The Evaluation of the customers' preference between AI vs. Human service in hospitality sector based on the type of experience.

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Prof. Carmela Donato
Supervisor

Belmina Bajrović
Candidate

Abstract

The growing technological developments, social, environmental, and political changes are all influencing and shaping the tourism sector. As a consequence of globalization, travel and tourism industry is increasing tremendously, including the application of Artificial Intelligence. Various AI technologies as chatbots, voice enables devices and self-service desks, are all rapidly being adopted by hospitality sector, especially because of the sudden outbreak of the coronavirus back in the beginning of 2020. AI is becoming more interesting topic to hotel sector, and managers are starting to be more open towards AI application. With the help of AI, hotels can find a new way of approaching the guests and offering them quicker and safer customer service, which can increase the overall customer satisfaction levels, but also strengthen the customer relationship. This study focuses on investigating the customers' preference between AI vs. Human service in hospitality industry, and if, and on which way, is COVID-19 influencing the changes in customers' attitudes and general preference.

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1.1.SUMMARY

The purpose of this research is to investigate how people perceive scenarios with AI vs. Human service in the hospitality sector. The goal is to test the consumers' experience and the emotional result of the same. It is supposed that based on the fear of being affected, people will now feel more secure in the scenarios with AI services, compared to those with Human touch scenarios. We will test the trust, customer satisfaction.

Chapter 1 is an introductive one: several statistics about the Tourism and Travel market and some definitions of the term “hospitality”,” tourism”, and” AI” will be provided.

Chapter 2 contains the theoretical background together with the conceptual model of the research. The relevant literature on which my work is based will be presented; some evidence about the reasons behind the hypotheses will be discussed too.

Chapter 3 explains how I have built the pre-test and the main test. All the information about how I have selected the stimuli and the scales of measurement, along with the research design and methods, is included.

Chapter 4 is focused on the analysis and the presentation of the results. The statistical tools and methods I have used will be touched on in detail.

Chapter 5 summarizes the research paper. It includes the conclusion, research contribution, limitation and future research recommendations.

Chapter 6, summarizes the full work on approx. ten pages.

1.2.MAIN FINDINGS

1. In the positive experience scenarios, self-service check in desk is more trusted and perceived as more competent among guests than human receptionist, and it causes greater satisfaction of guests (hence, more preferred).

2. **The findings on interaction of experience and agent imply the following:**

- as expected, guests with a positive experience have a higher level of trust, perceived competence of agent, satisfaction, engagement, loyalty, and emotions.
- guests who have had a positive experience revealed higher levels of trust, perceived competence, satisfaction, engagement loyalty and emotions towards human agents.
- guests who have had a negative experience revealed higher levels of trust, perceived competence, satisfaction, engagement loyalty and emotions towards AI agents.
- When it comes to blame, guests with positive experience would blame AI agents more, while people with negative experience blame human agents more.

3. **In the negative experience scenarios, AI resulted in higher trust, competence, satisfaction, engagement, and loyalty than those who had a negative experience with human service.**

4. **People with negative experience blame people agents more than machines.**

5. **Respondents showed a higher level of satisfaction, engagement, loyalty and emotion towards AI agents regardless of whether they are afraid of contamination or not.**

II. CHAPTER ONE

2.1. THE BIG MARKET.

The tourism and travel industry has existed from decades ago, and it has achieved a big share of the total market. Some countries are highly dependent on the Tourism and Travel industry, and it is believed that by its' potential future growth, a lot of investments are and will be put into it. The direct and total contribution of travel and tourism to GDP from 2006 to 2019 grew exponentially. In 2006 the total contribution resulted in 5,160, (in billion U.S. dollars) and in 2019 it was 8,810, which is approximately a 40% increase compared to 2006 GDP (Statista, 2020), which made this sector nearly three times larger than agriculture. The Global Tourism industry is estimated to be worth $1.4 trillion in 2013, with an average annual revenue rising 2.5% in the past five years (Market Research Reports, Inc., 2010-21). From 2010 there was a noticeable recovery and growth of this industry, with Asia and South America being in the best positions. Travel and tourism contribution to GDP was approx. $2.9 trillion globally in 2019 (Statista, 2020). The increase in travel, both domestic and international has become very popular since now the costs of the trip are cheaper, there are more direct lines and overall, more flights. It is noticed that both traveling for leisure or business purposes experienced year-over-year growth in the last 5 years. With the technological development, the digitalization of the tourism sectors came as well. Two leading online travel agencies are Booking Holdings and Expedia Group. Their revenues were approx. $12-14 billion dollars back in 2019. (Statista, 2020). Concerning the countries that invested the most in the travel and tourism countries, there is the U.S. in the first place, investing 209 billion U.S. dollars in 2019. They are followed by China, which in the same year invested 169.9 billion U.S. dollars. These top three countries are followed by India, France, Japan, Germany, U.K., and Saudi Arabia. (Statista, 2021). The top 6 countries that had the highest direct contribution to GDP in 2019 are U.S., China. Germany, Japan, Italy, and France. (Statista, 2021). It is essential to highlight that the European tourism industry is the largest in the world, and it accounted for 51% of the total shares back in 2015. The European tourism industry spiked because of the increased interest in countries like Italy, France, Spain, Germany, and U.K. (Research Nester,2021).

2.2. **TOURISM IMPACT DATA**

The impact of tourism can be grouped into three main categories, and those are: economic, social, and environmental. Regarding the economic impact, in 2011, "international tourism receipts exceeded US$1 trillion for the first time" (UNWTO, 2012). The current worth of tourism sectors is over $1 trillion annually, and it is growing each year. According to UNWTO (2012), Europe continues to lead the way in terms of the overall percentage of dollars earned, resulting in 45%. When it comes to social impact, tourism has a positive impact on it as well, since it encourages an increase in amenities as parks and recreation facilities, investments in arts and culture, etc. However, the United Nations Environment Programme (UNEP, 2003), has identified some negative social impacts of tourism like change or loss of identity and values, cultural clashes, ethical issues, etc. Furthermore, when it comes to environmental impacts, (UNEP, 2003), highlights that tourism mostly relies on the natural environment in which it operates, therefore tourism development mostly has a negative correlation with the environment in terms of depletion of natural resources, pollution, and physical impacts. To add, in 2007 the World Tourism Organisation (WTO) published that tourism brought US$855 billion, and gave roughly 100 million jobs (UNWTO, 2008), while IN 2019 tourism sector had US$8.9 trillion contributions to the world's GDP, covering 330 million jobs, which means that this sector covers 1 in 10 jobs around the world, with US$948 billion capital investment, resulting in 4.3% of total investment worldwide (Wttc.org). When mentioning tourism, the first term we connect it with is *hospitality.* Hospitality is often defined as 'the business of helping people to feel welcomed and relaxed and to enjoy themselves" (Discover Hospitality, 2015). Simply put, the hospitality industry is the combination of the accommodation and food and beverage groupings, collectively making up the largest segment of the industry. Other sectors connected and included in tourism are Transportation, Accommodation (Hospitality), Food and Beverage Services, Recreation, and Entertainment (BCcampus Open publishing, 2021). The global hotel industry market size also grew exponentially in the last few decades. In 2018, the retail value of the global hotel industry was 600.49 billion U.S. dollars (Statista, 2019). The hotel industry contributed 8.81 trillion U.S. dollars to the global economy in 2018. In the same year, it was measured that the global occupancy rate of the hotels (the share of total rooms available which are occupied or rented at a given time), increased across all the continents, with Europe having the highest occupancy rate at 72.4 percent, closely followed by the Asia Pacific region with 70.6 percent (Statista, 2019). As a consequence of the coronavirus, in 2020, a decrease of around 42.1% in the global revenue for the travel and tourism industry happened, compared with the previous year (Statista, 2019).

2.3.TOURISM MANAGEMENT: LEISURE AND BUSINESS TOURISM.

a) LEISURE TOURISM

Regarding the tourism industry, leisure tourism is explained to be the largest sector, which is defined as vacation time that is not connected to business traveling. Leisure trips usually include taking a time to relax, visiting new cities, countries, experience new cultures, foods, broaden the mindset, and similar. It is noted that in 2019, global leisure tourism spending reached 4,715 billion U.S. dollars (Statista, 2020). For leisure tourism, the group segment dominates the global market, and it is predicted that it will retain the superior status. In recent years a paradigm shift happened towards experience rather than goods. Guests are more likely to spend on recreation, travel, and eating, and this is a point that businessmen should consider to create a wide variety of offers in services. For leisure travel, the Generation X segment dominates the global market, and they are the segment most interested in this type of travel. (Allied Market Research, 2020). The demand for leisure tourism activities has grown exponentially all around the world, and it is connected with embracing psychological and physical well-being. On average, it is showed that seniors are now wealthier, healthier, and more educated, and they find satisfaction in having richer life experiences by traveling around different countries and learning about ones' story, culture, rituals, beliefs, traditions, etc. Leisure travelers are also described to have a higher income than they are willing to spend on experiences (MedCrave, 2017). The top four countries that spend the most on leisure travel and tourism in 2019 (as a share of total leisure spending) were Macau, Maldives, Seychelles, and Bahamas. From European countries, first is Croatia, Montenegro, and Greece. (Knoema.com, 2021). When it comes to world leisure travel and tourism spending at current prices, the top six countries are U.S., China, Germany, India, Japan, and Italy. The rise in want for leisure traveling also appeared because of the average amount of leisure time going up in many societies. The work hours are as well becoming more flexible and remote (OECD, 2017). The drop-in work times happened due to several factors as government regulations limiting the number of hours approved for employees to work. This can be supported by the European Union’s Working Time Directive limits work to 48 hours per week (European Commission, 2017). Furthermore, there is an increase in wages, especially as a result of laws on minimum wages, which leads to people working the same hours and earning more money. Besides, there is a higher preference for a 5-day working week, than a six-day, which makes more room for weekend getaways.

b) BUSINESS TRAVELLING

Else ways, business tourism is another branch of the tourism industry that includes trips on the business purpose, travelers that are working and being paid for that trip. It is vital to know the difference between these two segments since they have entirely disparate needs. Business guests are usually looking for convenience, value for money, calm and basic rooms, good internet and space for working, complimentary breakfast, etc. The activities included in business traveling are meetings, seminars, business events, or exhibitions. The main goal of a business traveler is to carry out the task he was responsible for, rather than personal enjoyment and relaxation. The difference between business and leisure travelers is also the fact that business traveler usually does not choose their destinations, but their superiors do that for them. Business is different from leisure since is normally regarded as obligatory, not optional. The purpose of business traveling is to fulfill the interest of the company we work for. Moreover, the trip expenses for business traveling are normally paid by the company as well, where the traveler is employed (Leiper, N., Witsel, M., and Hobson, J.S.P., 2008). Academically, there is not much literature about business travelers, however, there is a definition by Davidson (1994); 'Business tourism is concerned with people traveling for purposes which are related to their work.' Therefore, we can say that business tourism is the oldest form of tourism since it goes back to the beginnings of tourism, where the primary reason to travel was for work- to earn money, sell, buy, trade. Based on the research done by Nice, B., and Gray, L.P., 2004, business travelers are usually solo travelers, age 31-50, with earnings between $50,000 to 100,000 as annual income. Usually, most business travelers have a college degree, with some having a master's/advanced degree as well. When answering on the additional activities the business travelers usually do, 83% voted for dining out, followed by 32% nightlife, which can both be connected with late business dinners and events (Nice, B., & Gray, L.P., 2004). A defining element in business tourism and travel is the dominance of extrinsic motivators, which is not the case with leisure travel, which is activated by intrinsic motivation. Extrinsic motivators are the necessity to do business, to advance one's career, to get a monetary reward, or to keep a job (Getz, D., 2007). When it comes to the economical significance of business travel, we can state that the global spending for business traveling resulted in 1,283 billion U.S. dollars in 2019, which is 4 times less than the spending on leisure traveling (Statista, 2020). Business tourism is mostly for solo travelers, which makes another point of disparity with leisure travel. The business traveling was affected by a 52% decline in the early months of coronavirus in 2020.

However, it is predicted that it will rise to $842 billion by 2022, which equals an increase of 21% (Finance Online, 2021). Business spending counts for 21%, while leisure spending results in 79% (World Travel and Tourism Council, 2013),

2.4.**ADVENTURE TOURISM**

Adventure tourism can be defined as any trip that involved any of the three following elements: natural environment, cultural immersion or physical activity. It is often described with the words as ‘risk-taking’, or ‘adrenaline activity’. (CBI, 2021). This industry is created from many niche markets, which does not mean it is small, but rather that it serves a specific target audience and offers a unique service (The Economic Times, 2021). What is important to observe is the customers' changes in argumentations for traveling. The early beginnings of traveling were only for business and trade purposes, while in the last decade we can notice a prominent increase in the percentage of adventure travelers and a synchronic increase in the average amount spent per adventure trip. Adventure tourism refers to traveling with the purpose of some entertaining, adrenaline-infused vacation and activities, which also include simulators and virtual environments (Allied Market Research, 2021). As a consequence of this consumer's change, companies are trying to stay innovative, and always be up-to-date with the newest AI tools that can support and help operate adventure tourism. The rise of adventure tourism is highly connected with wellness and wellbeing as a need and a trend of Europeans (CBI, 2021). Nowadays, mental health, inner well-being, and physical state is very important and founded to be a key to a successful life. This is why many companies offer to their workers different adventure trips, team building activities, or seminars, to de-stress and improve their physical state, which will lead to better mental workload, better cognition, concentration, and creativity. (CBI, 2021). The connection between health and Artificial Intelligence is high. Today, there are many different applications and websites, as well as technologies as virtual reality, augmented reality, and mixed reality, that guests and travelers can use to follow their changes in vital signs, follow the routes, or walk through the environment created for them.

In 2013 Adventure Tourism Market Study estimated the value of the adventure travel sector to be $263 billion, while in 2018 it resulted in $586,3 billion. The projections for this market are estimating its worth to be 1,626.7 billion by 2026 (Allied Market Research, 2021). The growth of this industry is significant since it is becoming an attractive field globally.

The numbers show that specifically, Europeans make 100 million adventure trips each year to many different countries around Europe. Europeans are described to be adventurers, open-minded, and attracted to exploring new cultures/history and similar. It is estimated that around two-thirds of all traveler's expenses are spent in the country of visit, which creates a large contribution to the local economies of the visited countries (CBI, Ministry of Foreign Affairs, 2021).

2.4.1. Adventure Tourism Market description

It is important to make a distinction between two types of adventure tourism, and those are hard and soft. Soft adventure travel includes relatively safe activities and usually does not require any previously learned skills and experiences. This includes camping, fishing, birdwatching, canoeing, hiking, kayaking, sailing, surfing, and similar. On contrary, hard adventure traveling requires preparation and more experience for the activities. In the hard adventure activities, we can count rock climbing, caving, etc. (CBI, Ministry of Foreign Affairs, 2021). Between soft, hard, or other types of tourism segments, the soft tourism segment currently dominates the global Adventure Tourism Industry and it is also forecasted that they will keep their dominant position throughout the forecasted period, by 2021. (**See appendix A.)** for full list of Soft and Hard adventure activities). Regarding the type of activities between land-based, water-based, or air-based, the air-based activity segment is projected to grow the fastest. Couple traveler is mostly interested in adventure tourism, followed by families, and they friends/groups. When it comes to the age range of the segment most attracted to adventures, it is reported that the age group 30-41 is the biggest one **(see appendix B.. for more details).** Furthermore, the sales channel segment includes either travel agents or direct sales channels. The direct sales channels segment is dominant now, and it is forecasted to grow in the future as well. We can also segment this tourism market based on the regions; Europe, North America, Asia Pacific, and Lamea. From these regions, Europe dominates the Global Adventure market, and it is expected to grow by 11.9% by 2026. The top four most visited countries are Germany, Switzerland, Norway, and Italy. The second growing region is Asia-Pacific, which is attractive because it offers various parts to explore, from national parks, wildlife reserves, to other natural treasures of the Asia-Pacific region. Mostly visited countries are India, China, New Zealand, Australia, and Japan (Allied Market Research, 2021). Most adventure travelers are in their mid-30s, there are described as young, healthy, and more engaging in activities.

