, despite the inclusion of the need for human interaction as a covariate, the interaction effect is significant (F = 8.57, p = .004), leading to the same results presented above (Appendix 3.7.2).

Conclusion

Over the past few years the automotive industry has been leading the major industries towards embracing digital transformation. The automotive sector is indeed the industry which is investing the most in digital transformation, and forecasts expect it to spend more than 200 billion dollars per year by 2030[180]. The automotive industry is no longer what it once was and the car is no longer seen merely as a means of transport, since it represents so much more. Car manufacturers are witnessing the rapid transformation of this sector and its evolution towards the so-called 'mobility ecosystem'. Connected cars and autonomous vehicles, the shift from hardware to software-defined cars, the focus on sustainability, and the widespread phenomenon of car sharing are the main developments that are driving towards this new ecosystem[181]. Furthermore, the increasing centrality of the customer has driven companies to focus on their interests, preferences and habits in order to provide a high customer experience[182]. The digital transformation they are experiencing together with the need to provide a highly personalised customer experience has led companies to revolutionise their customer service. Through the aid of digital solutions such as chatbots or live chats, customer service is no longer merely solving the customer's problem and closing the ticket, but also offers immediate and proactive support.

As outlined at its very beginning, this thesis sought to demonstrate the existence of a relationship between the type of agent providing customer service and customer satisfaction, and how this relationship

[180] Placek M. Autonomous vehicles worldwide - statistics & facts. (2022, September 23). *Statista*. Retrieved July 2, 2023, from https://www.statista.com/topics/3573/autonomous-vehicle-technology/#topicOverview

[181] *Get beyond the wheel*.(n.d.).*Accenture*. *Retrieved July 2, 2023, from* https://www.accenture.com/us-en/industries/automotive-index

[182] Moving into the software-defined vehicle fast lane(n.d.). *Accenture*. *Retrieved July 2, 2023, from* https://www.accenture.com/us-en/insights/industry-x/software-defined-vehicles

changes according to the outcome of the service provided. The interest of this paper in exploring customer service applied to the automotive industry is rooted in the centrality it holds in the customer journey: customer service, as stated in an IBM consulting report, is in fact no longer just a priority, but has become essential[183].

Depending on the nature of the customer service provider, the user's perception of the service provider and its inherent characteristics will change; and in turn, the level of satisfaction may vary as well. Furthermore, when requesting customer service, the user seeks external support to address a problem that he or she is unable to solve autonomously, and the outcome of the service, whether negative or positive, will undoubtedly influence the user's consideration of the service provider.

Therefore, the research question initially posed is reproduced below:

"How does the use of a different agent type (Chatbot vs Live chat) influence customer satisfaction in the automotive industry's customer service?"

To conduct the analysis and answer the research question, two hypotheses were developed based on the literature study. The first was presented as follows: (Customer service provided through live chat with human agents (vs. chatbots) leads to higher (vs. lower) customer satisfaction). The second hypothesis was presented as follows: (In the case of a negative (vs. positive) service outcome, customers will show higher customer satisfaction when customer service is provided by the chatbot (vs. live chat)).

As can be seen in Chapter 3, which addresses the analysis of the study, only the second hypothesis has been confirmed, while the first can be considered valid within the sample.

Therefore, in the case of negative customer service outcomes, consumers show higher satisfaction when customer service is provided via chatbots rather than via live chat. Furthermore, the hypothesis for which the customer service provided through live chat leads to higher customer satisfaction than customer service provided through chatbots has been confirmed, but it's only valid within the sample.

The results of this study are especially useful for automotive companies that want to improve their customer service: with the help of digital assistants, they can increase customer satisfaction by providing a precise, accurate and successful service.

This study, therefore, has important managerial implications and theoretically contributes to the existing literature on this topic, filling the gap in the literature of the automotive and customer service world. The managerial implications and limitations of this research will be described below, for they can be a starting point for future research.

[183] AI for Customer Service.*IBM*. (n.d.). Retrieved July 11, 2023 from https://www.ibm.com/ai-customer-service

Theoretical Contributions

This thesis contributes to the existing literature on customer service and, as its theoretical implication, also fills the gaps in the literature identified in Chapter 2 of the research.

The first theoretical contribution of the thesis concerns the specific focus on the automotive industry. Other studies presented in the literature analysed customer service in the hospitality[184] and retail industries[185], studies which were considered as the basis of the object of study; these studies, however, questioned whether customer perceptions would change when customer service was provided in different contexts than those analysed.

The following thesis, on the other hand, contributes to academic research by analysing how customer satisfaction changes in the face of customer service provided by different agent types in the automotive sector.

Secondly, this paper contributes to the current literature on service outcomes. Indeed, part of the existing literature has already analysed different consumer responses to the service outcome provided by humans or robots and the attribution of responsibility for the service outcome to the agent: these studies have highlighted the need to verify the results both by using other types of robots or AI as service providers, in contexts that are different from hospitality[186], and by also analysing consumer attitudes in the case of a positive service outcome[187]. In this regard, this work has provided evidence of how the level of customer satisfaction changes when faced with a customer service provided via chatbots and live chat, as well as how this relationship is moderated by the outcome of the service, be it failure or success.

More specifically, this study was aimed at proceeding on the basis of several theories and authors that have shown how implementing customer service providers that convey empathy and social presence, compared to agents lacking empathy and human characteristics which can have more positive outcomes in consumer satisfaction[188]. Furthermore, existing research has shown how unlike the chatbot, the use of live chat still allows to convey empathy[189] and social presence through textual references, the use of emoticons and through the visual representations of customer support representatives[190]. These assumptions led to the formulation of

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[184] Choi, Y., Choi, M., Oh, M., & Kim, S. (2020). Service robots in hotels: understanding the service quality perceptions of human-robot interaction. *Journal of Hospitality Marketing & Management*, *29*(6), 613-635.
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the first hypothesis. In addition to this, it was investigated how the outcome of the service provided shapes the relationship between the agent providing this service and customer satisfaction. According to the attribution theory, researchers assert that consumers' perception of a robot service provider's controllability, compared to a human service provider, influences how they assign blame for a service failure[191]. Since service robots are driven by computer algorithms programmed by humans, robot service providers will have less influence over the service outcome than human service providers[192]. Furthermore, research claims that high frequency of technical problems with the robots' hardware and software systems results in low controllability of service outcomes by robots[193]. These assumptions led to chatbots being considered as less 'guilty' than human customer service in case of service failure, and, thus, to the development of the second hypothesis.

Managerial implications

The findings from this study offer an in-depth insight into the intricate landscape of customer service dynamics in the automotive industry. Although the main hypothesis, which suggests a higher level of satisfaction with a customer service provided via live chat than with chatbots, did not reach statistical significance to be extended to the population, the results confirmed the significant impact of the service outcome on customer satisfaction with a customer service provided in the automotive industry. Specifically, in the case of customer service with a negative service outcome, higher customer satisfaction was observed when customers turned to chatbots than when they turned to live chat.

This finding prompts a reconsideration of conventional notions and calls for a more adaptive and nuanced approach to customer service management in the automotive industry. Indeed, managers should develop a harmonious synergy between the chatbots, which excel at efficiency and handling routine tasks, and the skills of live chat operators, who play an indispensable role in dealing with complex issues that require human expertise and empathetic involvement.