It is refreshing to know that older European travelers are more traveling now than they did before since they care more about their health and self-growth now than they did before. We can also find European baby-boomers (age 57-75) enjoying active holidays with historical visiting of the city, cultural education-based experience but they will most likely not be involved in hard adventure of course. Both Gen X (41-56) and Millennials (age 25-40), are described to be the most active segments. (CBI, 2021).

2.4.2. ***Contribution of adventure tourists?***

Africa's and Asia's adventure tourism companies showed that Europe brings the most guest that are interested in these regions. These countries profit from Europe around 40%. Within Europe itself, European tourists have resulted in 60% of the adventure tourists. The contribution of adventure tourism is high, resulting in approx. 350 euros per day per visitor. The interesting fact is that because of the coronavirus, the number of Europeans traveling outside of Europe decreased by 98% in June of 2020, compared to June of 2019. According to UNWTO, the United Kingdom offers the largest adventure tourism market in Europe, resulting in 19% of global adventure travel tourism. Germany is steadily being in second place, accounting for 12% of the world's adventure travel tourists. Germany is followed by France, and then Italy. These are the top four countries that travelers go to if they would like leisure travel with some adventure or experience (CBI, 2021).

2.5.**TOURISM INDUSTRY DEFINITION.**

‘Tourism comprises the activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business, and other purposes.' (World Tourism Organisation, 2020). World Tourism Organisation listed the tourism sector as the fastest growing economic sector, and one of the most dynamic economic sectors, which leads to high foreign exchange earnings and an increase in the employment rates or job opportunities. What is specific about the travel and tourism industry is that it does not sell one specific product that can be defined, but rather it is a combination of many industries. From accommodation, F&B services, leisure/business travel, entertainment, tour operator services, tourist guide services, and other related services (WTO, 2021).

2.6. **HOTEL INDUSTRY DEFINITION.**

The hotel industry is an important part of the tourism and hospitality industry as well. This subdivision of the hospitality industry offers accommodation services to its clients. The hotel business is often described as a people's business since it requires a human touch and emotional intelligence to have higher customer satisfaction, relationship, and loyalty (Statista, 2020). It also provides meals and beverages, entertainment, catering services, housekeeping, and relaxation services. Hotel is a paid establishment with min. of one night's stay, and it is mostly based on a short-term basis. Higher-priced hotels can offer more services like swimming pools, business centers, childcare, event facilities, sports courts, etc. The services offered depend on the type of hotels. It can go from the most basic one as B&B, to apartments, studios, motels, boutique hotels, to luxury hotels and resorts. Depending on the accommodation you choose, you can get from limiter-service, mid-range service, to full-service. On the other hand, to know which kind of service to expect, a lot of people look at the star rating system, with one being the lowest and five being the highest offering the full-service and premium experience. Hotel operations vary in size, function, complexity, and costs as well. Typically, lodgings are run by general managers, and they have a specific organizational form, depending on the hotel's size. In the last years, there has been a noticeable increase in travel as an integral part of life. Leisure travel has become a rising trend and an indicator of one's status and identity as well (Statista, 2019).

2.7. **THE DEFINITION OF AI.**

As a contrasting term to the previous hotel’s definition, artificial intelligence is defined as the ability of technology, mostly computers and software’s to mimic human skills and knowledge, and to perform tasks to support, help, or replace humans (Britannica, 2020). AI is often defined as a computer system that can perform human intelligence tasks such as visual perception, speech recognition, decision-making, etc. (Forbes, 2018). The main task of artificial intelligence is to have the ability to reason, understand and find the meaning, make a conclusion or learn from past experiences. However, five decades of research in AI have still not managed to offer any firm evidence that AI can perform better than humans regarding emotional intelligence and the feelings of understanding and comfort that only human-to-human relationships can achieve (Britannica, 2020).

2.7.1. MARKET SIZE OF AI INDUSTRY

In 2021 it was forecasted that the worldwide revenues for AI will grow 16,4% annually. It is forecasted to reach around 126 billion U.S. dollars by 2025 (Statista, 2020). The development of AI is the biggest in Japan, followed by other parts of Asia-Pacific, then Western Europe. The biggest growth in AI by 2024 will have AI software platforms, followed by Ai applications development. (IDC, 2021). Despite AI's impact on labor, AI is predicted to contribute to global economic growth. The research was done in 2018 estimated that AI will contribute to approx. 26% of China's GDP by 2030, 14.5% on North America's GDP, and around 13.6% influence on the UAE's GDP. Furthermore, AI in the technology, media, and telecommunications industry is predicted to increase global GDP in 2030 by ca. 12.5%. (Statista, 2020). Between different segments of technologies, Machine Learning is projected as one of the most growing segments by 2025. (Allied Market Research, 2018).

2.8.INTRODUCTION.

It is not arguable that the Covid-19 pandemic has been an unwelcome surprise globally. With its' spread, it affected a lot of different industries, but mostly those that rely on direct human interactions. As what we are experiencing in the Covid-19 period is highly a result of human interaction and human touch, then the adoption of Artificial Intelligence is needed more than ever. AI was always presented as a good way to make things faster, better, and safer. Nevertheless, AI is mainly seen as a threat to humans, since there is a fear of being replaced by it. Specifically, the hospitality industry was always seen as a people's business, therefore, this industry is invariably the slowest in the adoption of AI (Drexler, N. & Lapre, V. 2019). However, since the hospitality industry is currently one of the top three most affected industries by coronavirus worldwide, this urges for hotels' re-innovations and applications of new systems and strategies. No doubt that the hospitality industry is one of those which will need the most adoption and change to stay vital since as stated by Statista.com (2020), the Travel & Transportation industry scored 5 on the scale of a minor (1) to severe (5) impact index of coronavirus. This was supported by the AHLA article, American Hotel and Lodging Association (2020), where it was explained that the hardest-hit industry in the Covid-19 era is 'leisure and hospitality, even far worse than retail and construction. The hardest-hit sectors could take more than five years to get back to 2019-level contributions to GDP. Seeing that the crisis specifically in this sector is big, it is believed that managers will be more open to change the old belief of hospitality being a people's business, and use the AI to create better protection and more safety (McKinsey & Company, 2020).

Some countries, such as Bosnia and Hercegovina or Italy are highly dependent on travel and tourism, which are considered to be very promising sectors in the service industry (Priyadarshini S., Ranjeeta T., and Deepti Y., 2020). This is why AI could be beneficial to make hotels stable again and help them survive this crisis. We can for sure say that this period is being characterized by technological advances in AI areas. AI is being adopted in many hotels around the world to make them stay firm and create a feeling of a safe and secure environment for their upcoming guests. The reshaping of the hospitality industry has begun, creating a new, innovative way of service offers to the customers like chatbots, robots, hotel kiosks, voice-controlled devices, and similar. According to the Glion Institute of Higher Education (2020), a leading hospitality institution, the role of artificial intelligence in hospitality will be of crucial importance in the recovery process from the post-covid crisis. Glion (2020) explains in their article how the focus will be on offering 'high tech, no touch'. The changes will include changing the non-functional decorative furniture with devices that are intelligent and digital. They called it the 'Hotel of Things', describing all the devices in the hotel that can communicate and have the ability to provide and send data. All devices are controlled by the app on our smartphones or by our voices. Wise C. (2020) from PBS news also explains how the implementation of AI is now determining. Considering people are usually being resented over the increasing automation of labor, Covid-19 is showing the opportunity of how the two, humans and AI, can work together in new ways to find the best solutions to the fastest recovery of the hospitality and tourism sector. AI has become an extremely active topic in 2020/2021, especially in the hospitality industry, since this industry is the one in which customers indeed love the human touch since it gives them a feeling of a home. However, due to the still-active situation of COVID-19, there is a rising question of hospitality should change their way of working, and create a non-human environment and offer services with full AI and automation. To date, research on consumers' perception and attitudes towards the adoption and application of AI in the hospitality industry after or during COVID-19 is still not developed. There is a lot of missing information regardless of the trust changes of customers towards the AI. The relationship between the AI as non-human touch and COVID-19, the virus that is transmitted by the human interaction, is still not well explained or analyzed. In particular the marketing literature had analyzed the general impact of COVID-19 on the AI, and some facts or assumptions were given: there has been seen a higher usage and application of AI, but there are no specific numbers of the percentual changes in trust/fear or the overall customers' attitude about the AI application after the COVID-19 experience.

Research question: When and under what circumstances experience influence the customers' preference between Human touch vs. AI?

This research question aims to address deficiencies in the current changes in customers' attitude towards AI in the post-covid19 situation. The main question is if the people will start trusting more AI than humans when it comes to their health and if their previously established fear and negative attitude towards AI will be changed since their current fear towards human interaction is higher. My research question should discover if the positive/negative experience has an impact on the relationship between AI vs. humans and the final customer attitude towards it. I will also investigate which are the specific scenarios when each of the variables is affected. My research motivation derives from a simple observation: how my family hotel business started applying AI during the covid-19 time, and how the attitude of the people around me, myself, and the managers changed toward the AI application in the hospitality industry. In this sense, I argue that the trust towards the AI as well as the need and want could increase and that people now could be more trustworthy towards the AI than the humans, since the fear of getting infected could affect the previously.

2.9. **TRENDS**

2.9.1. Hospitality trends

Some of the before-Covid-19 hospitality trends were *globalization, safety, and security, diversity, service, technology, and price value.* With the globalization trend, there is international tourism, which reached from 475 billion US dollars in 2000 to 918 billion US dollars in 2010, increased by 93,26% compared to 2000. Another trend is safety and security, which by Walker, 2010, is of crucial importance. Customers want to see all the measures a company did to make them feel safe, from video cameras, security, and other technological development that would stop any kind of online frauds, theft of personal information, even robberies and assaults (Ellis and Stipanuk, 1999). Diversity is something that attracts consumers more nowadays. From the diversity of services to organizational structure that would consist of people from different regions and races (Merchant, 2011). Furthermore, quality has played a significant role from the beginning of hospitality. Quality plays a crucial role in both attracting and retaining customers (Helms and Mayo, 2008).

Service quality and the degree of satisfaction derived from service quality are becoming the most important differentiating factors in almost every hospitality environment (O'Neill and Palmer, 2004). By investing in the service quality, the company can achieve better customer satisfaction, and with that increases loyalty and create a relationship with customers (Jonsson et al., 2009).

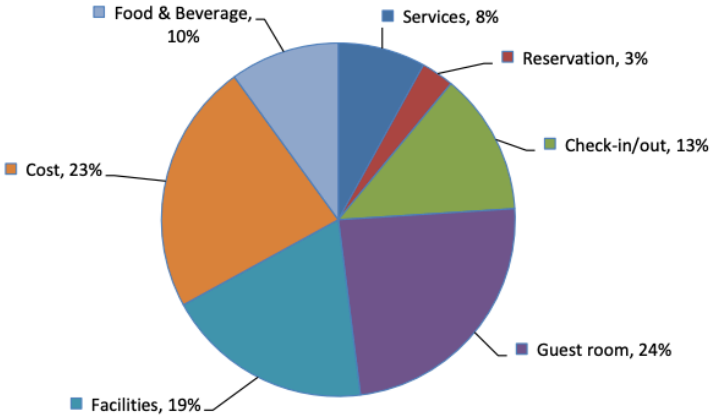


Figure 1: Kapiki, S. (2012). Factors driving satisfaction scores.

Technology has been used more in the last decade to improve customer experience in hospitality. Also, decision-making through decision support tools, databases, and modeling tools assists the manager's job. Thanks to expert systems, sophisticated expertise can be met by any manager (Romanovs, 2000). By technological developments, we can have increased staff productivity and time saved, as well as reduced response time to satisfy guest requests. The majority of the process in the hotel business is now automated and supported by different software and systems, which can help with mass email offers, check-ins and check-outs, and similar. Demographic changes are always suggesting to be followed and analyzed.

Table 2. Key data on demographic change up to 2020

Demographic developments	
Feature	**Top 10 source markets[i]**
Population development (volume)	Overall: rise (particularly sharp in the emerging markets), decrease in Japan and Italy
Migration of the population	Net balance of migration in the top 10 countries positive, in the emerging markets[ii] negative
Age structure	More older people (esp. in the top 10 countries and particularly in Japan)
Gender	Top 10 countries: slightly higher number of women (will decline somewhat in future). Emerging markets: opposite trend
Educational structure	Increase in formal education (except in Italy, Austria & Japan)
Household structure	Overall, households will shrink
Household income	To date: rise, in future: no data available

Source: The impact of demographic change on tourism and conclusions for tourism policy (Grimm et al, 2009)

2.9.2. ***Current and future trends in hospitality.***

A. ***Sustainability***

As Millennials and soon some of the GEN Z is taking over the majority parts of the workforce, it is needed to listen to their needs and wants. The first thing that comes in line is sustainable tourism and hospitality (Socialtables.com, 2020). In general, society is becoming more environmentally conscious as we are more aware of the environmental problems, therefore, more and more people are trying to make everyday changes to support the environment and protect it. These changing attitudes are filtering into the way travelers choose their hotel, and they want to see more eco-friendly constructions, energy saving, waste management, and similar (SiteMinder.com, 2020). In the article done by the Cornell Hospitality Quarterly (2011), under the title: *Hotel Guests' Preferences for Green Guest Room Attributes*, hotel guests found a green certification as the most important attribute among those listed. Guest appreciate hotels that have a recycling policy with a place where to recycle, as well as they prefer if the plastic bottles in the toilets are switched for refillable shampoo dispensers, energy-saving lightbulbs, and towel reuse policies. (Millar, M., and Baloglu S., 2011). It is the fact that people are becoming more aware of the global sustainability problems, one respondent said that this "has to be considered in branding, but beware of green-washers: consumers are now well-aware that window-dressing exists, and they will not buy it." (EHL insights, 2021).

B. Boutique hotels

In the last decade, hotel owners worked on creating giant hotels, that will look like an industry, offering various services, from a casino, shops, doctors, amusement parks, and similar (Khosravi S., Malek A., and Ekiz, E., 2014). The international accommodation sector witnessed the evolution of different types of tourist accommodation all over the world (Timothy and Teye, 2009). Changes in consumer behavior, changing markets, and the shifting production of accommodation lead to moving the preference from chain hotels to boutique hotels (Freund de Klumbis and Munsters 2005; Aggett 2007). Boutique hotels are created to offer modern and luxurious designs for a limited number of guests, but still offering that feeling of extravaganza (Olga, 2009). A boutique hotel defines as "a small hotel, with an intimate and individualistic atmosphere and style" (The Chambers Dictionary, 2003, p. 175). Horner and Swarbrooke (2005) identified “the emergence of boutique hotels as one of the most interesting developments in the hospitality sector of the leisure industry” (p. 369). The need for boutique hotels raised with the guests to have a unique and special accommodation, where you could feel more attention and more work invested being transferred to you, rather than being in a mega hotel, where all the rooms are big and same, and where you are just another guest. In a boutique hotel, managers can work on the quality of the service and not quantity, they can focus on all small details that will be recognized by the guests (Drewer, 2005). Another driving force of the growth of this kind of hotel is an increased interest in art, culture, and history, which are all conceptual design models behind boutique hotels (Freund de Klumbis and Munsters (2005). Words that best describe boutique hotels are warm, quirky, and small (Anhar, 2008). In the last few years, we can see those hotel giants are now challenged by small privately-owned hotels, each of which has its unique style. By analogy with small shops, selling things from well-known designers, these hotels received the name of "boutique hotels" (UKEssays, 2018).

C. Digitalized guest experience, contactless technology, and automation

From the last decade, the application of smart technology in the hospitality sector has become an important step. With the start of the coronavirus crisis, managers and marketers are trying all the possible, innovative ways of how to use technology to have a less human touch, and create a safe and secure environment for the guests. One of the ways to improve guest experiences is the apps. Apps are used now for contactless communication with guests, as well as self-check-in, and check out, food and beverage orders, etc.

Needless to say, the trend towards digital and contactless services has gained new momentum in 2020 (EHL insights 2021). Some of the new trends in hospitality services are also facial recognition and fingerprints used to asses hotel rooms. Moreover, there are now AI-powered chatbots that have proven to be a good customer service asset used to help in the booking process and overall questions responses. What is more, a new trend is as well a smart room and easy integration of systems. This includes automated temperature control, lighting, alarms, blinds, and other technological innovations, which are all increasing customer satisfaction, service quality, and reducing costs as well (Nevron,.eu, 2020). Revenue Hub (2020), explains that safety is a new luxury. New trends are focused on using the technology to prevent the spread of the virus, and keep everything clean and safe, as killer lamps, which use UV-light to sanitize surfaces, complementary tables/smartphones during the stay, etc.

D. Personalization

As the changes in guests' behavior happen, so does the need for more personalized service and offers. Personalization is becoming a key aspect of all hotels, no matter if we are operating with boutique or mega-hotels. It is important to see every guest as an individual, with their preferences and tastes regarding the stay. Therefore, it is important to understand and analyze their individual needs and offer them customized experiences (Les Roches, 2018). Making guests feeling at home, and having a unique service is the main factor in developing relationships and creating a strong brand image and loyalty. With the advanced technology, now more than ever is easier to collect the data and tailor the offering by each individual. The fact that this can all be done by AI systems is refreshing since efficiency is crucial as well. Technologies can help managers collect personal data, and automatically send offers or emails when there are special events that the guests have been interested in the past. Therefore, by the patterns from history databases, AI can help in discovering the specific preferences each guest has. For instance, the happy birthdays' emails, special discounts for birthdays/anniversaries knowing the previous special requests dietary requirements, the view, the size of the bed or the type, the breakfast time and similar. All of this can be used to create a good service in advance, a surprise to our guests with a feeling of being listed to and appreciated (HospitaltyTech, 2018). Furthermore, it is also possible to track the customer's average spending by room, or by night, which gives a clearer picture of the price we need to offer to a specific client. Hoteliers can develop targeted and relevant sales and marketing tools aimed at individuals or similar groups. To create a personalized environment, managers need data from the customers.

One example of how to easily collect the customers' preferences is shown by Hotel Lugan Dante in Switzerland. They created an online check-in service where each guest can find the 'My page' portal for guests to customize their needs. This portal includes around 150 options guests can modify or choose. Some of them are the all the options about baby services, like the baby kit, cribs, food, etc., then the customization of a minibar, pillows, blankets, room technologies, different services or activities offered for families, or different tools/equipment need to make them feel like home as chargers, yoga mats, printers, presentation clickers, etc. An even better solution would be to send something similar to 'My Page' to the clients as soon as they make a reservation, so the hotel can prepare all the amenities needed and put everything inside their room, creating a nice welcoming feeling when they enter (Chen M.M., 2020).

*2.9.3. **AI trends in the hotel industry***

Since hospitality is a highly 'people's business, it is important to know when and what to apply from AI in your business. To build a relationship or solve a problem, it is unlikely to use AI and robots, since we need human empathy and reasoning. But when it comes to some repetitive tasks like check-in and check-out, reservations, financial reports, and all that that can be done without direct human touch, then AI is the right thing to use. With the implementation of AI in some parts of the business, we make jobs easier for our staff, so that they can concentrate on the things AI cannot fully deliver, understanding the guests' needs, ideas, creativity, empathy, feelings, relationships, and feeling of home. For instance, there are some examples of AI being used in the hotels for room service, virtual personal assistants, or chatbots, that can be used to answer some easy questions or problems our guests can have, and save the time of our staff (Pallister, S., 2019). Technology in the Hospitality industry is mainly used to resolve the pain points in travel and reservation systems, to increase the quality of customer service, and make information available much faster. AI has been used in hospitality mostly in the last 10 years, and there have been both supporting and rejecting attitudes towards it. Many managers still do not want to implement AI highly in hospitality, since they believe the human touch and work in this industry is highly respected and is seen as a must. However, time changes, and to be successful, managers must be up to date, and try to use the technology for their benefit. AI can for sure save significant money, minimize human error and deliver superior service (Mariano, K., 2018). Some of the first signs of AI being implemented in the Hospitality industry were smart booking systems, voice, and text-based assistants, and IoT. IoT helped connected motion sensors, room control, and smart voice or movement control in the rooms.

With this, guests get a personalized experience (Maruti Tech, 2019). With the usage of Big Data and Machine learning, hoteliers can now forecast ups and down in demands with shifts in seasons and customer choices. From this information, they can create and design their strategy and action plan, that helps optimize their service offering, prices, and costs (Maruti Tech, 2019). With the incorporation of AI in demand and revenue forecasting, hoteliers can get easy and fast results. The three main metrics that could be used: occupancy rate, Average Daily Rate, and Revenue per available room. The demand probability is usually built on seasonal choices, current trends, hotel history, local events, and similar (Maruti Tech, 2019). Example of a hotel business that has applied some AI smart devices is Accor Hotel in Paris, which is focused on changing smart rooms with personalized services. This includes voice-activated virtual assistants, IoT interconnected devices, room amenities control for music, temperature and lighting, personalized activity suggestions, and similar. Another example is Hilton Hotels with their energy program, where they with the LightStay program predict energy, water, and waste usage and costs (Bryant, J.G., 2020).

2.10. ***AI impact on Hotel Sector***

1. *Higher efficiency with cost savings*

With the implantation of AI and robotics in the hotel sector, we can save time for repetitive tasks as check-ins and check-outs itself, cleaning, information/critics/questions answering, room service, etc. By this, we can assure less costs, since after we once invest in the technology needed, the workload of the housekeeping or reception/reservations can be decreased. AI can also be used for proper stock and wastage management, which also results in a more efficient way of work and cost savings. According to McKinsey (2017), AI is mostly used in workforce management, AI spends, operations, and customer experience. These are all departments that if improved can lead to higher efficiency and save money (McKinsey & Company, 2017). AI is said to have an impact on labor productivity as well. In Italy, there is a 12% marked increase in efficiency when AI was applied. In France, it is 20%, and Austria had 30% increased productivity in 2017 (Purdy, M., & Daughery, Paul, 2017). When it comes to data analysis, AI is proven to improve speed and increase reporting time. Moreover, the AI can handle big data, whereas for humans it would be hard or even impossible to analyze and gather conclusions from whole data a hotel can receive (Gardner, K. 2019). The higher efficiency also lies in the automation of the process, since now a lot of repetitive tasks can be done faster with AI.

For instance, automatic reservations input rather than each guest's reservation being inserted in the hotel system by hand by humans. Channel manager is a famous software that can be implemented in hotel management systems. This software syncs all your booking portals automatically, so it helps reduce double bookings, syncs the prices and minimum stay, etc. For instance, this software is implemented in the Hotel Europe Group in Sarajevo, Bosnia and Hercegovina, which leads to increased efficiency, cost, and time savings, but also easier booking management and higher revenues (Bajrovic, B., 2021). Regarding the automation process with AI, some other examples are automatic email replies, automatic email bookings, automatic offers or news being sent to a specific group of clients, etc. The result is time saved, and less human presence is needed in these situations. To add, AI can also offer cognitive insights to predict what a particular customer is likely to need, identify credit fraud in real-time, analyze warranty data to identify safety, etc. (Davenport, T.H., & Ronanki, R., 2018). Minimizing errors are another important task for AI. By the minimization of the number of errors, the overall efficiency is improved. Operating costs can also be reduced and controlled with AI. These costs are depended on the type of the business, but they consist of salary expenses, maintenance and repair costs, travel expenses, marketing costs, supply costs, and/or costs of the production materials. AI can replace fully, or at least partially certain employees, so therefore there will be a reduction in the salary's costs. Furthermore, with the automation process, a lot of marketing costs can be reduced. (Haponik, A., 2019). Besides, an interesting part of hospitality issues and sources of costs where AI could be of help in solving food waste. Food waste in the hospitality industry is near 100 billion euros each year, and it also brings enormous environmental damage. Some data showed that across 250 hotels globally, food waste is between 4-12% of food costs. Solving this problem, by decreasing the food waste in half, would ensure the work in the kitchen runs more efficiently and also more sustainable (Lambert, C., 2020). The owner of Winnow Vision in France, a software that helps in food wastage, explains how AccorHotels, Hilton, Marriott, Shangri-la, and Club Med have already implemented this system. For instance, Novotel in Warsaw saves 27.000 meals and 18,000euros each year by AI smart ways of reducing waste.

2. *Enhancement of revenue by competitive intelligence*

AI programs can be used for analyzing and predicting the production levels, inventory needed, costs, and others, and in this way, it can offer the best way of how to control the production to maximize the revenues (Hotel Technology News, 2019).

Moreover, AI can predict and manage supply and demand requests, so it gives a base for extension or bigger production. AI-powered revenue management is all about smart pricing, and in this way, the AI can predict competitor rates, price sensitivities, room occupancy, etc. (Hotel Technology News, 2019). Mr. Emanuele Mansueti, consultant at HotelPerformance explained how tools like Smart Pricer and Dynamitich can help increase revenue by adapting prices to fluctuating demand (EHL Faculty insights, 2021). There are different demand-specific optimization systems for profit enhancement in hospitality, which are all used to boost revenue based on the demand and price strategies depending on the seasonal, industry, and customer behavior changes (Technative, 2018). Hospitality and travel agents now use self-learning algorithms to extract insights from online searches and the history of customer data and previous actions to predict future price movements. The next step for these self-learning algorithms is to analyze multiple factors that can influence travel such as seasonal trends, demand growth, limited-time special offers, airfares, as well as customers' preferences and purchase patterns (McKinsey, 2017). API or Application Programming Interface, which can be defined as a software intermediary that allows two applications to communicate, also allows algorithms to assess the occupancy data from nearby hotels or the prices quoted by competitors (from the data available online) and accurately predicts the demand for each room type (Mulesoft, 2021). AI can test a lot of designs, learn and progress results, which is above usual human capacity. By the customer data we get from the technologies, AI can create the best target market or personas sections, and it can show which products or services are mostly suitable for particular client fragments. Regarding occupancy rate, AI machine learning algorithms can now learn and store the relevant data, and help businesses provide relevant insights into the occupancy patterns. Furthermore, AI technologies can also follow multiple different sources of information and adapt the pricing or to warn if some external factors could influence the current occupancy rate (Strongbytes, 2019). In addition, there is the Besidespen pricing model (Sia Partners, 2016). This is a new AI trend, where with the help of technologies, programs, and analysis, we can divide our customer segments by their need, and offer them a personalized offer that the AI can divide loyal vs. occasional guest or repeats vs. premium by evaluating the evaluating profiles and data. With the evolution of technology, the traditional model of pricing which had few price points based on promotional rates was switched with a more complex model. The managers started using more dynamic pricing, depending on the situation, and allowed more price points, where a 1% deviation from the BAR is possible (Sia Partners, 2016).

However, even with the dynamic pricing method, prices are not created independently per each room. Rather, if the overall demand is increased, then the prices of all rooms would go up. Open pricing was encouraged by a start-up Duetto in 2012, which specialized in dynamic pricing in a specific sector of Hospitality. Their theory is that each room had its characteristics, target market, distribution, and channel. This is the way the usage of Open Pricing can offer special prices for each room independently (Duetto, 2021).

DIFFERENCES BETWEEN TRADITIONAL RM, DYNAMIC PRICING AND OPEN PRICING

	Revenue Management	Dynamic Pricing	Open Pricing
Definition (Duetto)	The art and science of **predicting real-time customer demand** and **optimizing the price** and availability of products to match that demand.	The process of actively applying revenue management by selling the **same products** at **different prices** to **different customers**.	The ability to **price all room types, channels and dates independently** of each other to maximize revenue without having to close any off.
Real-time prediction	✓	✓	✓
Inventory control	✓	✓	✓
Based on BAR	✓	✓	x
Customer segmentation	x	✓	✓
Room type and channel differentiation	x	x	✓

Figure 2: Sia Partners, 2016. Differences between traditional RM, dynamic pricing, and open pricing.

With the usage of a Machine Learning revenue optimization system with different data sources to give and insight and predicting pricing figures. As a result, we have an increased ROI and RevPAR, or revenue per available room. By the research done by McKinsey (2017), artificial intelligence promises to boost profits and transform all industries, with a special influence on the tourism and travel sector. Moreover, by Accenture.com, the rates of profitability could be boosted by an average of 38% by 2035 across all 16 industries, including Tourism and Travel. The AI has a big effect on the supply chain management, and with the help of AI, the average supply chain shortened by just one day in the Fortune 100 company can bring from US$50million to US$100 million in cash flow (Mikail, N, 2016). Further on, the impact of AI on the share of profit increase in the Accommodation and Food services by 2035 is predicted to be 74% (Purdy, M., & Daughery, Paul, 2017).

3. *Customer experience improvement*

Another major AI impact in Hotel Sector is customer experience improvement. Starting from messaging automation, where hotels offer virtual colleagues that can be available 24/7 to the customers and improve visitor fulfillment by making them feel taken care of.

Also, customers like having their assistants and they like communication on their terms, from their room or the other parts of the hotel (Olsen, M. D., & Connolly, D. J., 2000). The advantage is that customers do not have to come to the reception or call certain info numbers, but can solve their issues from their phones at any time and from any place. The second thing interesting to mention is a check-in with facial recognition. Biometric authentication is becoming more popular each day, and we can find different industries using it for different purposes (Williams, C. & Buswell, J. 2003). One example is education as well, where students use the app for facial recognition, such as Keyless, to attend exams, classes, or to log in to the university sites. The advantages are the time saving for checking each person separately, but also the data protection and privacy. Facial recognition in the hotel sector can also be used for entering the rooms so that the guests are sure that only they are allowed to come in, or in airports, facial recognition can be utilized for boarding passes and international id checks. The third thing that can influence customer experience is no doubt a smart room with a voice control system (Bisoi, S.K, Roy, M., & Samal, A., 2020). In the smart rooms the customers can now play with the lights, windows, tv, music, and temperature at all times, as they pleased, and with their voice. Usually, these voice control systems are connected either with the iPad or the mobile app. Data science used is not good only for the hotel, but it reflects on customer satisfaction immediately. With the help of AI, we can create a clear picture of the customer wants and preference, providing a better experience and boosting incremental revenue at the same time ((Avery Philips, 2018). In general, customer experience is a competitive driver of success and growth. The complexity of customer data and tasks is the reason why AI is so much needed to support and improve customer satisfaction. The superior skills that AI brings are the ability to ingest and understand a customer's entire history before each conversation. In this way, AI can create a personalized feeling of communication, and make customers feel important and listened to. The goal of AI is to work on its own to understand the customer preference and offer them the products or services which will make them feel as they were made just for them (Thiel, Will, 2021).