Beyond just focusing on customer satisfaction, this strategy is crucial for the effective use of resources. Based on the findings, businesses might implement a hybrid customer service approach, at least in the near future. In fact, organisations can deliberately deploy chatbots to handle initial inquiries and routine tasks to ensure prompt responses and reduce the workload on human operators. This efficiency optimization reduces costs and opens up resources to focus on more complex aspects of customer service, while also maintaining a high

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level of satisfaction through accurate and quick responses. On the other hand, businesses should allow the human operator to take control of the conversation when it comes to more complicated inquiries and for which careful human evaluation is required. To achieve the desired balance between automation and human intervention, it is crucial to provide specialised training to live chat operators. Such training provides them with the skills necessary to excel in areas where human intuition and empathy are irreplaceable, including complex problem solving, emotional support and in-depth analysis of customer issues. Despite the sample's preference for live chat, businesses should keep investing funds on chatbots: as technology advances, chatbots will be able to provide increasingly accurate and timely answers and, perhaps, manage complex conversations. Interactions with chatbots, often in the embryonic stages of their development, may not reflect their full potential. In the coming years, technological advances will enable chatbots to surpass humans in many aspects of customer service, erasing initial scepticism. As chatbots develop, their disruptive potential will become more and more clear, possibly revolutionising customer service in the automobile sector.

In addition, managers should focus their efforts on the evolution of performance metrics. Traditional metrics, such as response time and resolution rate, offer insights into the efficiency of customer service operations. When evaluating the efficacy of automated assistance, metrics like chatbot accuracy and customer satisfaction during chatbot encounters can be quite insightful.

With regard to chatbots, their design and execution should be influenced by ethical considerations. Indeed, the gathering and usage of data during chatbot interactions must be transparent. Compliance with ethical standards not only safeguards the organisation's reputation, but also fosters customer trust in automated service systems. Furthermore, additional studies should be conducted to identify and accommodate the distinct preferences of various client groups in light of the possibility that preferences vary across different customer segments. Within the hybrid model, segmentation enables customised approaches, ensuring that various client needs are satisfied.

In conclusion, this study gives rise to the important managerial implications shown above, changing established paradigms in the automotive customer service landscape. The finding that customers are more satisfied with chatbots in the presence of failing service outcomes emphasises the hybrid service model's potential for transformation. By strategically balancing the capabilities of chatbots and live chat operators, automotive companies can revolutionise customer service operations, optimise resources and provide exceptional support. Embracing this dynamic evolution is not just a choice, but a necessity to meet the evolving expectations of today's customers in an automotive landscape driven by technological advances and changing consumer preferences.

Limitations and Future Research

Although this research thesis aims to fill some gaps in the literature, it has some limitations that future research could fill. Through further research, the literature will be able to compare these new findings with those provided within this study and draw important conclusions.

A first limitation of this research certainly concerns the number and nationality of the respondents. In fact, the present study was carried out by collecting a sample of about 130 people, most of whom were Italian. Future research could extend the present study to a larger sample composed of people of other nationalities in order to analyse whether any cultural differences affect consumer preferences on the type of agent providing the service.

A second limitation lies in the level of technological expertise. Despite the fact that the sample analysed showed a high level of technological innovativeness (4.7 out of 7), previous studies have shown that the Italian level of digital competences is rather low, making it necessary to replicate the same study by sampling people from countries with a high level of digital competences[194]. The nationality of the participants could therefore be an interesting element for further research.

Furthermore, as the study was based on a customer service that occurred in the automotive industry, it would be interesting to see consumer responses to a chatbot/live chat customer service occurring in another industry.

Finally, despite the fact that the scenarios and descriptions shown to the experiment participants were created with the aim of eliminating cognitive biases, it is possible that personal preconceptions affected the participants' responses. Future research should for this reason repeat the present study using different stimuli and scenarios, in order to verify whether the present results can be confirmed or could, instead, change.

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Appendix

1.1 Stimuli

1.1.1 Stimulus 1 Chatbot Failure

1.1.2 Stimulus 2 Chatbot Success

1.1.3 Stimulus 3 Live Chat Failure

1.1.4 Stimulus 4 Live Chat Success

1.2 Introductory description

"Hi, my name is Raffaele Sensini and I am a Marketing student attending the Marketing Analytics and Metrics course at LUISS Guido Carli University in Rome. I am conducting research for my Master's Thesis and I would be grateful if you could spend a few minutes to answer a few questions. Your answers will be used for academic purposes only, will be treated confidentially and will remain completely anonymous. It will take a maximum of 5 minutes to complete the survey. Please answer as openly and honestly as possible; there are no right or wrong answers. Thank you for taking part in the survey!"

1.3 Measurement scales applied in the experiment

1.3.1 Perceived Robot Presence Scale – four Items 7 points Likert scale

"The conversation clearly shows the use of a chatbot, with no trace of human interaction";" The conversation image unambiguously represents a chatbot';" The conversation image clearly represents interaction managed via artificial intelligence"; "The conversation image clearly suggests the use of an artificial intelligence-based system"

1.3.2 Customer Satisfaction Scale – Three Items 7 points Likert scale

"I was satisfied with the provided service"; "I was delighted by the provided service"; "I was happy with the provided service"

1.3.3 Need for Human Interaction Scale – Three Items 7 points Likert scale

“I enjoy the process of communicating with human service agent”;”I like communicating with human service agent”;”Interacting with robot service agent bothers me more than human service agent”

1.3.4 Technological Innovativeness Scale – Four Items 7 points Likert scale

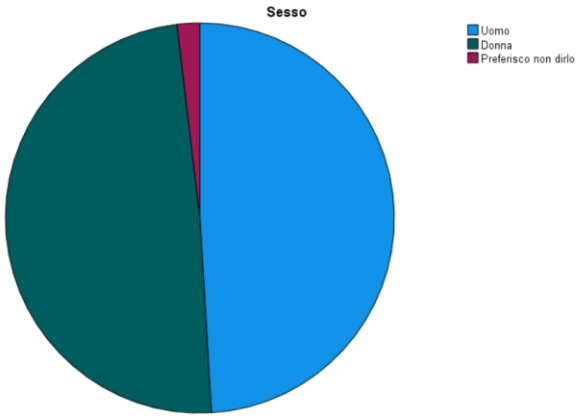
"Other people come to me for advice on new technologies";"In general, I am among the first in my circle of friends to acquire new technology when it appears"; "I can usually figure out new high-tech products and services without help from other"; "I keep up with the latest technological developments in my areas of interest"

2.1 Descriptive statistics pre-test

2.1.1 Gender

Sesso

		Frequenza	Percentuale	Percentuale valida	Percentuale cumulativa
Valido	Uomo	26	49,1	49,1	49,1
	Donna	26	49,1	49,1	98,1
	Preferisco non dirlo	1	1,9	1,9	100,0
	Totale	53	100,0	100,0	



2.1.2 Age

Statistiche descrittive

	N	Minimo	Massimo	Media	Deviazione std.
Età	53	18,00	58,00	26,8868	7,88050
Numero di casi validi (listwise)	53				