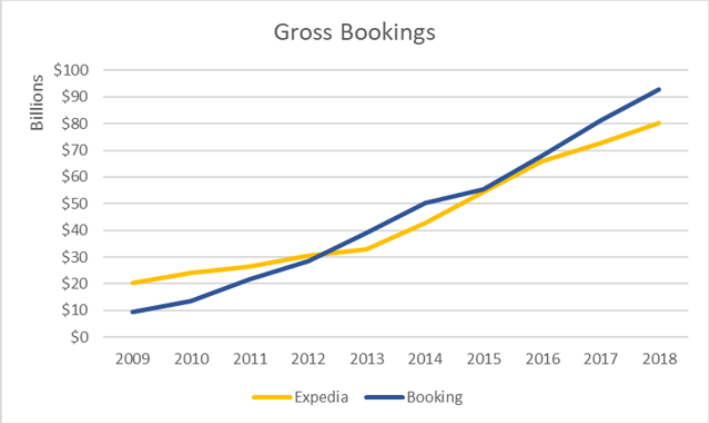
III. CHAPTER TWO

3.1. TOURISM AND HOSPITALITY AS A COMPLEX TERM – the early beginnings and development

Historically, travel for leisure purposes was an experience offered and available only for upper classes or royalty. Men were known to travel and trade all around the world, and share with others the products or services they did not have. Some of the first evidence of tourism, or some first actions that lead to the creation of tourism we have today, were found in Egyptian culture (Hachtmann, R., 2007), as well as in the Greeks ca. 485-424 B.C. (Ludwig, K., 1990). Other roots began in Rome as well, where they had some ways of traveling and form of holiday around ca. 300 A.D., that later on was shaped in hospitality and tourism (ibid, p.30). In the 12th century, the first forms of tourism and travel were found in educational travels to France, England (Oxford), and Italy (Bologna). From here start the desire to experience the world as an individual. "The subjective experience of travel is a distinguishing feature of the beginnings of the modern age: by traveling, one's self-experienced its liberation". (Opaschowski, H.W., Tourismus, 1996.) The world hospitality first appeared in the 14th century, and it was derived from the Latin word *hospes,* which means guest, host, and foreigner (Latdict, 2014.) The word tourist appeared in print much later, in 1772 (Griffiths, R. and Griffiths, G.E., 1772). William Theobald suggests that the word tour comes from Greek and Latin words for circle and turn and that tourism and tourist represent the activities of circling away from home, and then returning (Theobald, W.F., 1998). Early signs of modern tourism we know started from the 16th-18th century (Opaschowski, H.W., Tourismus, 1996). In the Bildungsreisen period in the 19th century, which means educational journey we could see an important stage in the development of tourism. This period was marked by the travel of famous philosophers like Jean-Jacques Rousseau, Johann Wolfgang von Goethe, Johann Gottfried Herder, and many others, that searched for knowledge, experience, and travel novels (Gyr, U., 2010). The next period was marked by the great changes in transportation and travel with the creation of the Central European system of transport, that brought together many countries and increased mobility of tourist. Then came steam navigation and railways, which all influenced human connection, selling, and traveling (Schivelbusch, W., 1989). One of the early theories of tourism appeared in the early 1920s, which was a German term, Fremdenverkehr, and was used to describe the business and economic actions and problems (Krippendorf et al., 1987).

From the 1960s this term was replaced by different tourism studies and various theories that have been explaining ever since (Gyr, U., 2010). What followed through the 2000s is known as a period of technological development, and was followed mostly by the application of online travel bookings that grew exponentially, and by 2014 global leader Expedia had expanded to include brands such as Hotels.com, the Hotwire Group, Trivago, and Expedia CruiseShip Centers, earning revenues of over $4.7 million (Expedia Inc., 2013). From 2014, the other biggest, and today most known company for online booking, Booking.com, started leading. At Booking, gross bookings in 2018 were about 10 times what they were 10 years ago. At Expedia, bookings are about 4 times what they were in 2009. (see graph below).

Figure 3. Gross Bookings of Expedia vs. Booking Holdings through years. (Manders, R., 2019).



Tourismteacher.com (2020), highlighted in a very clear, visual way the most interesting and important events in the history of tourism **(see appendix C.).** Today, tourism theories and studies are a set of various, always up-to-date academic approaches which can offer different applications. Tourism is often described as the strongest sector, the one that is dependent and created with and for people. This global phenomenon has an almost incomprehensibly massive infrastructure. In most countries, tourism plays a main role and has a significant impact on society, politics, culture, and as a final result, on the economy (Gyr, U., 2010). According to oas.org, the tourism sector's main task is to contribute to three high-priority goals of developing countries, and they are: generating income, employment rate, and foreign-exchange earning. When it comes to service, it is automatically connected with **hospitality.** *Hospitality* is offering a new short-term home feeling to the guests, where the overall customer satisfaction will be depended on the entertainment, food, staff service, and communication offered amenities, design, and functionality offered, etc.

Hospitality should mean different and original, and most of all, it should be a 'place' where people can still be individuals and broaden their personality and style, even learn and apply something new (Hogan, 2008). The hospitality industry is part of a huge group of companies know as Travel and Tourism, which provides the needed goods/services to satisfy customer's needs. This industry is the largest and fastest-growing industry in the world (Walker, 2010). The Travel and Tourism industry is composed of five parts: a) the tourism lodgings, b) the transportation services, c) food and beverage operations, d) retail stores, and e) the various activities and entertainment (Kasavana and Brooks, 2007). To have a successful hotel business, hospitality operations should be focused on the guest, and offer them more high-touch instead of high-tech, since people tend to like being welcomed by humans and have human interaction as a feeling of social connectivity and warmth (Walker, 2010).

3.2.AI APPLICATION IN HOSPITALITY

3.2.1. **HISTORY OF AI**

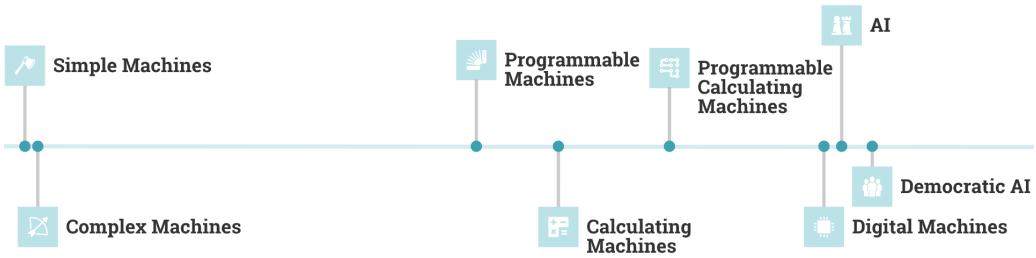


FIGURE 4: Bussler, F., 2020. A History Of Artificial Intelligence — From the Beginning. Towards Data Science.

Artificial Intelligence (AI) history consists of original work and research by not only mathematicians and computer scientists, but studies by psychologists, physicists, and economists have also been much used. The timeline consists of the pre-1950 era of statistical methods to present 2021.

The first forms of artificial intelligence can be found hundreds of years ago. For instance, in 1726, Jonathan Swift, the author of the grand book Gulliver’s Travels, describes the engine, a machine on the island of Laputa. This machine was invented to improve speculative knowledge by practical and mechanical operations.

Later on, in 1763, Thomas Bayes had developed a framework for reasoning about the probability of events, which today n the machine learning we call: Bayesian inference (Press, G., 2016). Later on, in 1854, Gorge Boole argues that logical reasoning could be performed in the same manner as solving a system of equations, now called Boolean algebra, which is used as a basis for the design of digital computer circuits (Britannica, 2021).

What is a machine?

A machine can be defined as a device that is being used to support or replace humans or before animal work. Primary machines were used to replace physical tasks, but as the development of AI started, machines are today being used to replace cognitive tasks as well. (Britannica, 2019). Very famous machines are Alan Turing's Machines, first describes in 1936. These machines were simple abstract computational devices that were created to help find the levels and limitations of what can be computed. (Stanford Encyclopedia of Philosophy, 2016). Turing machines are today considered to be the foundations of mathematics.

Some of the first forms of applying AI as robot machines started in the first half of the 20th century, where science fiction movies were filmed, showing off the first forms of humanoid robots. One example can be the movie Wizard of Oz or Metropolis with their humanoid robot called Maria (Rockwell, 2017). Artificial intelligence is a quite young discipline, supposed to be active in the last 70 years, and it is not fully developed or investigated (Council of Europe, 2020). Many scientists, mathematicians, and philosophers were and are highly interested in this field. In the 1950s, a young British polymath, Alan Turing explores the mathematical possibility of AI, and this logical framework was published in his paper 'Computing Machinery and Intelligence' (SITNBoston, 2017). 1940-1960 was a period that was marked by the birth of AI since there was a high desire to understand how to merge the functioning of machines and organic beings (COE, 2020). Around the 1960s, AI flourished with the computers' development, they could now store more information and become faster, cheaper, and more accessible, thanks to machine learning algorithms (Rockwell, A., 2017). Specifically, in 1963 McCarthy started the AI lab at Stanford. (Roy, A., 2020). In the next approx. 6 years there was not much research done because of the reduction in funds available based on the lack of the outcome and applicability of solutions. In 1969 at Stanford University in California, the researchers Feigenbaum and Lederberg created DENDRAL, a project in AI, with the main aim to study hypothesis formation and discovery in science. (Britannica, 2021). In the period from 1980-1990, there was the advent of the first microprocessors that influenced AI development.

This was followed by the implementation of different expert systems in different fields like molecular chemistry and medicine to get a diagnosis of blood diseases and prescription drugs (COE, 2020). This period was also the one in which a lot of investors started boosting the funds. In 1986 appeared the first commercial expert system R1, which used the Match system rather than Generate-and-Test, which means it used the best problem-solving method rather than testing all hypothesis until one acceptable is found. This expert system was proven to save companies a lot of money, and this was the point where a new industry of AI started. (Roy, A. 2020). In 1990 the focus was put on pattern recognition and machine learning, which kept the focus on neural networks and then bloomed in the 1990s. (Keith, D., 2019). In 1997 the computer beat a human in the chess play. This computer was created by IBM and was named Deep Blue. (Baxter, M., 2019). In 2005 the creation of autonomous robots was developed, followed by 2008 Google's voice recognition application. What followed were the humanoid robots' developments around 2010, and then the new bloom of AI from 2014 which included innovations like inception network, ResNet, ResNeXt, RCNN, YOLO, GAN, AlphaGo, Deep Re-Inforcement learning, and similar. (Roy, A., 2020). In the last five years, the biggest focus has been put on developing voice and facial recognition like Apple's Siri, smartphones and natural language, robots vacuum cleaner, chatbots, virtual assistants, biometrics, serverless computing, etc. (Forbes, 2020). For detailed scheme of the most important AI developments in history, see appendix D.)

3.2.2. **AI TODAY**

In the last decade, AI has attracted enormous attention and had a bloom based on massive daTa and new computing power. Artificial intelligence aims to imitate the cognitive abilities of a human being and slowly switched humans for some repetitive and mathematical tasks. The fact that artificial intelligence can possess great intelligence scares many. Since intelligence can be mechanized to some levels, this makes people feel not unique, and this directly impacts their identity (Mijwel, M. M., 2015). Knowing we can be replaced with a machine affects something machines do not have, our feelings. For the last 20 years, AI developed enormously, from driverless cars, robot vacuum cleaners, smartphones with voice assistants, facial recognition, fingertip passcodes, SIRI, Alexa, Xbox 360 that tracked human body movement, Google DeepMind's AlphaGo, Google Home assistant, the Alibaba language processing, Bixby assistant, to chatbots, NLP, etc. (Reynoso, R., 2019).

Artificial Intelligence is founded to be the most complex and astonishing creation of human minds yet, with the fact that this industry is quite new, largely unexplored, and had a lot of potentials to be used. This rapid growth is what makes some people feel uncomfortable with AI since the capabilities of it are very powerful. To better understand the existing AI capabilities, it is important to understand the types of AI as much. To divide and create different types of AI, the level of replicated human capabilities used by AI machines are measures. Meaning, it depends on how a machine works compared to a human, we can classify one AI among multiple types. Some AI systems or devices can have a limited function and performance, while others can have equivalent levels of human-like functions. One way to classify AI's is to test their similarities to the human mind in terms of thinking and feeling like humans. If we use this type of classification, we can divide four main types of AI: ***reactive, limited memory, theory of mind, and self-aware*** (Joshi, N., 2019).

The reactive type of AI is the oldest form of AI systems and they have limited capabilities. These kinds of systems or machines perform only the basic operations and they do not have long-term memory, nor they have any memory-based functionality, like learning from past experiences and similar. They replicate the human mind in a way of responding to different kinds of stimuli, but they cannot learn. These machines are used only for automatic responses to a limited set of combinations of inputs and outputs (Forbes, 2019). One example of a reactive type is IBM's Deep Blue machine that beach chess Grandmaster Garry Kasparov in 1997. Another example is facial recognition where machine learning takes a human face as input and puts a box around the face for identification as an output, so no stored information, no learning (Johnson, J., 2020).

The second type of AI is the one that has ***Limited Memory***. These machines are updated reactive ones. Besides the characteristics of the Reactive type machines, they are also capable of learning based on the previous data, activities from the past, to make a decision. Limited Memory types use old patterns to create predictions and make better future actions. The examples of this type of AI we can find in our everyday devices and applications we use, like chatbots, Siri, Alexa, self-driving cars, or any application on our phones that uses our inputs to make better decisions/offers/notifications in the future (Lateef, Z., 2020).

The third type of AI is the ***Theory of Mind***. The first two types of AI exist already and are applied, the last two types are either a concept or in a progress. For Theory of Mind, researchers are currently engaged in creating. These machines will be able to understand people regarding their needs, emotions, beliefs, and attitudes (Roza, F., 2020). In the Oxford handbook of philosophy of cognitive science, one definition for Theory of mind type of AI was given: ''*Theory of Mind' refers to the cognitive capacity to attribute mental states to self and others. Other names for the same capacity include "common-sense psychology," "naïve psychology," "folk psychology," "mindreading" and "mentalizing." […] How do they [people], or their cognitive systems, go about the task of forming beliefs or judgments about others' mental states, states that aren't directly observable?'.* (Goldman, A.I., 2012). The last type of AI is ***Self-aware***, which is currently the highest level of AI machines. This is the last step of a robot to achieve, which is self-actualization and self-awareness, which is sometimes a demanding task even for humans. This is predicted to be created years in the future. The aim is to create a machine that will be able to understand all the human emotions, to evoke emotions in others, but also to have an indent itself, so desires, needs, beliefs, etc. (Joshi, N., 2019). This is a level of AI development that can have a crucial consequence for human society since it can happen what we often see in science fiction movies. Once the Ai robots are self-aware, they will be cable of creating their ideas like self-preservation which directly influence humanity. However, since the experts predict the potential creation of these robots far in the future, decades, even centuries away, this is something that should not bother us now (Forbes, 2019).

3.3.AI IMPACT ON THE ENVIRONMENT, SOCIETY, POLITICS, AND ECONOMICS.

1. AI IMPACT ON THE ENVIRONMENT

The impact of AI on the environment can have both positive and negative sides. The production of AI itself can have a negative consequence on air pollution, even worse than those of a car (News Scientist). The training of the AI is an energy-intensive process. AI algorithms have a carbon footprint due to excessive data, compute and power requirements needed to perform or test the models, which leads to carbon dioxide emissions. (Medium.com, 2020). It is estimated that training a single AI is as much as 284 tonnes of carbon dioxide – five times the lifetime emission of an average car. For instance, Amazon spends a lot of energy, but at the same time, it is investing in wind and solar farms, creating renewable energy that can serve them. Another example is Google company which also has a long-term contract with renewable energy suppliers which reduces the carbon emissions created by AI production and training (Lu, D.,

2019). The positive side of AI is that it can help create a more flexible and autonomous electric grid, integrating more renewable energy. Moreover, AI helped farmers increase their yields by providing necessary data about the seasonings when to apply what and similar. Artificial Intelligence can also help in improving weather forecasts, which for some tropical regions means to keep people safe (Cho, R., 2018). AI is being used for faster and more correct analysis of the weather changes and the trees/herbs destroyed in natural disasters. ML can also predict where poaching may occur in the future or improving an ecosystem model that gathers data about fishes, their number, movements, and conditions. Therefore, AI can highly help in ecosystem management, support habitat protection, and restoration. Artificial Intelligence can support renewable energy as well, helping grids store more energy, as well as help the turbine's propeller to produce more electricity per rotation. AI can also make smart and sustainable cities, shops, hotels, where things can be digitalized, like QR code menus rather than paper/plastic menus, reusable bags, coffee cups, recyclable clothes, etc. (Earth Institute, 2018).

2. AI IMPACT ON SOCIETY

One of the biggest AI impacts on society is the ***automation of labo***r since it can directly displace labor or create new jobs in new areas. Historically, the human labor substitution with automation had led to the creation of complementary jobs in the long run. Some theories show how automation increases productivity growth. For instance, the effect of electrification on manufacturing productivity in the early 20th century, or more recent IT positive impact on productivity, since it decreases repetitive tasks. If there is more ***productivity***, then AI should have a positive effect on ***employment*** based on the increased demand (Bessen, 2018). Dauth, Findeisen, Sudekum, and Wosbner (2017), agree on this, and explain how each additional industrial robot leads to the loss of two manufacturing jobs, but opens enough new jobs in the service industry to compensate for the negative employment effect in this industry. There are other mixed opinions, like Graets and Michaels (2015), that find a noisy effect of robot adoption in industries, while Acemoglu and Restrepo (2017) find a negative effect of Ai adoption on employment. We can argue for both sides, but it is unavoidable to notice that there are fewer human workers in our everyday lives, from online banking to online shopping, or in-store shopping but with self-checkout desks. Moreover, AI adoption is difficult ***in society***, i.e., workers. Individuals are experiencing difficulties with adapting when changing from one to another occupation or when learning new skills (Molloy, Smith, Wozniak, 2014). Therefore, it is supposed that employees could be repellent towards the idea of new AI applications.

Another concern is that the potentially rapid growth and changes with AI can ***disrupt the workforce***, which calls for clear policies for employee support and training. Another great societal change will be the ***changes in human behavior and needs***. Since the AI will start decreasing and limiting human closeness, this will lead to a decrease in the need for people to meet face to face for idea exchange, which can have a big impact on the social development of future generations (Tai, M.C.T., 2020). Another impact of AI on society is ***wealth inequality*** since it is predicted that those who have higher earnings will be able to invest in AI and stay competitive, so there will be a wider gap between the poor and wealthy. On the other side, the positive impact of AI on society is its' help in the field of ***healthcare, medical diagnosis, and treatments***, as well as in nursing homes, which showed that interaction between elderly and robots like Mabu, can positively affect happiness, productivity and overall health (Petrecca, L., 2018). Another societal change is the need for personalization. As there are many AI tools for customer analysis, the customer now requires personalized service and a more unique experience. However, all of these factors can be seen from both positive or negative sides, depending on which perspective we analyze and If we are using AI for the proper usage.

3. AI IMPACT ON POLITICS

With the help of Artificial Intelligence, we can now get data and predicts voter preferences or the position of candidates. Specifically, regarding the elections, the AI completely changed how politicians engage the electorate and communicate with society. Nowadays, the majority of voters use the internet to follow and influence political decisions and actions. For instance, creating the 'Obama campaign' back in 2008 served to bring advanced data analytics and targeted advertising into the political sphere through Machine Learning, creating analytical models that offered personalized e-mailing using online data (CSIS, 2020). Another example is Hillary Clinton's 2016 campaign which was led almost completely by an ML algorithm called 'Ada'. The task of the algorithm was to play a virtual role in every strategic decision Clinton made, like where and when to deploy the candidate, where and when to air television ads, or when was safe to stay still. This raised the question of the ethics of using AI and the lack of regulatory policies as a drawback. The impact of AI on politics can be seen both as positive and negative (Berkowitz, J., 2020). From the negative point of view, we can also say that AI can be a threat to democratic institutions since with AI there are more privacy violations, as data surveillance, privacy breaches, election hacking, personal data, and identity theft, etc.

Through the applications and social media, we used, we can be influenced and tricked all the time by fake news, fake accounts, aggressive customized ad campaigns that sometimes make us feel like someone is following our every step. For instance, as soon as we start searching for a specific product like shampoo on the internet, a lot of ads will pop up offering us the same category of products we were just searching for. We could also get a notification, emails, or even texts if we left our data on those websites. From the positive point of view, Ai can be used for assisting with consolidation institutions, procedures, cultures, or ideologies. AI can be used to ease administrative burdens if used correctly (Pestel Analysis, 2020). AI can play a significant role in encouraging and involving citizens in democratic processes such as offering the appropriate and trustworthy data and information, analyzing fraud and corruption in the system, using predictions to anticipate cyber-attacks and personal data theft or loss on social media. Furthermore, by different applications, we can stay politically aware and active, and be influenced on voting, or other activities (Kaur, A., 2019).

4. AI IMPACT ON ECONOMICS

The AI impact on economics worldwide is predicted to stay positive. From the side where the AI can be used as a tool for predictive analytics in forecasting economics, to its' positive contribution to the world's GDP. AI has the potential to add 16% to the current global economic output and affect o the average contribution to productivity growth (McKinsey, 2018). The AI algorithms and techniques can help to obtain sufficiently large data sets and make it easier to analyze and explain the results, as well as it can decrease the risk of biases, which can all help in having clear and more correct results. This boots the revenues, which influence the GDP growth trajectories (McKinsey, 2018). Moreover, with labor automation, Artificial Intelligence could add up to approx. 11% or around $9trillion to global GDP by 2030. AI also increases innovation in products which could deliver up to about 7% or around $6trillion of GDP by 2030. AI tools can be applied across different industries like commerce, construction, banking, and financial services, food industry, etc., and all as supporting systems or devices which can make the work/tasks more effective and efficient, at the same time generating same or even higher revenues for a shorter time at a lower cost (Pestle analysis, 2020). Various AI algorithms can track and influence the financial market, as the company JPMorgan, which works with an algorithm that determines the effect ex-President Donald Trump's tweets may have on the economy (Berger, I. W., 2018).

Another positive aspect of AI regarding the economies is the possibility to track the company's demand and supply changes to mitigate or event to help in preventing the impact of some economic downturns or changes (The Wall Street Journal, 2018). To add, the research showed that 45% of total economic gains by 2030 will come from product innovation, personalization, and enhancements, which is and will stimulate consumer demand. With AI application we can have greater product variety, increased personalization of products and services offers as well as higher attractiveness and affordability (PWC, 2017-2021). One of the most important economic risks of AI is the downgrade of the companies that are slow to adopt AI since they will start losing their competitiveness. For instance, brick-and-mortar stores are closing as the economy becomes increasingly digitalized (Cho, R., 2018).

3.4.**SWOT ANALYSIS OF AI**

In the survey published in the article 'Impact of Artificial intelligence in the hospitality Industry' regarding the customers' attitude towards the AI vs. human touch in January 2020, 26.9% of the participants believe the chance human employees deliver bad service to customers in hotels is higher than that of AI. Furthermore, 63.8% of participants believe that AI helps shorten waiting time for services, while 42.3% believe AI maximizes the hygiene and cleanliness of hotel properties. To add, only 24.3% of the participants believe AI works more effectively than humans, but 79.6% believe applying AI is a modern trend to follow. Therefore, the main problem is the customers' trust in the AI and the perception that humans can do some tasks better (Bisoi, S.K., Roy, M., and Samal, A., 2020).

Some of the advantages that AI can bring are the fact that it does not get tiring, AI is a rational decision-maker, it is quite suitable to be applied for repetitive tasks, it is widely helpful in medical applications, etc. Besides the above-mentioned advantages, the main thing that worries many is the high cost of the implementation, it cannot replicate humans fully, since humans possess emotions and moral values. Moreover, often in AI there is no improvement with an experience like there is with humans, and creativity is not the main thing for AI, while creativity is a part of humans' life, and something that keeps us motivated, inspired, and going. Another great disadvantage of AI is that if we apply too much of it and it forms of robots, it can highly affect the unemployment rate since we can easily fire humans to decrease the costs. Therefore, there is a thin line between AI helping society and potentially making chaos (Chaitanya, N. K., 2020).

S	W
1. Decrease in tasks 2. Hygiene and cleanliness 3. Great tool for strategic planning and management 4. Accurate and prompt diagnostics 5. Reduction in Human error 6. Takes risks instead of humans 7. Available 24/7, tireless, faster. 8. Time-saving 9. Increase workplace productivity 10. Adopted in many industries 11. Better quality of life 12. Medical application 13. No emotions	1. Trust issues 2. Governments are slow on the uptake 3. It can be expensive to adopt 4. It can be hard for employees to understand and work with AI devices 5. It can make human unproductive or lazy 6. Unemployment problems 7. No emotions 8. Lack of creativity 9. Does not improve with experience 10. Lack of personal connections 11. Out of the box thinking 12. Can be hacked, data can be lost
O	T
1. Combining AI with newer forms of tech 2. It can help with people with disabilities or elderly 3. Reducing language/cultural barriers 4. Less repetitive tasks for employees 5. More automation 6. Efficiency and effectiveness benefits 7. Exponential technological advancement 8. Intrusion detection 9. Manufacturing 10. Sustainability and global warming problem solving 11. Financial trading 12. Detecting & managing security intrusion	1. Chance to outsmart humans 2. Loss of jobs/employability 3. Loss of control 4. Safety and security risks 5. Data theft 6. Distortion of competition 7. Transparency challenges 8. Liability problems: who is responsible for potential damage? 9. Underuse or overuse of AI 10. Negative impact on the environment 11. Channing society: human touch, our social needs, and skills. 12. Environmental impact

Source: Belmina Bajrovic, 2021.

3.5. LIST OF AI TOOLS USED IN TOURISM AND TRAVEL INDUSTRY, for summary table, see appendix E.

3.5.1. CHATBOTS/VIRTUAL ASSISTANTS

Chatbots or virtual assistants/agents are software programs that are created to assist customers by spoken or written communication, answering questions, and offering solutions to problems (Expert AI, 2020). From the consumers' side, chatbots are often described as one of the most advanced AI tools, while from the technological side it represents software created for answering questions (Expert, AI.2020). The first chatbot called Eliza appeared in 1966, which make sit older than the Internet itself, but it was not allowed to be put on Messenger until 2016 when Facebook allowed it and created an absolute boom (Zaboj, D., 2020). As a market, it is expected to reach 1.25$ billion by 2025 with a positive customer view on it. From 2018, chatbots became highly accepted and founded to be trustworthy and effective for solving minor issues. Specifically, compared to 2018, in 2019 the number of consumers who were willing to engage with chatbots increased by 50% (Forbes, 2019). Forbes (2019) published that 71% of consumers say they are satisfied with their smartphone voice assistants like Siri. 74% say they use virtual assistants while buying or informing, and they explain how they notice a reduction in waiting time of more than 5 minutes. By 2022 it is predicted that 70% of consumers will replace their visits to the stores with their voice assistants. To add, 74% of users prefer chatbots over human assistants while looking for some simple answers (PSFK, 2020). What is more, 64% of consumers stated that 24/7 service is the most useful chatbot characteristic, since it is something that a human cannot do (Kinight, C., 2019). However, 23% of consumers still prefer human interaction over chatbots, especially when there are complex issues to solve, which indicates that people do not trust AI when there is a more serious situation (American Express, 2021). Nowadays we are surrounded by chatbots every day since they are used as a helpful tool on many websites, no matter with which industry we are dealing. Often if we enter the website to search for some information, a chatbot will pop up asking if we need any help. Sometimes the chatbot can also have a name given and have a short introduction about itself. With the development of AI speech and text-based assistants, the way of how are customers interacting with the brands changed. In 2018 more than two-thirds of Americans said that they feel comfortable using the chatbots and that they feel they contribute to the online experience quality (ChatBot, 2020).

Since the adoption of new technologies is connected with the consumers' personalities, the consumers that will easier accept chatbots and find them fun and helpful are those who are younger and more open-minded, like Millennials and Gen Z. Gen Z were among the earliest adopters of chatbots since they prefer this easy and quick engaging method of communication (Hostcomm, 2020). Also, the connection between using chatbots and consumers is the smartphones as well. Therefore, since Gen Z is often described as 'Smartphone generation', the main goal is to get fast access to data and information. When it comes to Millennials, 60% of them have used them, and 70% reported a positive experience. (Arnold, A., 2018). Furthermore, from the managers' perspective, 57% of executives said that chatbots bring significant ROI with minimal effort. They also believe that in the future chatbots will enhance employee productivity by 61% and improve the ability to handle clients' queries by 60% (Accenture, 2018). It is not inevitable that chatbots are here to stay and grow in the future, therefore companies must determine where and how to use them for their specific needs, to set a realistic expectation for returns, and to figure out the best way to get them installed and accepted.

3.5.2. **SELF-SERVICE TECHNOLOGY** (ATM, self-service ordering panels, self-service check-in, check-out kiosks, self-service informative machines).

Self-service technologies (SST) allow customers to get a service without the need for a human assistant or help. Some of the examples of SSTs are already well established on the markets worldwide (Carreirao, P., 2019). The main goal of creating self-service devices is to make tasks faster, convenient, more accurate, and sometimes more fun. Some of our everyday tasks we can easily do on our own, therefore with the invention of self-service technologies, previously complicated services with long queues are not simplified and can be done at any time, without prior reservations and waiting. This market is quite young, but it is definitely in the growing phase, especially as a consequence of the COVID-19 virus. Back in 2019, the global self-service technology market size was valued at $28.3 billion and it is predicted to have a CAGR of 6.7% from 2020 to 2027. The integration of biometric security services in some of the self-service technologies is expected to increase the growth of the industry (Grand View Research, 2020). Some of the earliest and most popular examples of self-service are Automatic Telling Machines, or **ATMs.** The first ATM was introduced in 1967 in the UK. This machine affords better availability, faster transactions, and a secure system at any time (Lamasa Tech, 2020). Currently, there are over 3.5 million ATMs in use all over the world (Kagan, J., 2020), and 40% of customers use an ATM 8-10 times a month (NationalCash, 2017).

Therefore, ATMs are now an old story, something people are used to, something people prefer and use every day, and something it is proven to be trustworthy and secure. Based on the products in this industry, the ATM segment had the biggest revenue share of 51.6% in 2019 (Grand View Research, 2020). Another example **is self-service kiosks**, which can be used in different industries and for a variety of purposes, like transportation, traveling, hospitality, food and beverage, medicine, etc. The self-service kiosk can be used for issuing tickets on the train stations, offering information as in the shopping mall, ordering food like in McDonald's, etc. In hospitality, self-service kiosks can be used in restaurants to check the menus, working hours, and tables available. It can also be used as self-service check-in and check-out kiosks that work as an alternative to the conventional front desk service (Lacalle, E., 2021). The self-service kiosks received special attention and interest as COVID-19 appeared, to secure a safe service to the customers. The statistics show that 73% of around 530 shoppers said they prefer self-service technologies as self-checkout over the human assistants or front desk. Besides this, 70% of consumers expect the self-service option for information purposes, complaints and feedback. Self-service kiosks are considered to be in main hotel innovations over the last 16 years (King, R., 2019). The self-service kiosk can also be founded in the Airplane industry in the forms of automatic flight check-ins, border-control technologies, baggage checking, etc. Other self-service kiosks can also be post office self-service kiosks, self-ordering in restaurants, self-service gas stations, self-service parking, and others. The self-service global market size valued at $14.76 billion in 2018, and it was projected to have a CAGR of 9.1% from 2020 to 2027 (Allied Market Research, 2020). The third important application of self-service technologies is in the **Supermarkets with express self-checkout counters**. From the manager's side, this application reduces operating costs, increases sales and ROI and it also creates a competitive advantage over the competition. From the customer side, the waiting time is decreased, the orientation inside the supermarket is improved, the payments are simplifying and better organization of services (OEMkiosks, 2020). By the study done by Oliveira, A., Maia, M., Fonseca, M., and Moraes, M. (2020), the majority of the respondents preferred the use of SSTs in all the situations presents. The main reasons indicated for their preference are because they believe they are faster (58%), safer (44%), and easier to use (43%). The extrinsic motivators regarding gender were safety for women and user-friendly for men. Self-service technologies are promising investments in the hospitality industry, but also other sectors. Based on the still current COVID-19 situation, which is present for over a year now, is it important to find the best way how to apply AI tools to support the safety and health of our guests, and provide them a secure stay and services.