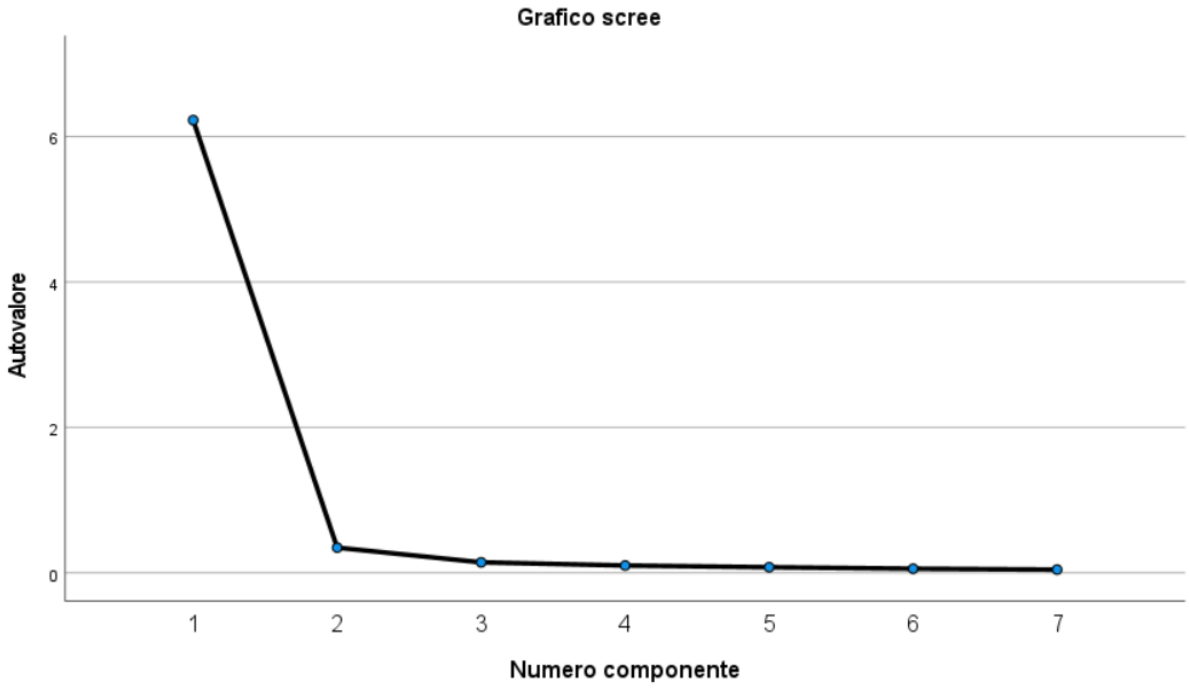
2.2 Measurement scale pre-test: Factor Analysis check

2.2.1 Total variance explained

Varianza totale spiegata

Componente	Autovalori iniziali			Caricamenti somme dei quadrati di estrazione		
	Totale	% di varianza	% cumulativa	Totale	% di varianza	% cumulativa
1	6,227	88,954	88,954	6,227	88,954	88,954
2	,347	4,960	93,914			
3	,145	2,066	95,981			
4	,101	1,448	97,429			
5	,078	1,109	98,538			
6	,057	,819	99,357			
7	,045	,643	100,000			

Metodo di estrazione: Analisi dei componenti principali.



2.2.2 Component matrix

Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d' accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - La conversazione mostra chiaramente l'uso di un chatbot, senza traccia di interazione umana.	,923
Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d' accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - L'immagine della conversazione rappresenta inequivocabilmente un chatbot.	,954
Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d' accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - L'immagine della conversazione rappresenta chiaramente l'interazione gestita tramite l'intelligenza artificiale.	,951
Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d' accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - L'immagine della conversazione	,962
Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d' accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - L'immagine della conversazione suggerisce chiaramente l'utilizzo di un sistema basato sull'intelligenza artificiale.	,962

2.2.3 Communalities

Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d' accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - La conversazione mostra chiaramente l'uso di un chatbot, senza traccia di interazione umana.	1,000	,851
Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d' accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - L'immagine della conversazione rappresenta inequivocabilmente un chatbot.	1,000	,910
Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d' accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - L'immagine della conversazione rappresenta chiaramente l'interazione gestita tramite l'intelligenza artificiale.	1,000	,904
Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d' accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - L'immagine della conversazione suggerisce chiaramente	1,000	,925

2.2.4 Correlation matrix

Matrice di correlazione tra gli elementi

	Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d'accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - La conversazione mostra chiaramente l'uso di un chatbot, senza traccia di interazione umana.	Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d'accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - L'immagine della conversazione rappresenta inequivocabilmente un chatbot.	Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d'accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - L'immagine della conversazione rappresenta chiaramente l'interazione gestita tramite l'intelligenza artificiale.	Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d'accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - L'immagine della conversazione suggerisce chiaramente l'utilizzo di un sistema basato sull'intelligenza artificiale.
Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d'accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - La conversazione mostra chiaramente l'uso di un chatbot, senza traccia di interazione umana.	1,000	,871	,886	,901
Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d'accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - L'immagine della conversazione rappresenta inequivocabilmente un chatbot.	,871	1,000	,942	,918
Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d'accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - L'immagine della conversazione rappresenta chiaramente l'interazione gestita tramite l'intelligenza artificiale.	,886	,942	1,000	,939
Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d'accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - L'immagine della conversazione suggerisce chiaramente l'utilizzo di un sistema basato sull'intelligenza artificiale.	,901	,918	,939	1,000

2.2.5 KMO & Bartlett's test

Test di KMO e Bartlett

Misura di Kaiser-Meyer-Olkin di adeguatezza del campionamento.		,920
Test della sfericità di Bartlett	Appross. Chi-quadrato	584,374
	gl	21
	Sign.	<,001

2.3 Measurement scale pre-test: Reliability check

2.3.1 Reliability statistics

Statistiche di affidabilità

Alpha di Cronbach	Alpha di Cronbach basata su elementi standardizzati	N. di elementi
,974	,976	4

2.3.2 Item-total Statistics

Statistiche elemento-totale

	Media scala se viene eliminato l'elemento	Varianza scala se viene eliminato l'elemento	Correlazione elemento-totale corretta	Correlazione multipla quadratica	Alpha di Cronbach se viene eliminato l'elemento
Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d' accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - La conversazione mostra chiaramente l'uso di un chatbot, senza traccia di interazione umana.	12,96	42,922	,907	,829	,975
Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d' accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - L'immagine della conversazione rappresenta inequivocabilmente un chatbot.	12,51	46,524	,939	,898	,967
Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d' accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - L'immagine della conversazione rappresenta chiaramente l'interazione gestita tramite l'intelligenza artificiale.	12,68	42,991	,955	,924	,961
Indicare su una scala da 1 (completamente in disaccordo) a 7 (completamente d' accordo) in quale misura sei d'accordo o in disaccordo con le seguenti affermazioni. - L'immagine della conversazione suggerisce chiaramente l'utilizzo di un sistema basato sull'intelligenza artificiale.	12,62	41,932	,952	,908	,962

2.4 Independent sample t-test

2.4.1 Levene test

Test campioni indipendenti

		Test di Levene per l'eguaglianza delle varianze		Test t per l'eguaglianza delle medie							
						Significatività		Differenza della media	Differenza errore std.	Intervallo di confidenza della differenza di 95%	
		F	Sign.	t	gl	P unilaterale	P bilaterale			Inferiore	Superiore
MeanChatbotInteraction	Varianze uguali presunte	3,859	,055	9,684	51	<,001	<,001	3,49964	,36139	2,77412	4,22516
	Varianze uguali non presunte			9,902	47,322	<,001	<,001	3,49964	,35342	2,78878	4,21051

2.4.2 Descriptives statistics

Statistiche gruppo

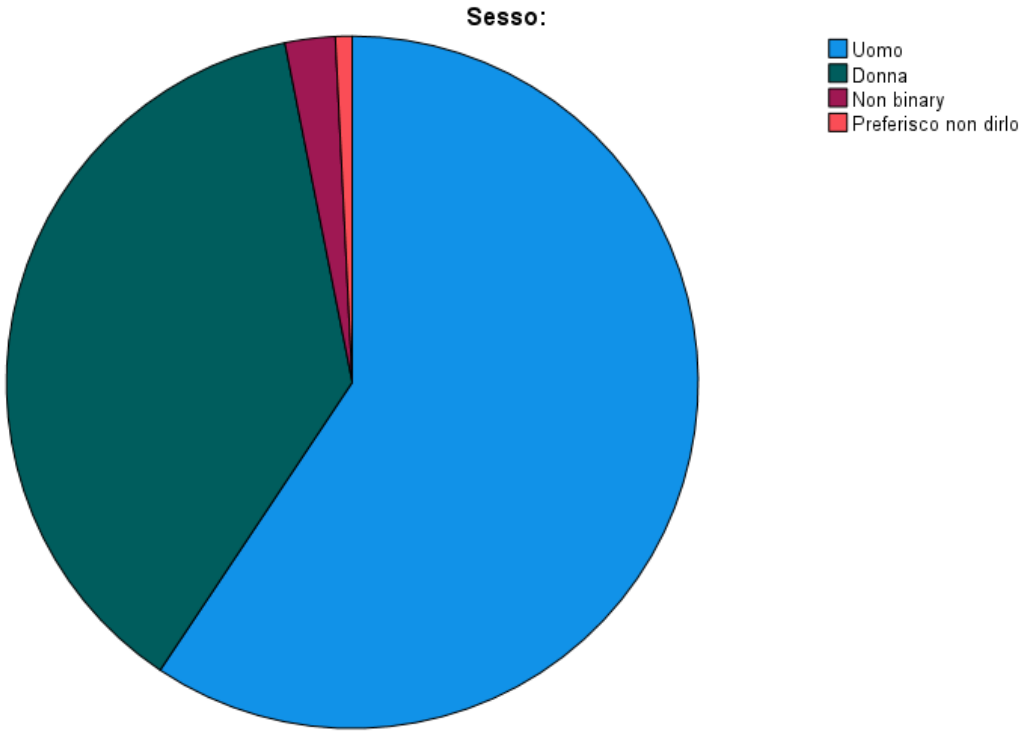
	Scenario	N	Media	Deviazione std.	Errore standard della media
MeanChatbotInteraction	1,00	25	6,0800	1,01735	,20347
	,00	28	2,5804	1,52912	,28898

3.1 Descriptive statistics Main study

3.1.1 Gender

Sesso:

		Frequenza	Percentuale	Percentuale valida	Percentuale cumulativa
Valido	Uomo	76	59,4	59,4	59,4
	Donna	48	37,5	37,5	96,9
	Non binary	3	2,3	2,3	99,2
	Preferisco non dirlo	1	,8	,8	100,0
	Totale	128	100,0	100,0	



3.1.2 Age

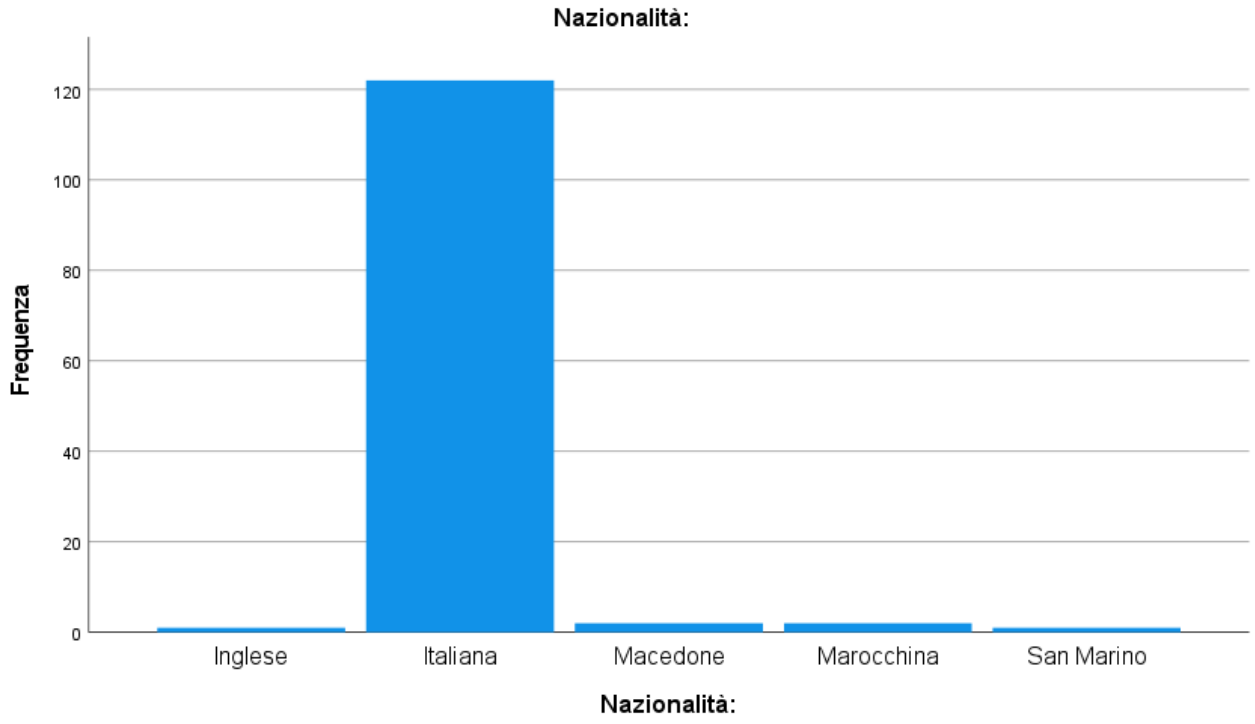
Statistiche descrittive

	N	Minimo	Massimo	Media	Deviazione std.
Età:	128	18,00	89,00	26,8359	8,81639
Numero di casi validi (listwise)	128				

3.1.3 Nationality

Nazionalità:

		Frequenza	Percentuale	Percentuale valida	Percentuale cumulativa
Valido	Inglese	1	,8	,8	,8
	Italiana	122	95,3	95,3	96,1
	Macedone	2	1,6	1,6	97,7
	Marocchina	2	1,6	1,6	99,2
	San Marino	1	,8	,8	100,0
	Totale	128	100,0	100,0	



3.1.4 Randomised scenarios

Scenario

		Frequenza	Percentuale	Percentuale valida	Percentuale cumulativa
Valido	1,00	32	25,0	25,0	25,0
	2,00	31	24,2	24,2	49,2
	3,00	34	26,6	26,6	75,8
	4,00	31	24,2	24,2	100,0
	Totale	128	100,0	100,0	

3.2 Independent sample t-test – Manipulation check

3.2.1 Independent sample t-test – Chatbot vs Live chat

Statistiche gruppo

	AgentType	N	Media	Deviazione std.	Errore standard della media
Il sevizio di assistenza clienti precedentemente mostrato veniva fornito tramite: - Chatbot:Live chat	1,00	63	1,71	1,170	,147
	,00	65	6,06	1,749	,217

Test campioni indipendenti

		Test di Levene per l'eguaglianza delle varianze		Test t per l'eguaglianza delle medie							
						Significatività		Differenza della media	Differenza errore std.	Intervallo di confidenza della differenza di 95%	
		F	Sign.	t	gl	P unilaterale	P bilaterale			Inferiore	Superiore
Il sevizio di assistenza clienti precedentemente mostrato veniva fornito tramite: - Chatbot:Live chat	Varianze uguali presunte	3,692	,057	-16,477	126	<,001	<,001	-4,347	,264	-4,869	-3,825
	Varianze uguali non presunte			-16,576	112,077	<,001	<,001	-4,347	,262	-4,867	-3,828

3.2.2 Independent sample t-test – Failure vs Success

Statistiche gruppo

	ServiceOutcome	N	Media	Deviazione std.	Errore standard della media
L'esito del sevizio fornito dall'assistenza clienti precedentemente mostrato è stato: - Il servizio ha avuto esito negativo:Il servizio ha avuto esito positivo	1,00	66	6,38	1,019	,125
	,00	62	1,76	1,289	,164

Test campioni indipendenti

		Test di Levene per l'eguaglianza delle varianze		Test t per l'eguaglianza delle medie							
						Significatività		Differenza della media	Differenza errore std.	Intervallo di confidenza della differenza di 95%	
		F	Sign.	t	gl	P unilaterale	P bilaterale			Inferiore	Superiore
L'esito del sevizio fornito dall'assistenza clienti precedentemente mostrato è stato: - Il servizio ha avuto esito negativo:Il servizio ha avuto esito positivo	Varianze uguali presunte	,783	,378	22,565	126	<,001	<,001	4,621	,205	4,215	5,026
	Varianze uguali non presunte			22,402	116,107	<,001	<,001	4,621	,206	4,212	5,029