3.5.3. BIOMETRIC AUTHENTICATION & IDENTIFICATION

Biometrics has been used as the most suitable means of identifying and authenticating individuals in a fast and secure way by the individuals' unique physical and behavioral characteristics (Thales Group, 2021). The identification by biometrics can include DNA matching, the shape of the ear, eye recognition, face recognition, fingerprint recognition, gait, hand geometry recognition, odor identity, typing recognition, voice identification, signature recognition, and others, (Biometrics Institute, 2021). Biometrics adds more security, convenience, and speed. In contexts of consumer service, biometrics ad a personalized experience to the guests and users. As well as other AI technologies and developments, Biometrics is experiencing growth during the current coronavirus situation. The size of the biometrics system market is predicted to grow at $33 billion by 2023, from which the facial recognition market is predicted to grow $8.93 billion by the end of 2022, with a CAGR of 19.68% (Amundsson, S., 2020). In 2016, facial recognition makes 40%, while face recognition makes 15% from total biometric types. Back in 2016, Biometrics was used only in the IT sector (19%), followed by Government, Finance, and Retail (German, R., & Barber, K.S., 2016). Biometrics is something very useful when it comes to online activities, from making a payment to taking an online exam. As more services can be done online, more fear from hacking or theft appeared. Therefore, having a balance between security and convenience is the best thing that biometrics offer. For instance, 73% of the respondents wanted to use biometrics for payment authentications in a visa study done in Europe (Amundsson, S., 2020), What is more, 90% of the business will be using biometric identification by 2020. Usage of biometrics is helpful with law enforcement and public security, so that each person can be identified at any time. Another example is border control, where we can use electronic passports which are biometric travel documents, which include two fingertips stored and a passport photo as identification. Electronic passports became very popular, since they save time, and are safer and more accurate. They do not demand human staff attending and checking each person, but an individual can do it for themselves. To add, over 1.2 billion e-passports were noted in 2020 (Thales Group, 2021). The biometric market is a growing one, and it is expected to grow by $50billon by 2024. One of the problems with biometrics are raising the questions of data security, but until the customers are inside EU countries, they are protected by the General Data Protection Regulations for EU members that came into force in 2018, which explains the customers' rights to be forgotten, the need for clear and affirmative consent, and lists severe penalties for inability to comply with these rules (European Parliament, 2016). Regarding the hospitality industry, biometrics can be a great way to improve customer satisfaction.

Hoteliers can use customers' biometrics to tot information about a guest when they are entering, so that they can greet him/her by their names before having to identify with passports. This is an example that can also create a feeling of personalization and advanced service. Another example of using biometrics in hospitality is for rapid check-in. Facial recognition check-ins are already active in some hotels in China, which allows customers to skip traditional formalities of checking in, and with this save time, have more privacy, and have a better feeling of personalization (Tam, W., 2020). With the whole COVID-19 situation, another good application of biometrics in hospitality is for easy and secure room access. By creating the option for guests to access the rooms by fingerprint or facial recognition, the managers save time needed to manage key card inventory, issues with broken cards, and human staff needed to assists (Tam, W., 2020). Insights from Oracle show that consumers are most willing to engage with new technologies when they feel they are in control of their experience, so they are responsible. (Lee, J., 2017). In this study 150 hotels were included, from which 72% believe that guest recognition by facial biometrics will be in use by 2022-2023. To add, 41% of hotel guests stated that they will be more likely to return to the hotel if they are recognized by an employee without having to give their name or ID before (Biometric Update, 2017). In the last few years, the consumers' needs and attitudes change drastically, wanting more personalization, and fast and safe service. 83% of 1000 participants from a study done by the State of Consumer Data Privacy in the U.S. and U.K. stated that they would be at least somewhat comfortable in using or storing biometric data by apps or devices. However, 79% showed their concerns about data privacy (Mascellino, A., 2021). According to IBM data three-fourths of young professionals are comfortable with biometric tools as a fingertip or facial recognition, while Millennials (25-40) showed the increased support for Biometric Authentication by Millennials. (Shick, S., 2018). Growth of biometrics usage is imminent, but what matters is to keep it as safe as possible, and present to the customers the benefits of adopting these tools.

3.5.4. **CONTACTLESS PAYMENTS**

Contactless payments are defined as a new way of making a secure purchase of a good/service by using your credit card with radio frequency identification (RFID) and near-field communication (NFC) technologies, or as we know it 'a tap'. By tapping a payment card, our mobile phones/smartwatches near the point-of-sale terminal we get fast and easy contactless payment (Kagan, J., 2020).

The possibility to pay by mobile phone or smartwatch is by payment apps such as Apple Pay, Google Pay, Samsung Pay (Kagan, J., 2020). When it comes to the market size of this amazing AI development, it was valued at $1,2 billion in 2019 and predicted to grow to $5,4 billion by 2027, therefore at a CAGR of 20.6% (Goswami, A., Borasi, P., Kumar, V., 2020). Based on device type, it is predicted that by 2027 smartphones and wearables will be one of the most growing segments, followed by pos terminals and smart cards. Moreover, the impact of COVID-19 on this industry is big, owing to the increase in use and adoption of contactless payment methods globally. Therefore, it is predicted that by 2027, the most growing industry using contactless payments will be Restaurants and Hotels, and Food and Groceries (Allied Marker Research, 2020). According to PYMNTS and PayPal survey done last year on 2,400 consumers, 57% reported that the contactless payment accepted their willingness to shop in certain shops positively, moreover, the results showed that consumers prefer contactless payment over traditional in-store payments such as cash, paper bills or anything that included physical contact (PYMNTS, 2021). Another study by Retail Customer Experience in 2020, showed that 74% of Americans use their phone to order and pay for their goods at least once a week, with 48% tapping the phone to make purchases even several times a week or more (Retail Customer Experience, 2020). The top three reasons for using contactless payments were stated as follows: 44% convenience, 18.6% ease of use, 18.3% to avoid in-store paying and contact. Consumers explain that they would visit stores more for 49% if they were tap-to-pay or self-checkout kiosks options. Furthermore, 58,5% of participants stated that would be more likely to support the brand if they offered contactless payments. During COVID-19, 41% of Americans paid less frequently with cash, but rather with credit cards or contactless payments. Overall, 77% of consumer stated their preference for contactless payments (Retail Customer Experience, 2020). COVID-19 had been a major factor in contactless technology development and has popularized and increased the awareness of its' advantages. The main goal of managers during the coronavirus is to find a way to minimize the physical contact and maintain the distance to prevent the potential spread of the virus. Besides contactless payments, hoteliers can also adopt contactless elevators that work with the gesture of the hands, so that customers do not have to touch the bottoms. There are also contactless menus in the restaurants, whereby moving the fingers in the air you can choose what you want from the menu, without touching the screen, the paper menu or talking with the waiter/tress. (HospitalityNet, 2020). Contactless payments are just one part of the contactless service that is being adopted through many hotels worldwide to ensure safe and secure service.

By contactless service not only do managers act by the COVID-19 regulations, but they can also save time, cut costs, make processes faster and easier, and create a more unique experience for our clients.

3.5.5. SMART ROOMS with VOICE CONTROL

The smart hotel room concept is one of the most important technology trends appearing in the hospitality industry. This AI application is quite new since it was developed and implemented just a few years ago, with the first famous example of smart rooms beginning in China, when the leading hotel group InterContinental Hotels Group, teamed up with Baidu, a Chinese tech company specializing in artificial intelligence to create a new personalized experience for their guests (Wong, M.H., 2018). A smart hotel room is defined as one that uses smart technologies and electronic gadgets controlled by the Internet of Things to provide a unique experience. Usually, the communication between the gadgets and guest happens with voice control and through the internet connection. With the application of smart rooms with voice control, there is an increase in personalization, since the guest can control different parameters inside the room like temperature, music, alarms, TV, windows, and similar, with their voices. Moreover, a characteristic of a smart room is to adapt the room itself. This means that a smart room will know when to decrease the temperature inside the room if it gets to a certain level inputted, or to turn on/off the lights or curtains when the guest comes or goes out of the room. This is directly connected with the improvement in sustainability since there are savings in electricity as well (HDL automation, 2021). The smart rooms can also be more efficient in saving water, or to reduce the staff needed to perform tasks that now be automated with new technologies (Imbardelli, P., 2019). The smart hospitality market is estimated to grow to $18.1 billion by 2021, at a CAGR of 25.8%. The main drivers of this market are the need for optimized guest experience management, revenue generation, lower operational costs, sustainability, and the application of IoT (Markets and Markets, 2017). The newest forms of smart rooms are those with implements voice recognition systems. For example, Kimpton's Alexis Hotel in Seattle, U.S., has Amazon's artificial intelligence-driven Echo devices, Alexa, installed in their guest rooms. Alexa can answer some questions that guests have, or offer them the list of the best restaurants/cafes around the hotel. These echo devices have more than 15,000 skills which can allow guests to request anything, from specific music to wake them up, the local weather report, their schedule and tasks, and similar (Global Business Travel, 2021). With the ability to adapt to anything by their desires, customers can feel more special and more at home.

Through the smart speaker, it is possible to be connected with entertainment devices, so that guests can turn on the TV or a special channel with their voices. The most beneficial thing about this AI tool is the fact that it creates a special treatment for each individual, but also offers faster guest service (Revfine, 2021). Voice control is integrated into the smart rooms allows devices like smartphones, smart speakers or hubs, smart TVs, and personal computers to understand and recognize human speech and to respond to the commands that are given. Alexa as an Amazon service is a mostly used tool for hospitality, but there are also devices like KLM's smart assistant which works on the same process (Revfine, 2021). Voice recognition is projected to have an important role in the hotel and restaurant industries. In the survey done by Oracle on 150 hotels and 702 consumers in the U.S., 59% of hotel guests believe that controlling their rooms with voice-controlled devices like Alexa would improve the guest experience. Moreover, the hotelier agreed to this, and 78% of them stated that they believe the application of voice-controlled systems inside hotel rooms will be widespread by 2025, from which 70% believe that voice recognition will be used for room service as well. Hoteliers believe that with the usage of this biometric, they can also collect customer feedback, which can help them for further improvements (Lee, J., 2017). The voice recognition market size itself is expected to reach $21.5 billion by 2024 at a CAGR of 19.18% (Markets and markets, 2019).

*3.6. **HOW ARE GENERATIONS INFLUENCING AI APPLICATIONS?***

3.6.1. UNDERSTANDING THE MARKET, CONNECTION BETWEEN TECHNOLOGY AND GENERATIONS.

Shifting needs and expectations of the customer are changing the hospitality business and how they interact with their customers. Millennials and Gen Z are the drivers of the major changes in customer behaviour, which leads to manager's changes in their services and way of interacting with the customers (Brown, E.,2019). The main thing when applying new systems or changing the strategies is understating our target markets and their needs. There could exist some trends in hospitality but if our target does not need it, then it is not necessary to be in step with that trend and apply it. Target marketing is often described as a customer-driven marketing strategy that provides the necessary skills needed to establish a relationship with customers (Kotler, Armstrong, 2008). In the case of applying AI innovations in hospitality, managers should be conscious of the specific need of the clients, and the clear purpose of the changes.

Since hospitality is the industry that is slower in AI adoption, based on the human touch connections with this business, it should be careful about where to apply AI. When analyzing the customers' overall satisfaction, we can notice a slight decrease going from 94.6 in 2019 to 92.5 percent in 2018. This is the main indicator that customers are increasing their standards, and want to see more new, innovative ways of serving (Brown, E., 2019). With the beginning of companies like Amazon, Airbnb, and Booking, the hotel sector was affected and changed. Now people demand higher service quality and better value for the money since more options are opened to them. When it comes to AI adoption within the generations, baby boomers do not understand AI as a helpful tool and prefer to have human agents. On the other hand, Gen Z and Millennials stated their preference for a search engine, virtual assistant, or FAQ help centre when it comes to resolving issues (Brown, E., 2019). Furthermore, the reports show that younger generations are more comfortable in general with AI application and usage, and they are more enthusiastic about contacting support over chat, 44%. We can see the usage of virtual assistants each day, and how much help they give. The simplest example is the help on Just Eat or other delivering applications, wherein one step, just by providing your order number, you can get help and information needed. (Brown, E., 2019).

3.6.2. ***GENERATION Z***

With changes in the generation, the changes in consumer's need happen, Gen Z is described as the one that is mostly into technology since this generation is the one after 1995 when the biggest bloom of technology happened. For this generation, it is said that is good in social networks, digital natives, that they like uniqueness, communication, and similar (McKinsey, 2018). Generation Z is truly becoming important with their unique experience need, new beliefs, and influential behaviour. This generation has a low brand trust since they do not be talked about, they prefer investing in experiences than in material goods (Retail Customer Experience, 2020). This generation is also important to consider as an important market segment since they are very socially/digitally powerful. In a matter of seconds, they can post or share something about our company that can ruin the reputation, and they also believe in the word of mouth. By identifying the true wants of this generation, the hoteliers can apply the correct technologies that would support the customer service quality. Younger people, like those belonging to Gen Z, have become a strong influence on consumers of all ages and different incomes, and they also influence the way those people consume and behave towards a brand/company (McKinsey, 2018).

The useful characteristics to be aware of from this generation is that they are truth seekers. They like individual expression, and they do not like the traditional way of doing business, and they avoid labels. The hoteliers should be aware of three main implications of this generation: they see consumption as access rather than possession, they see consumption as an expression of individual identity, as well as a matter of ethical concern (Francis, T., Hoefel, F., 2018). Knowing the generation's preference can help managers create an AI-supported environment that will fulfil the needs and wants of their targeted market; such as the personalization factor with Gen Z.

3.6.3. ***GENERATION Y-MILLENIALS***

Besides the Generation Z, the biggest generation is Gen Y or Millennials, which includes people in the age range (25-40). Gen Y is an important segment since they entered the workforce and businesses and now have the biggest income (Greenleigh, I., 2014). Gen Y usually have higher levels of education, and are interested in exploring new cultures and lifestyles. They are also described to be 'open-minded' (Hussain, S., 2017). It is necessary to know what is your segment market to create and adapt your hotel's strategy. From pricing to offers, it will depend on the group of people to whom you want to sell your services. It is said for Millennials that 'having a virtual world of information at their fingertips has made Gen Y the impost impatiens, advertising sceptic, buyer-aware public we have ever known. For them, corporate reputation and brand are less important than peer recommendations and viral forms of marketing. Price is generally secondary over convenience', said Agarwal, G., (2009).

From the survey done with the millennials regarding if they prefer in-person services or online services, there was some interesting information gathered. Firstly, when wanting to pay a bill, ask for directions or recommendations, roughly 40% of the respondents answered that they would prefer to have in-person contact. When it comes to fulfilling more technical tasks like requesting a wake-up call, they did not care much, and the majority stated that in this case, they would not feel the need to have in-person contact, but that they could do it via mobile apps or automatic alarms/telephones. When it comes to ordering room service, 42% stated they would use a telephone or mobile app, meaning that for room service people do not care if there will be many human interactions (Greenleigh, I., 2014), Jonathan W. Witter, CCO from Hilton Hotels explained how guests are already looking for some more innovative and interesting technological experiences in the hotels.