3. 3 Measurement scale main study: Reliability check – Customer satisfaction

3.3.1 Reliability statistics

Statistiche di affidabilità

Alpha di Cronbach	N. di elementi
,965	3

3.3.2 Item-total Statistics

Statistiche elemento-totale

	Media scala se viene eliminato l'elemento	Varianza scala se viene eliminato l'elemento	Correlazione elemento-totale corretta	Alpha di Cronbach se viene eliminato l'elemento
Indica in che misura sei d'accordo con le seguenti affermazioni: - Sono soddisfatto del servizio offerto	7,87	17,864	,926	,948
Indica in che misura sei d'accordo con le seguenti affermazioni: - Sono rimasto entusiasta del servizio offerto	7,84	17,786	,918	,953
Indica in che misura sei d'accordo con le seguenti affermazioni: - Sono contento del servizio offerto	7,79	17,459	,931	,945

3.4 Measurement scale main study: Reliability check – Technological innovativeness

3.4.1 Reliability statistics

Statistiche di affidabilità

Alpha di Cronbach	N. di elementi
,924	4

3.4.2 Item-total Statistics

Statistiche elemento-totale

	Media scala se viene eliminato l'elemento	Varianza scala se viene eliminato l'elemento	Correlazione elemento-totale corretta	Alpha di Cronbach se viene eliminato l'elemento
Valuta in che misura sei d'accordo con la seguente affermazione: - Altre persone si rivolgono a me per consigli sulle nuove tecnologie	14,24	24,957	,797	,910
Valuta in che misura sei d'accordo con la seguente affermazione: - In generale, sono tra i primi nella mia cerchia di amici ad acquisire nuove tecnologie quando appaiono	14,31	22,232	,850	,893
Valuta in che misura sei d'accordo con la seguente affermazione: - Solitamente riesco a capire i nuovi prodotti e servizi ad alta tecnologia senza l'aiuto degli altri	13,88	24,057	,836	,897
Valuta in che misura sei d'accordo con la seguente affermazione: - Mi tengo aggiornato sugli ultimi sviluppi tecnologici nelle mie aree di interesse	13,88	23,805	,816	,904

3.5 Measurement scale main study: Reliability check – Need for human interaction

3.5.1 Reliability statistics

Statistiche di affidabilità

Alpha di Cronbach	N. di elementi
,867	3

3.5.2 Item-total Statistics

Statistiche elemento-totale

	Media scala se viene eliminato l'elemento	Varianza scala se viene eliminato l'elemento	Correlazione elemento-totale corretta	Alpha di Cronbach se viene eliminato l'elemento
Valuta in che misura sei d'accordo con la seguente affermazione: - Mi piace il processo di comunicazione con gli operatori umani del servizio clienti.	10,48	7,559	,810	,755
Valuta in che misura sei d'accordo con la seguente affermazione: - Mi piace comunicare con un operatore di assistenza umano	10,43	7,475	,810	,754
Valuta in che misura sei d'accordo con la seguente affermazione: - Interagire con un agente di servizio robotizzato mi infastidisce di più rispetto a un operatore di assistenza umano.	10,73	8,043	,631	,921

3.5.3 Descriptive statistics – Technological innovativeness

Statistiche descrittive

	N	Minimo	Massimo	Media	Deviazione std.
Mean_TechInn	128	1,00	7,00	4,6934	1,60469
Numero di casi validi (listwise)	128				

3.6 ANOVA

3.6.1 Test of Homogeneity of Variances

Test di Levene di eguaglianza delle varianze dell'errore[a,b]

		Statistica di Levene	gl1	gl2	Sig.
MeanCustomerSatisfaction	Basato sulla media	,212	3	124	,888
	Basato sulla mediana	,128	3	124	,943
	Basato sulla mediana e con il grado di libertà adattato	,128	3	104,881	,943
	Basato sulla media ritagliata	,143	3	124	,934

Verifica l'ipotesi nulla che la varianza dell'errore della variabile dipendente sia uguale tra i gruppi.

a. Variabile dipendente: MeanCustomerSatisfaction

b. Disegno: Intercetta + AgentType + ServiceOutcome + AgentType * ServiceOutcome

3.6.2 Descriptive statistics of ANOVA test

Statistiche descrittive

Variabile dipendente: MeanCustomerSatisfaction

AgentType	ServiceOutcome	Medio	Deviazione std.	N
,00	,00	1,7957	,87211	31
	1,00	5,9314	1,18287	34
	Totale	3,9590	2,32626	65
1,00	,00	2,3763	1,17613	31
	1,00	5,3229	,94465	32
	Totale	3,8730	1,82223	63
Totale	,00	2,0860	1,06772	62
	1,00	5,6364	1,10898	66
	Totale	3,9167	2,08565	128

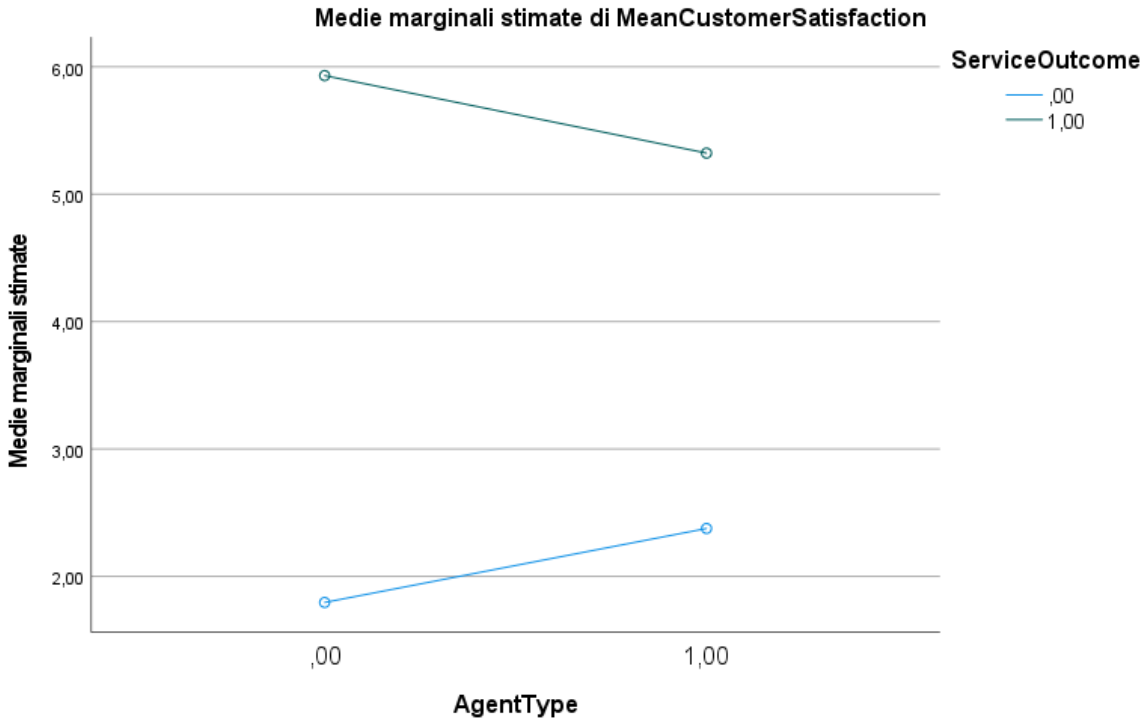
Test di effetti tra soggetti

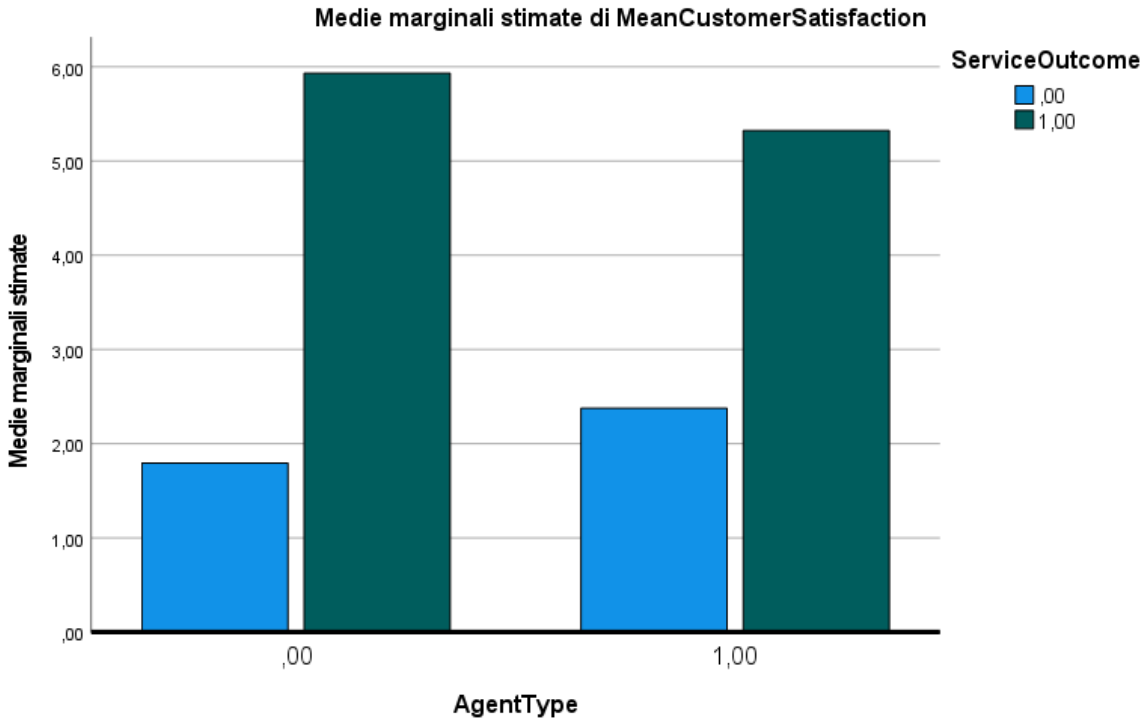
Variabile dipendente: MeanCustomerSatisfaction

Origine	Somma dei quadrati di tipo III	df	Media quadratica	F	Sig.	Eta quadrato parziale	Parametro noncent.	Potenza osservata[b]
Modello corretto	414,293[a]	3	138,098	123,951	<,001	,750	371,854	1,000
Intercetta	1901,068	1	1901,068	1706,329	<,001	,932	1706,329	1,000
AgentType	,006	1	,006	,006	,941	,000	,006	,051
ServiceOutcome	400,695	1	400,695	359,650	<,001	,744	359,650	1,000
AgentType * ServiceOutcome	11,296	1	11,296	10,139	,002	,076	10,139	,885
Errore	138,152	124	1,114					
Totale	2516,000	128						
Totale corretto	552,444	127						

a. R-quadrato = ,750 (R-quadrato adattato = ,744)

b. Calcolato utilizzando alfa = ,05





3.7 ANCOVA

3.7.1 Test of Homogeneity of Variances

Test di Levene di eguaglianza delle varianze dell'errore[a]

Variabile dipendente: MeanCustomerSatisfaction

F	gl1	gl2	Sig.
,269	3	124	,847

Verifica l'ipotesi nulla che la varianza dell'errore della variabile dipendente sia uguale tra i gruppi.

a. Disegno: Intercetta + Mean_NHI + AgentType + ServiceOutcome + AgentType * ServiceOutcome

3.7.2 Descriptive statistics of ANCOVA test

Statistiche descrittive

Variabile dipendente: MeanCustomerSatisfaction

AgentType	ServiceOutcome	Medio	Deviazione std.	N
,00	,00	1,7957	,87211	31
	1,00	5,9314	1,18287	34
	Totale	3,9590	2,32626	65
1,00	,00	2,3763	1,17613	31
	1,00	5,3229	,94465	32
	Totale	3,8730	1,82223	63
Totale	,00	2,0860	1,06772	62
	1,00	5,6364	1,10898	66
	Totale	3,9167	2,08565	128

Test di effetti tra soggetti

Variabile dipendente: MeanCustomerSatisfaction

Origine	Somma dei quadrati di tipo III	df	Media quadratica	F	Sig.	Eta quadrato parziale	Parametro noncent.	Potenza osservata[b]
Modello corretto	417,045[a]	4	104,261	94,713	<,001	,755	378,853	1,000
Intercetta	78,025	1	78,025	70,880	<,001	,366	70,880	1,000
Mean_NHI	2,752	1	2,752	2,500	,116	,020	2,500	,348
AgentType	,045	1	,045	,041	,840	,000	,041	,055
ServiceOutcome	394,043	1	394,043	357,957	<,001	,744	357,957	1,000
AgentType * ServiceOutcome	9,438	1	9,438	8,574	,004	,065	8,574	,828
Errore	135,400	123	1,101					
Totale	2516,000	128						
Totale corretto	552,444	127						

a. R-quadrato = ,755 (R-quadrato adattato = ,747)

b. Calcolato utilizzando alfa = ,05

SUMMARY

Chapter 1

According to Statista's research, the value of the global automotive manufacturing market in 2021 was approximately USD 2.86 trillion[195], while global passenger car sales reached 67.2 million units in 2022, one million more than the previous year, and forecasts predict a further increase in 2023[196].

The automotive sector, one of the world's largest industries in terms of revenue, is an extremely complex market in which the large multi-brand groups are the biggest players in the industry.

The automotive industry is no longer what we used to know: the emergence of several new market trends is leading us towards the mobility ecosystem. Indeed, connected cars and autonomous vehicles, shared mobility and the shift from hardware to software-defined cars, the focus on sustainability and dynamic customer expectations are today's megatrends which are challenging traditional OEMs (Original Equipment Manufacturers), while opening up exciting new perspectives. As a result, companies must be innovative in the way they reconfigure their products, organise their business, use new technologies and reinvent the customer experience according to their evolving behaviour[197].

The rise of these new digital trends allowed the automotive industry to lead the major industries in embracing digital transformation and in fact, recent studies have shown that the automotive sector is spending the most on digital transformation and expects to spend more than $200 billion annually by 2030[198].

Moreover, in recent years, companies are increasingly focusing on customer preferences and habits, resulting in the development of a customer-centric business model. Although 'the customer comes first' is an old mantra that has been repeated over and over again, it is still extremely topical nowadays and, in fact, only companies that have a 360-degree view of their customers can achieve the greatest results[199]. In order to ensure a successful customer experience, it is essential to identify all the touch points along the customer journey and their integration with each other. One touchpoint extremely relevant nowadays is represented by 'customer

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[195] IBISWorld. (2023). Global car manufacturing industry revenue between 2019 and 2022 (in trillion U.S. dollars) [Graph]. In *Statista*. Retrieved July 2, 2023, from https://www.statista.com/statistics/574151/global-automotive-industry-revenue/

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service', which encompasses all the efforts the company makes to assist customers before they buy or use the products or services provided by the company. Customer service has evolved over the years and today is no longer limited to solving the customer's problem and closing the ticket, but also offers immediate and proactive support, regardless of the channel used. But why are many companies focusing more and more on customer service in recent years? The answer is retention. Moreover, it is well known that retaining an existing brand customer is much cheaper than acquiring a new one[200]. The trend towards digitisation we have been experiencing in recent decades, also fuelled by the advent of pandemics, has changed several processes and activities, including customer service. While customer service used to take place mainly in traditional offline channels, there has recently been a migration towards digital service channels as the 'first point of contact'[201]. In particular, customer service activities are increasingly provided by sophisticated artificial intelligence tools, which significantly reduce the workload of the workforce. The main reason why an increasing number of companies are adopting artificial intelligence tools, such as chatbots, to provide customer support is the extreme efficiency and speed with which they enable highly personalised and proactive customer service, consistent with changing consumer preferences. Unfortunately, for every pro there are cons. Indeed, despite the countless benefits listed above, the risks related to cybersecurity[202], privacy[203] and the inevitable scepticism of employees[204] has partially slowed down the massive adoption of digital customer service tools from the companies.