At Hilton Hotels, they implemented the Connected Room platform, which is a perfect example of how we can embed AI in the hospitality business to increase customer satisfaction. With Connected Rooms, the guests are allowed to personalize their room in terms of lighting, temperatures, artwork in the guestrooms, and similar. Generation Y is becoming a larger segment, and it is becoming a major segment to target in the hotel industry. Millennials are hyper-social, and they are described to be very attached to mobile phones and social media (Greenleigh, I., 2014). Some of the characteristics of gen Y is that they are technologically dependent, always online, love personal travel experience, and seekers for something extra, they enjoy instant gratification as emails and texting which are primary means of communication for gen Y, they prefer modern structures and art and are well-traveled (Hussain, S., 2017). There are also some of the expectations of Gen Y from hotels that can be listed, such as the variety of food 24/7, self-service check-in/check-out, hotels with individual personalities, multi-use lobbies, health and fitness facilities, and similar. (Hussain, S, 2017).

3.7. ***WHAT IS THE IMPACT OF COVID-19 ON THE HOSPITALITY INDUSTRY?***

Back in 2018, research showed that 95% of the respondents want to pass routine tasks to AI, but only half of them trust it (Medium.com, 2018). Here we can see how at that time customers still haven't had full trust when it comes to AI. As we can assume, the biggest challenges with AI are the trust and loss of identity, but here is the point where we raise the question if this period of coronavirus is the perfect one to gain customers' trust in AI and use this situation to modernize, digitalize and use automation. AI is for sure our future, the key point is just the time when it will be applied throughout the whole hospitality field, and the question of when it will be the best to start redesigning with the AI application regarding the problems of human trust attitudes toward AI. AI in this way would not be used in terms of cost efficiency, skills, financial frauds in hospitality but to increase the perception of safety in the consumers' eyes and create higher trust than with humans. Besides these challenges, Ivanov S., Seyitoglu F., Markova M. (2020) explained in their paper that AI implementation in hotels highly depends on the country and its' technological developments and interests. Moreover, from the managers' side another drag could be the cost of the application, since in this period of the financial crisis, hotels being forced to close or bankrupt, it could be hard to invest in such a big change. From the employers' side, it could be seen as ethically inappropriate, since a lot of people in the hotels already lost their jobs, and the application of AI could point out the further potential job losses.

What is more, the overall application of AI in the tourism and hospitality industry in the time of COVID-19 was quick to replace the front desk tasks by introducing a self-service kiosk. Still, the implementation of higher AI devices or robots to change human contact is slow or limited, since managers still believe that tourism is a 'people's business' (Ivanov S., Seyitoglu F., Markova M., 2020). Will the impact of covid-19 be that strong to change this belief in this sector? We can already see and recognize some of the changes done when it comes to hospitality. For instance, as a Marriot Bonvoy member, you can use the app to order dinner to your room, LIVE chat with associates, to bring amenities to your door, all without human interactions (Marriott.com, 2020). Some of the other already applied ways to fight the coronavirus and create a safe environment inside the hotels are chemical-free ozone cleaning systems, Curis foggers to decontaminate air, UV lights, digital menus, bar codes, mobile applications for a different kind of service, and similar (O'Shea-Evans, K. 2020). Folmer K. and Bhatt J. (2020) explained for abcnews.com how the application of AI could be beneficial for hospitality recovery. They named UV light robots and lamps as two currently interesting things that could help protect against coronavirus. "The robot creates a high-energy pulse of UV light that gets into the DNA and the RNA, the genetic material of viruses and bacteria, and makes it so they can't replicate anymore," said Dr. Mark Stibich, Xenex's founder and Chief Science Officer (Folmer K. and Bhatt J. 2020). There are a lot of medically proven AI applications that could reduce the possibility of getting infected (Curry, D. 2020). It is not questionable that the AI could be seen as a great opportunity that the managers should seize to enhance the tourist experience (Zhanjing Z., Chen P., and Lew A., 2020). Since even now, at the beginning of 2021, is still not fully safe to travel, and it is being predicted that will not be safe and easy to travel at least for the next 6 months, changes in strategies and adoption of automation, AI, and new technologies with less human touch are all necessary. Hospitality is known as a 'high touch' industry will need to change to 'high tech' (Zhanjing Z., Chen P., and Lew A., 2020.). According to the article published by Howard A. and Bornstein J. (2020), the consumers' previous approach towards AI and their perception regarding the lack of trust and increase in fear could be affected highly after coronavirus. Besides, one of the previously noted negative feelings about AI is anxiety, which was experienced when encountered with robots (Nomura et al., 2006; 2008). Even after vaccines and the pandemic retreats, it is hard to imagine our lives, especially travel, tourism, and hospitality sectors, returning exactly to how it was until the start of 2020. Before COVID-19, most people had some level of apprehension towards AI, since they found it unnecessary in hospitality (people's business).

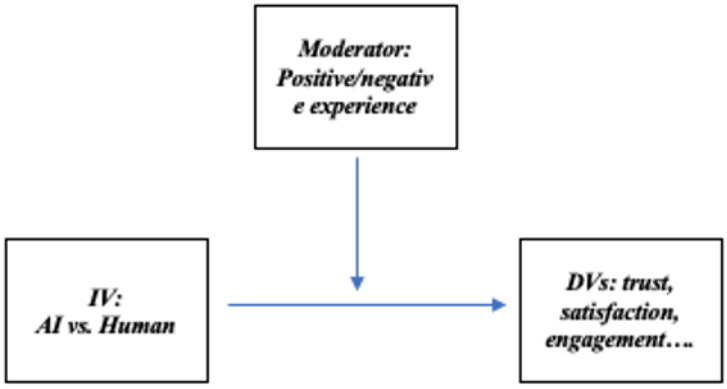
However, ever since it has been proven how much AI can help stop the spread of COVID-19, we can see this attitude being changed (Howard A. & Bornstein J., 2020). During COVID-19 lockdowns there was a noticeable increase in comfort with digital technologies and AI usage. People did not only show a positive attitude but their appetite for them as well (Deloitte, 2020). Furthermore, consumers may be slow to return to old habits and crowds, therefore creating new ways of working and offering new customer experiences will be essential for the recovery and survival of hospitality. As explained in Deloitte, 2020 article regarding 'The future of hospitality, trust will be essential. As by BBC.com article written by Thomas Z. (2020), "People usually say they want a human element to their interactions but Covid-19 has changed that," says Martin Ford, a futurist who has written about the way's robots will be integrated into the economy in the coming decades. Also, CEDEFOP (2020) believes that AI adoption is being part of the EU's new reality in a post-coronavirus world. Demaitre E. (2020) wrote for therobotreport.com that the coronavirus pandemic is changing consumer comfort with AI. By their research, 21% indicated that they are now more comfortable having full contact with AI agents, while in the previous studies almost 90% preferred to deal with human representatives. Ruel H. & Njoku E. (2020) wrote for emerald.com insights regarding AI redefining the hospitality industry. AI application in this period could redesign structures and processes in the hospitality (Ivanov and Webster, 2017; OECD, 2018; Cain et al., 2019; Prentice et al., 2020), which can lead to competitive differentiation for hotel businesses, much needed in this time (Pizam and Shani, 2009; Bellou and Andronikidis, 2009; Jooss, 2018; Zlatanov and Popesku, 2019).

IV. CHAPTER THREE

HYPOTHESIS AND METHODS:

According to the thesis title: ***The evaluation of customers' attitudes and preferences in AI vs. Human hotel service scenarios based on the type of experience*****,** this study aims to try and test the relationships between different AI vs. Human service experiences, which will be manipulated to see the changes in reactions between AI and Human service scenarios. In this case, our IV will be AI vs. Human. The moderato will be the positive/negative experience, and as a consequence we will have a 2 (Ai vs. Human) x 2 (positive vs. negative) factorial design of the experiment. Our study will contain eight DVs that we want to test to see if any of those are significant. DVs are trust, satisfaction, engagement, loyalty, emotions, blame, perceived competence, fear of contamination. To make it more visually clear, a scheme of moderation effect was presented below.

Figure 1. Moderation



*2.1.**HYPOTHESIS DEVELOPMENT***

First hypothesis I want to make is the general preference between AI vs. Human service in the hospitality. This will be test through the DVs, meaning that we will compare the means of some of the most appropriate DVs in AI vs. Human service scenarios. Since self-service check-in desk is a kind of AI technologies responsible for repetitive tasks regarding the check-in/check-out process, we can understand how it does not need much human interactions or empathy/emotions that only human receptionist can give to the clients.

The growth of self-service kiosks market has been predicted to go up to 6.7% in the next 6 years (Grand View Research, 2020). Also, in the research done in 2019, 73% out of 530 shoppers explained how they prefer self-service kiosks (King, R. 2019). The main reasons for this belief are that clients think they are faster (58%), safer (44%), and easier to use (43%), (Oliveira, A., Maia, M., Fonseca, M., and Moraes, M. 2020). This is why it is supposed that in the positive experience, people will prefer more self-service check in desk, since they also make them feel safe and protected, and can offer secure service (NationalCash, 2017). From this we can suppose out first hypothesis:

H1: Self-service check in desk will be more preferred among guests than human receptionist.

The second thing I would like to test is the type of experience and its' influence on consumer behavior in AI vs. Human service scenarios. We can suppose that in the positive scenarios for both options we will have a positive relationship with the IDVs like trust, satisfaction, engagement, and loyalty since this is something that logically follows a positive experience. However, it is important to analyze what would happen in the negative scenarios for both AI and Human service experience. When negative experiences happen, how do we decide who is to blame and what can influence that? This is connected with moral psychology which explains human thought and behavior in ethical scenarios (Stanford Encyclopaedia of Philosophy, 2006). Moral judgments are often described as evaluations of good versus bad of the certain actions or person's character (Haidt, J. 2001). The central element of moral psychology is blame, which Beardsley, E.L. (1970) said 'had power and poignancy for human life unparalleled by moral concepts. The activation of blame is a consequence of a certain stimulus we experience, which is aided by certain emotions as well. Blame is also considered to be a social regulation since its' primary function is to publicly regulate the behaviors. Moreover, negative emotions are strongly connected with blame, since blame judgments are often followed by anger or frustration, which are easily revoked by a feeling of injustice (Wranik, T. and Scherer, K., 2010). When it comes to judging technologies, it is often difficult to say who is the one to blame, is it the programmers, manufacturers, AI itself, or others? To add, perceived blame will be more likely assigned to technologies vs. Humans, since humans will be easier to other humans, and make quicker judgments towards the AI (Atabekov, A., & Yastrebov, O., 2018). From this we can create our second hypothesis:

H2: In negative experience, human service will be preferred, since people blame more machines.

Furthermore, I would like to investigate if the fear of contamination will have an effect on the customer's preference and their behavior regarding AI vs. Human service scenarios. We can suppose that the fear of contamination in clients can have an impact on the relationship between trust and the Self-service check-in desk since if can switch the preference from Human service to AI service just because people fear being infected with COVID-19. According to Mertens G., Gerritsen, L., Duijndam, S., Salemink, E., and Engelhard, I.M., (2020) article on 'Fear of the coronavirus' topic, health anxiety, worry, and safety behaviors were related to increased fear of getting contaminated by the current coronavirus. To add, there was a noticeable human distrust and social disruption noted from the beginning of COVID-19 (European Parliament, 2020). From this, we can argue how the fear of contamination can lead to changes in preference between AI and Human service in the hospitality sector. We can suppose our third hypothesis:

H3: The relationship between AI/human and DV is influenced (moderated) by fear of contamination. In particular for people high in fear of contamination the presence of AI/human will generate a higher/lower DV.

METHODS

To investigate the above-mentioned issues, I plan to use the experimental design as a research method, which is particularly appropriate to empirically test the cause-effect relationship between dependent and independent variables. More specifically, the idea is to collect data through experiments aimed at monitoring in which scenarios will positive/negative experience influence the relationship between AI (vs human) and final outputs, like connections with trust, and the influence of customer experience on the engagement, loyalty, satisfaction, but also blame, emotions, perceived competence, and contamination. In this case, the moderator will be the type of experience (positive vs. negative) since we can manipulate it by showing the situation in which AI/humans delivered a good/bad service for hospitality and check the best combination. IV is AI vs human touch and DVs are trust, satisfaction, engagement, loyalty, blame, perceived competence, perceived contamination, emotions. The research design will be conclusive and causal. I will make 2 (positive/negative experience) x 2(AI vs. Human) between-subject design, which means I will have four scenarios testing eight dependent variables: trust, perceived competence, satisfaction, loyalty, blame, perceived contamination, engagement, and emotions evoked. The relationship between IDV and DV will be affected by positive/negative experiences, on which coronavirus can affect as well. This study will be particularly interesting to do now since we can see if the participants' attitudes towards the AI will be changes because of COVID-19. In this way we will be able to answer the research question of this study, which is:

Research question: When and under what circumstances experience influence the customers' preference between Human touch vs. AI?

The data collection method was based on pretesting and the main study. It was all based on electronic surveys created by Qualtrics. Essentially, the research aimed to understand how the experience can affect consumers' behavior and attitudes toward AI and Human service in the hotel industry. In the pretesting, the aim was to collect the data about the most preferable AI tools out of the five offered. Data about each AI tool's familiarity and preference was gathered. After the pretesting, the self-service check-in desk was chosen as the most appropriate example of AI tools to use in the scenarios against Human receptionists. In the main study, 4 different scenarios were created with short stories and backup pictures as a stimulus, with positive/negative AI experience and positive/negative receptionist experience.

The design was a between-subject with each of the respondents being exposed to just one of the conditions: positive AI experience, positive receptionist experience, negative AI experience, or negative receptionist experience. After being showed the stimulus, each respondent was asked about trust, satisfaction, engagement, loyalty, perceived blame, perceived competence, contamination, and positive/negative emotions as the result of positive/negative experience scenarios. The aim was also to measure if guests will be less likely to blame humans for negative experiences than the AI desk or vice versa. In the end, several demographics, including sex, age, and country of residence were collected. All the responses obtained were anonymous and not traceable to the respondents; no one was provided a monetary incentive to participate.

Full pretesting and main study look and questions can be found in Appendixes F and G.

Stimuli building

Stimuli were presented with the picture of self-service check-in desk vs. Human receptionists. For each condition, there was a different story written corresponding to the type of experience, negative vs. Positive. The pictures were modified so that each contains the same person (a woman), to keep the same exposure, and to make images comparable. To make conditions consistent, only one person was presented, so that the participants can imagine themselves.

Purpose & design

The main purpose of pre-testing was to investigate which is the best AI tool to use as an example in the main study. The goal was to test the familiarity and if the customers want to see more of that AI device in the future. Around 40 answers were collected since all participants were exposed to all questions. In the main study, I collected 120 responses, resulting in 40 responses for each of four scenarios, and each participant was exposed to only one scenario. The stimulus remained visible during all the time in which respondents were answering the questions, aimed at discovering the customers' attitudes towards AI vs. Human hotel service based on manipulated situations.

Scales of measurement

For all questions, participants were presented with certain statements which were previously used in the research papers, therefore all the scales are pre-validated. The participants had to mark the level of agreement/disagreement. The scale used was the Likert scale, containing 7 points, from strongly disagree to strongly agree, therefore it is an interval scale since it also has equal intervals between the points on the scale.

1. Trust scale was used from the paper by **Adams, B.D., and Chung-Yan, G., 2004. Creating a Measure of Trust in Small Military Teams.**

3 item scale was created from this, and the statements used in our study were the following:

a) I trust the X.
b) I feel safe using X.
c) I feel my privacy and health are protected in this way.

2. Satisfaction scale was built based on the research paper by **Willson, J., 2007. Dissertation An examination of the relationships of interaction, learner styles, and course content on student satisfaction and outcomes in online learning.**

The number of items created were four, and they were as following:

a) I think this experience was beneficial.
b) I would use X if given opportunity.
c) X met my needs as a customer.
d) I am happy with how X handled the task.

3. Engagement scale was created by the research paper by **Orozco, F.C.E., & Arooyo, J.C., 2017 + (Salanova, M., et al., 2015; Schaufeli, W.B., et al., 2002.**) In the study their items were used.

The items used were as following and there were three of them in total:

a) I would continue using X.
b) I believe X cares for me as a customer.
c) My relationship with X had made me feel appreciated and heard.