In order to ensure a successful implementation of AI, it is necessary to consider all the crucial factors that may affect the outcome of the implementation. The first step to a successful implementation is to put the customer first[205]. In addition, rethinking the data infrastructure and the integration of AI with existing platforms and humans seems essential[206]. The key will be to improve collaboration between humans and machines, establishing a corporate culture of absolute trust in machines and involving business specialists and frontline employees to help design them. Companies will have to pay particular attention to the way they communicate

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the introduction of AI tools into their business processes to their employees, underlining in particular the full integration of machine and human rather than, as is commonly thought, the replacement of the latter.

Chapter 2

The first chapter, in which an in-depth examination of the automotive industry and new digital trends was provided, laid the foundation for a targeted study into the uncharted territory of artificial intelligence-driven customer service in the automotive industry.

Huang et al. (2018) demonstrated that artificial intelligence can be effectively used to replace or substitute humans in certain services[207]. Subsequently, given the increasing substitution rate, many studies have focused on customer service, comparing customer service provided by humans with that provided by robots. Choi et al. (2020), in fact, developed a study in which they examined the perceptions of hotel guests on the quality of customer service provided by human and robotic staff[208], while Song et al. (2022), analysed how consumer adoption intention changes depending on the type of service agent employed[209]. Furthermore, some of the existing literature has gone further by analysing different consumer responses to the service outcome provided by humans or robots. Indeed, Belanche et al. (2020) explored the different attributions of responsibility for service outcomes (failure or success) to robots and humans[210]. Finally, Pozharliev et al. (2023) examined consumer responses to a negative or positive service outcome provided by an autonomous vehicle or human agent in the mobility services sector[211]. However, the above-mentioned studies are aimed at investigating customer service in the hospitality and retail sectors, thus requiring further analysis in different sectors to enable generalisation of the results. Furthermore, it emerges also a call for future research to examine how other types of communication involved may influence consumer responses. Based on the existing literature, much research has already been addressed to examine the difference in consumer responses to customer service provided by a robot or a human, but to the author's knowledge, an investigation to compare consumer responses to customer service provided by chatbots and live chat in the automotive industry has not yet been addressed in the literature.

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[207] Huang, M. H., & Rust, R. T. (2018). Artificial intelligence in service. *Journal of service research*, *21*(2), 155-172.
[208] Choi, Y., Choi, M., Oh, M., & Kim, S. (2020). Service robots in hotels: understanding the service quality perceptions of human-robot interaction. *Journal of Hospitality Marketing & Management*, *29*(6), 613-635.
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This leads to the formulation of the following research question:

"How does the use of a different type of agent (chatbot vs. live chat) influence customer satisfaction in automotive customer service?"

To answer this research question, two hypotheses were formulated. These hypotheses were prepared with the support of the literature.

Initially, the relationship between customer service and customer satisfaction was investigated.

Indeed, according to the definition provided by Levy and Weitz (2007), customer service is "the set of retailer activities that enhance the value received by consumers during purchases"[212]. Martin et al. (2015) found that providing a high level of customer service leads to positive outcomes, including fewer complaints, good word of mouth, higher satisfaction and higher repurchase intention[213]. Subsequently, the different ways in which companies provide customer service and the related consumer responses were examined according to the type of channel adopted.

With offline customer service, customers receive live, personalised assistance from qualified personnel, where the human touch of these encounters fosters empathy and facilitates the creation of emotional bonds between customers and company representatives. However, offline customer support has some disadvantages such as limited geographical coverage and the timeliness of the service affected by the availability of the staff during working hours. In recent years, therefore, companies have started to take advantage of digital technologies such as chatbots, which consist of conversational agents employed to carry out a variety of customer service functions, such as resolving complaints, finding products for purchase, giving accurate information, and providing recommendations[214]. Studies demonstrate that people expect to be able to interact and experience the same level of service both online and offline[215]. However, due to the lack of empathic perception, users usually show a negative attitude towards chatbots compared to humans[216]. Furthermore, the frequent communication failures in human-chatbot interaction do not completely satisfy users' expectations leading users to remain dissatisfied[217].

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Another digital support tool deployed by companies in the last decade is the live chat. Live chat systems provide users with the online equivalent of offline communication through customer service employees, allowing customers to request a customer support service tailored to their needs[218]. Live chat appears to be the only tool able to convey both feelings of social presence and empathy and ensure timeliness of response while maintaining the possibility to receive customer service from the comfort of home[219]. Although the use of a live chat service is not exactly the same experience as a face-to-face contact with the service staff, studies have shown that users often rely on textual references to assess the real meaning of the text message[220] and thus service providers using 'emoticons' in messages may communicate emotions to increase the feeling of empathetic behaviour[221]. In addition, visual representations of customer service representatives may enhance the perception of social presence in an online environment, positively influencing attitudes regarding the use of a live chat function[222].

According to the aforementioned literature, through live chats, service providers are able to convey empathy and social presence in the same way as they do when offering service offline, and thus customer service via live chat can be considered as the same as the service offered face-to-face by human beings.

Consequently, since live chats consist of human assistance offered to users via the Internet and, unlike chatbots, are able to convey empathy, and since empathy implies a positive attitude, we hypothesise:

H1: Customer service provided via live chat with human agents (as opposed to chatbots) leads to higher (as opposed to lower) customer satisfaction.

Since customer service is meant to solve users' problems, the second hypothesis sought to investigate how customer satisfaction changes depending on the service outcome, for both customer service agents analysed. Consistent with this, service failures can occur regardless of whether customer service is provided by a human or a chatbot, and each time a service failure occurs, users try to explain this[223]. According to attribution theory,

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individuals want to understand the reasons behind certain events in order to prevent them from happening again[224]. When individuals experience negative outcomes, they automatically seek the reasons for these outcomes and who or what is responsible for them[225]. According to attribution theory, researchers state that consumers' perceptions of the controllability of a robotic service provider versus a human service provider influence how they attribute blame for a service failure. In general, it is believed that since service robots are driven by human-programmed computer algorithms, robotic service providers will have less influence on the service outcome than human service providers[226]. Furthermore, the high frequency of technical problems with the robots' hardware and software systems results in a low controllability of the service outcome by the robots[227]. The lower controllability of the service outcome due to decisions based on algorithms pre-developed by humans, the numerous problems with the hardware and software, the lower perceived competence and the more complex attribution of blame mean that customers perceive the chatbot as less 'guilty' than humans in the case of service failure. Since live chat is a 'human-intermediated assistance offered to users via the Internet', this consideration can also be extended to live chat.

Based on the findings so far, it is possible to formulate the second hypothesis:

H2. In the event of a negative (vs. positive) service outcome, customers will show greater satisfaction when customer service is provided by the chatbot (vs. live chat).

Afterwards, the conceptual model of the experiment was shown . The model of the present work consists of one independent variable, one moderator, and one dependent variable.
The independent variable is the agent type. The use of live chats in customer service in the automotive industry is expected to show greater customer satisfaction (the dependent variable), rather than customer service chatbots. Service outcome is the moderator, which enhances the relationship between the agent type in the customer service and the customer satisfaction in the automotive industry. It is expected that in the case of a negative service outcome, in the automotive industry customers will show higher customer satisfaction when the customer service is provided by chatbots rather than live chats.

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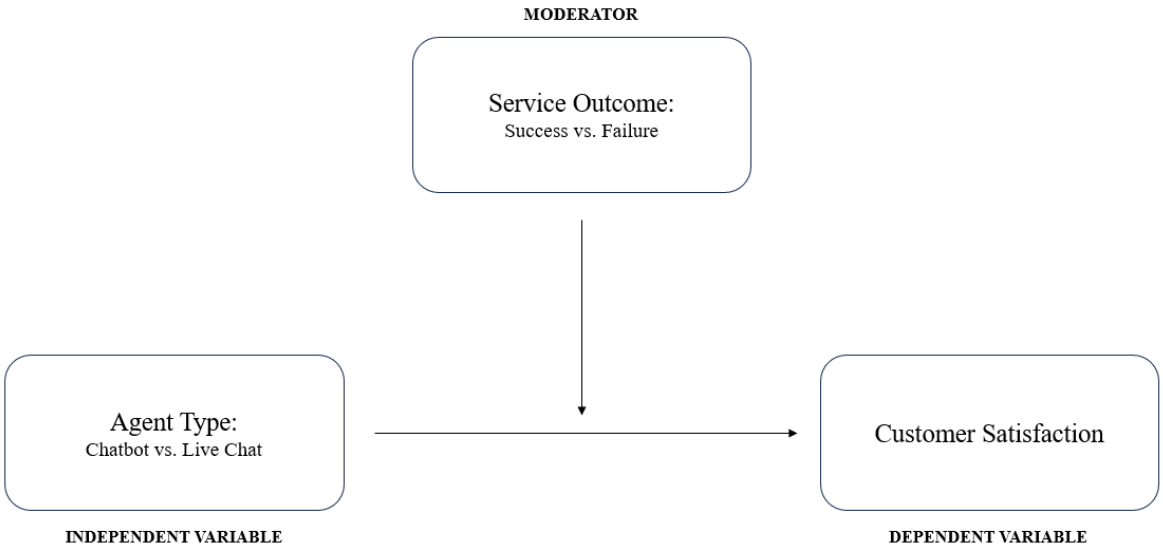

Chapter 3

In order to test the above hypotheses, quantitative research was conducted by developing a 2 (chatbot vs. live chat) x 2 (failure vs. success) experiment between subjects, in which participants were randomly assigned to one of four experimental conditions.

The study initially provided participants with a description of the circumstance they were facing: they were informed that, while driving to their best friend, they had encountered a problem with their car and had therefore contacted the customer service of the car manufacturer's website to seek assistance. Next, in order to provide all respondents with the basic knowledge needed to answer the questionnaire, they were shown the definitions of chatbot and live chat before being presented with the stimuli. Then, the participants were asked to carefully read the conversation they had with the customer service agent, in which they explained the problem they experienced with their car and received, in turn, support from the customer service agent. Two of the four stimuli depicted the conversation held between the customer service chatbot and the driver, while the other two represented the same type of conversation with the chatbot, but held with the live chat. For both the chatbot and the live chat, two scenarios were constructed: one scenario in which the customer service agent succeeds in solving the problem (success) and the other in which it fails (failure).Finally, the participants were asked to answer some questions about the customer service they received.

The aim of the experiment was to identify whether the outcome of customer service in the automotive sector moderates the relationship between the type of customer service agent and customer satisfaction. Before

analysing the main study, a pre-test was launched to verify that the respondents had correctly identified the type of service provider in the presented scenario. After that, the main study was developed and launched.

Within the main study, respondents after visualising the randomised scenario, rated their level of satisfaction with the service received through a pre-validated customer satisfaction scale. In addition, a descriptive variable was included to assess the level of technological innovativeness of the sample analysed and the need for human interaction as a covariate. After having performed the factor analysis and reliability for the scales used and two independent sample t-tests to check the manipulation of the independent variable and the dependent variable, the two-way ANOVA was launched. Within the two-way ANOVA, the type of agent was used as the independent variable. The outcome of the moderator service was manipulated and thus also nominal. Finally, customer satisfaction, played the role of dependent variable. The two-way ANOVA is useful for testing the moderating role of the service outcome (success or failure) on the relationship between the type of customer service provider (chatbot or live chat) and customer satisfaction.

The results were as follows. The main effect of agent type on customer satisfaction is not significant, so it cannot be extended to the population that customer service customer satisfaction is higher when the service is provided via a live chat, rather than via chatbot. On the other hand, the results showed a significant effect of the service outcome on customer satisfaction. This suggests, as expected, that customer satisfaction with a successful service is higher than with a unsuccessful service. Furthermore, the interaction between agent type and service outcome had a significant effect on customer satisfaction. More specifically, in the case of a 'negative' service outcome, satisfaction was higher when customer support was provided via chatbot rather than via live chat, whereas in the case of a successful service outcome, satisfaction was higher when customer support was provided via live chat than when it was provided via chatbot. The second hypothesis was thus confirmed.

Finally, ANCOVA was performed in order to also include the covariate in the model. The need for human interaction does not significantly influence customer satisfaction, showing that customer satisfaction with the service is not influenced by the respondents' need for human interaction. Despite the inclusion of the need for human interaction as a covariate, the interaction effect is significant and leads to the same results as presented above.

Conclusion

As can be seen in Chapter 3, which addresses the analysis of the study, only the second hypothesis was confirmed, while the first can be considered valid within the sample.

The results of this study are particularly useful for automotive companies that want to improve their customer service: with the help of digital assistants, they can increase customer satisfaction by providing a precise, accurate and successful service.

Turning to the theoretical contribution, this thesis contributes to the existing literature on customer service and, as a theoretical implication, also fills the gaps in the literature identified in Chapter 2 of the research. The first theoretical contribution of the thesis concerns the specific focus on the automotive industry. Other studies presented in the literature have analysed customer service in other industries; secondly, this work contributes to the existing literature on service outcomes. Indeed, part of the existing literature has already analysed the different responses of consumers to the service outcome provided by humans or robots, but this work has gone further both by using other types of robots or AI as service providers, in contexts apart from hospitality and in case of successful service outcome.

Turning to managerial implications, the results confirmed the significant impact of service outcome on customer satisfaction for a service provided in the automotive industry. In particular, in the case of a negative customer service outcome, higher customer satisfaction was observed when customers turned to chatbots than when they turned to live chat. This result prompts a reconsideration of conventional notions and calls for a more adaptive and nuanced approach to customer service management in the automotive industry. In fact, managers should develop a hybrid approach to customer service, in which organisations can deliberately employ chatbots to handle initial enquiries and routine tasks to ensure quick responses and reduce the workload of human operators. This optimisation of efficiency reduces costs and allows resources to focus on more complex aspects of customer service, while maintaining a high level of satisfaction through accurate and quick responses. At the same time, companies should allow the human operator to take control of the conversation when dealing with more complicated requests for which careful human evaluation is required. Despite the sample's preference for live chat, companies should continue to invest funds in chatbots: as technology progresses, chatbots will be able to provide increasingly accurate and timely responses and, perhaps, handle complex conversations. Interactions with chatbots, often in the embryonic stages of their development, may not reflect their full potential.

Furthermore, managers should focus their efforts on the evolution of performance metrics. Traditional metrics, such as response time and resolution rate, offer insights into the efficiency of customer service operations. When evaluating the effectiveness of automated support, metrics such as chatbot accuracy and customer satisfaction during chatbot encounters can be very useful.

Talking about limitations and future research, the first limitation of this research certainly concerns the number and nationality of the respondents. In fact, the present study was conducted by collecting a sample of about 130 people, most of whom were Italian. Future research could extend the present study to a larger sample of people of other nationalities to analyse whether any cultural differences influence consumers' preferences on

the type of agent providing the service. A second limitation concerns the level of technological expertise. Although the sample analysed showed a high level of technological innovativeness (4.7 out of 7), previous studies have shown that the Italian level of digital skills is rather low, making it necessary to replicate the same study by sampling people from countries with a high level of digital skills. Finally, since the study was based on a customer service in the automotive sector, it would be interesting to see consumers' responses to a chatbot/live chat service in a different sector.