4. Loyalty scale was build based on the survey from the research paper written by **Francisca Cecilia Encinas Orozco and Judith Cavazos Arroyo, 2017. Students' loyalty in higher education: the roles of affective commitment, service co-creation and engagement.**

The items used in our study were as following:

a) I would recommend this hotel.
b) I would encourage friends and family to book this hotel.
c) I would consider returning to this hotel.

5. Perceived Competence was a scale that was used from the research paper done by **Silon, Ellen L., and Harter, S. 1985**., **Matthew K. X. J. Pan, E. Croft, G., 2018.**

The items used in our study were as following, and there were three of them in total:

a) X is reliable.
b) X is competent.
c) X is (cap)able.

6. Blame scale was used from the paper done by ***Awad et al. 2018. Blaming automated vehicles in difficult situations.*** The items used were as following, and there were two of them in total:
   a) X is the one responsible for this experience.
   b) X caused this experience.

7. ***Fear of contamination:*** The items were taken from this research paper: **Brand, J., McKay, D., Wheaton, M. G., and Abramowitz, J. S. (2013). The relationship between obsessive compulsive beliefs and symptoms, anxiety and disgust sensitivity, and Swine Flu fears.** ***J. Obsessive Compuls. Relat. Disord.***

The items used from this paper in our study were as following:

a) I am concerned about Coronavirus.
b) The threat of Coronavirus influenced my decision to be around people.
c) Coronavirus influenced my travel plans.

V. CHAPTER FOUR

ANALYSIS OF DATA IN SPSS

Sample

Before doing the demographics, it was needed to clear the data and fix/recode some answers. For instance, regarding the country of origin, the question was created in a form of a blank space where the participants needed to write down their country of origin. Because of this, the name of the same country was written in different ways, using abbreviations, using CAPS, and others, making it all look like different countries (Bosnia and Herzegovina, BiH, Bosnia, Bosna, Bih, BH, etc.). In order to have valid demographics, it was needed to apply the recoding for the names of countries. This was done by changing the names with numbers. Therefore, 1= BiH, 2=Croatia, 3=Italy, and 4 is Others. From 124 observations, we can analyze that 87 were men and 28 were women, out of which 70.2% were in the age range 18-24. 60% of the participants were from Bosnia and Herzegovina, followed by 21.8% from Italy.

Demographics

Demographics	**n**	**%**
Age		
18-24	87	70.2
25-40	28	22.6
41-56+	5	4.0
n/a	4	3.2
Total	**124**	**100.0**
Gender		
Male	87	70.2
Female	28	22.6
Prefer not to say	5	4.0
n/a	4	3.2
Total	**124**	**100.0**
Country of origin		
BiH	75	60.5
Croatia	5	4.0
Italy	27	21.8
Other	13	10.5
n/a	4	3.2
Total	**124**	**100.0**

DATA EXAMINATION

To prepare the dataset for analysis, data cleaning and data examination were first performed. The following steps have been conducted:

- Since the answers for the different scenarios were saved in separate columns, concatenation was performed. Hence, the columns of the same items were concatenated, and the empty columns were removed.
- In the second step, a check of the scales' reliability was performed.
- After that, the aggregation of scales was performed. We calculated new variables by calculating the mean value of the indicator. These variables are saved in a data set called trust, competence, satisfaction, engagement, loyalty, blame, emotions, contamination
- An "Agent" variable was created (where 1 - AI experience; 2 - Human experience).
- The variable "Experience" was created (1 - positive; 2 - negative)
- Variable “NegativeExperience” was created (1 - AI negative experience; 2 – Human negative experience).
- The variable “Fear” was created, where Likert was recoded from 1-4 in 1 and from 4.01-7 in 2 (1 - those who are not afraid of contamination and 2 - those who are afraid of contamination).

DATA CLEANING

Before testing the hypothesis, it is necessary to do testing and analysis of collected data. According to Hair, J.F. at al. (2010), in this phase it is necessary to do the following:

1. Find the missing values and remove them
2. Identify the outliers

MISSING VALUE

In this phase it was determined that from 254 observations recorded as the sample, 130 participants did not fulfil the survey, just opened the scenarios and then quit the survey. This is something that could happen often, and it is only seen after the data has been opened in the SPSS. Regarding this, 130 empty observations were removed from the sample. Hence, the final sample consisted of 124 observations. The analysis of missing values was not applied, since all the fields in the survey were marked to be required to fulfill before going on to the next

question. In this way, we protected our survey from having missing answers, unfulfilled answers, or inconsistent work.

IDENTIFYING THE OUTLIERS

For the needs of identifying the *outliers*, which represent the observations with the combination of characteristics that are significantly different in comparison to other observations, it was needed to apply univariant and multivariant analysis of the collected data. Univariant analysis of identifying the outliers explores the distribution of observations for each variable and detects as outliers those observations which are outside the distribution (Hair, J.F., et al., 2010). Multivariant analysis of identifying the outliers implies the analysis of the multidimensional position of each of variables relative to some of the common points (Hair, J.F., et al., 2010), and it is possible to use Mahalanobis D^2 method of measuring the distance from each observation in multidimensional space relative to the center of average values of all observations, taking into account the value for each observation regardless the number of variables.

RELIABILITY OF SCALES

The reliability of scales implies the degree of consistency between more indicators of the one constructor factor. The reliability of scales can be applied in two ways: i) checking if "*item-to-total*" correlation is higher than 0,50 and "*inter-item*" correlation higher than 0,30; ii) using *Cronbach alpha* coefficient, which should be higher than 0,70. Below is done the check of scales reliability calculating Cronbach Alpha coefficients.

1. **Trust**

The scale consists of 3 items. The alpha coefficient for the three items for scale TRUST is .870, suggesting that the items have relatively high internal consistency.

Code	Item	Reliability Assessment - Cronbach Alpha
Trust_1	I trust the self-service check in desk.	0.870
Trust_2	I feel safe using the self-service check in desk.	
Trust_3	I believe my privacy and health are protected in this way.	

2. **Perceive competence**

Code	Item	Reliability Assessment - Cronbach Alpha
Perceive_competence_1	The self-service check in desk is reliable.	0.951
Perceive_competence_2	The self-service check in desk is competent.	
Perceive_competence_3	The self-service check-in desk is able.	

The alpha coefficient for the three items for scale 'Competence' is .951, suggesting that the items have relatively high internal consistency.

3. **Satisfaction**

Code	Item	Reliability Assessment - Cronbach Alpha
Satisfaction_1	I think this experience was beneficial.	0.933
Satisfaction_2	I would use self-service check indesk again if given opportunity.	
Satisfaction_3	Self-service checkin desk met my needs as a customer.	
Satisfaction_4	I am happy with how the self-service check in desk handled the tasks.	

The alpha coefficient for the four items for scale 'Satisfaction' is .933, suggesting that the items have relatively high internal consistency.

4. **Engagement**

Code	Item	Reliability Assessment - Cronbach Alpha
Engagement_1	I would continue using the self-service check indesks.	0.912
Engagement_2	I would use self-service check indesk again if given opportunity.	
Engagement_3	Self-service check-in desk met my needs as a customer.	

The alpha coefficient for the three items for scale 'Engagement' is .912, suggesting that the items have relatively high internal consistency.

5. **Loyalty**

Code	Item	Reliability Assessment - Cronbach Alpha
Loyalty_1	I would recommend this hotel.	0.982
Loyalty_2	I would encourage friends and family to book this hotel.	
Loyalty_3	I would consider returning to this hotel.	

The alpha coefficient for the three items for scale 'Loyalty' is .981, suggesting that the items have relatively high internal consistency.

6. **Blame**

Code	Item	Reliability Assessment - Cronbach Alpha
blame_1	The self-service check in desk is the one responsible for my experience.	0.853
blame_2	The self-service check in desk caused this experience.	

The alpha coefficient for the ttwo items for scale 'Blame' is .853, suggesting that the items have relatively high internal consistency.

7. Emotions

3 items were reversed codes. Hence, the results for these 3 items were recoded. The alpha coefficient for the five items for scale 'Emotions' is .939, suggesting that the items have relatively high internal consistency.

Code	Item	Reliability Assessment - Cronbach Alpha
emotions1	This experience made me feelfrustrated (R).	0.939
emotions2	This experience made me feelangy (R).	
emotions3	This experience made me feelanxious (R).	
emotions_4	This experience made me feelhappy.	
emotions_5	This experience made me feelrelaxed.	

8. Fear of Contamination

The alpha coefficient for the three items for scale 'Fear of Contamination' is .725, which is slightly above the 0.7. However, it still shows that the items have good internal consistency. After the step with reliability of scales, we can now continue with hypothesis testing. First, we have to do descriptive statistics in order to get the mean value for each item and check the differences.

Code	Item	Reliability Assessment - Cronbach Alpha
Fear_of_Contaminatio_1	I am concerned about Coronavirus.	0.725
Fear_of_Contaminatio_2	The threat of coronavirus influenced my decision to be around people.	
Fear_of_Contaminatio_3	Coronavirus influenced my travel plans.	

Descriptive statistics:

After the reliability of scales check, it was needed to check some descriptive statistics. Descriptive statistics were run for each of the item under each scale in order to check the means. The minimum value for items was one, while the maximum value was 7, and it was done on 124 observations/participants. We can conclude that all the items had high means, with Fear of contamination scale items having the highest. The third item for Fear of contamination had M=6.09, SD=1.14, which was the statement 'Coronavirus influenced my travel plans'. This measn that on the scale from 1-7, most of the people agreed with this statement. Since all items had means above 4, it means the data relativety distributed near the mean value. Standard deviation is a measure used to tell of how dispersed the dana is in relation to the mean. Low SD means dana are clustered around the means. A SD close to zero/1 indicates data points are close to the mean. In our case SD for all items were in the range from 1 to 2.

	N	Minimum	Maximum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
Trust_1	124	1	7	4.38	.174	1.936
Trust_2	124	1	7	4.60	.165	1.834
Trust_3	124	1	7	4.75	.146	1.631
Perceive_competence_1	124	1	7	4.18	.170	1.896
Perceive_competence_2	124	1	7	4.22	.165	1.842
Perceive_competence_3	124	1	7	4.31	.156	1.740
Satisfaction_1	124	1	7	4.37	.158	1.755
Satisfaction_2	124	1	7	4.65	.155	1.720
Satisfaction_3	124	1	7	4.15	.180	2.004
Satisfaction_4	124	1	7	4.18	.191	2.122
Engagement_1	124	1	7	4.53	.156	1.741
Engagement_2	124	1	7	4.36	.162	1.805
Engagement_3	124	1	7	4.07	.173	1.922
Loyalty_1	124	1	7	4.39	.160	1.779
Loyalty_2	124	1	7	4.31	.157	1.749
Loyalty_3	124	1	7	4.44	.158	1.764
blame_1	124	1	7	4.73	.134	1.494
blame_2	124	1	7	4.77	.131	1.455
emotions1	124	1	7	4.07	.169	1.879
emotions2	124	1	7	4.33	.173	1.928
emotions3	124	1	7	4.37	.157	1.746
emotions_4	124	1	7	3.72	.155	1.723
emotions_5	124	1	7	3.59	.155	1.725

Fear_of_Contaminatio_1	124	1	7	5.22	.121	1.347
Fear_of_Contaminatio_2	124	1	7	5.15	.119	1.323
Fear_of_Contaminatio_3	124	1	7	6.09	.102	1.141

The average mean for each scale (eight of them in total) was showed as well. In this case Contaminatio scale had the highest mean, M=5.48, SD=1.023, while the lowest was in Emotions scale M=4.02, SD=1.615. All other scales had mean above M=4.2, and average SD=1.5.

	N	Minimum	Maximum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
Trust	124	1	7	4.58	.143	1.596
Competence	124	1	7	4.23	.157	1.744
Satisfaction	124	1	7	4.34	.156	1.741
Engagement	124	1	7	4.32	.151	1.681
Loyalty	124	1	7	4.38	.156	1.733
Blame	124	1	7	4.75	.124	1.377
Emotions	124	1	7	4.02	.145	1.615
Contamination	124	1	7	5.48	.092	1.023
Valid N (listwise)	124					

Hypothesis testing

a) AI agents vs Human agents

H1: Self-service check in desk will be more preferred among guests than human receptionist.

The hypothesis concerned agent preference. However, since one respondent had the experience of only one agent, there could be no question about preferences. Therefore, we tied preferences to variables trust, competence, satisfaction, engagement, loyalty, blame, emotions, and contamination. In other words, the difference was tested for mentioned variables. This hypothesis was tested by doing a t-test and checking the difference between the responses of the respondents who experienced AI scenario (scenarios 1 and 2) and those who experienced scenario with human agents (scenarios 3 and 4).

Group Statistics					
	Agent	N	Mean	Std. Deviation	Std. Error Mean
Trust	AI	62	4.89	1.433	.182
	Human	62	4.27	1.698	.216
Competence	AI	62	4.51	1.490	.189
	Human	62	3.96	1.938	.246
Satisfaction	AI	62	4.65	1.478	.188
	Human	62	4.02	1.932	.245
Engagement	AI	62	4.46	1.475	.187
	Human	62	4.19	1.868	.237
Loyalty	AI	62	4.58	1.521	.193
	Human	62	4.18	1.913	.243
Blame	AI	62	4.82	1.232	.156
	Human	62	4.67	1.515	.192
Emotions	AI	62	4.15	1.554	.197
	Human	62	3.88	1.676	.213
Contamination	AI	62	5.61	1.012	.129
	Human	62	5.35	1.026	.130

The average means for all items were higher in AI than those in human receptionist service. For instance, in Trust for AI, M=4.89, SD=1.433, while in Trust for Human, M=4.27, SD=1.698. This indicates that participants prefer more AI than human, or at least, they gave better votes to AI in terms of trust, competence, satisfaction, engagament and loyalty.

Independent Samples Test									
	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Trust	3.275	.073	2.191	122	.030	.618	.282	.060	1.177
Compete.	9.878	.002	1.784	122	.077	.554	.310	-.061	1.168
Satisf.	13.995	.000	2.037	122	.044	.629	.309	.018	1.240
Engag.	6.761	.010	.889	122	.376	.269	.302	-.330	.867
Loyalty	5.413	.022	1.299	122	.196	.403	.310	-.211	1.018
Blame	4.109	.045	.618	122	.538	.153	.248	-.338	.644
Emotions	.814	.369	.933	122	.352	.271	.290	-.304	.846
Contam.	2.626	.108	1.410	122	.161	.258	.183	-.104	.620

The results show that there is no statistically significant difference in the level of engagement, loyalty, blame, emotions, and fear of contamination depending on the agent, since their mean difference were all lower than 0.4. However, there is a statistically significant difference in trust $t(122)=2.191$, $p<0.05$, competence $t(122)=1.784$, $p<0.1$, and satisfaction $t(122)=2.037$, $p<0.05$. Their mean difference was higher (.618, .554,.629).

Specifically, the mean values for all three variables were statistically significantly higher for the AI agent compared to the human agent. In other words, respondents expressed a higher level of trust, perceived competence, and satisfaction towards the AI agent than towards the human agent. If we tie preferences to satisfaction and trust, as well as perceived competence, then we can argue that **the first hypothesis is confirmed**. In other words, a self-service check-in desk is more trusted and perceived as more competent among guests than a human receptionist, and it causes greater satisfaction of guests (hence, more preferred).

The interaction of Experience and Agent

To deepen understanding of guests' perception of AI and human agents, a series of ANOVA tests were performed to test the differences in DV (trust, perceived competence, satisfaction, engagement, loyalty, blame, emotions, and fear of contamination) depending on the Agent (AI or human) and Experience (positive vs. negative).

a. TRUST as DV

Descriptive Statistics

Dependent Variable: Trust

Experience	Agent	Mean	Std. Deviation	N
Positive	AI	5.56	1.257	35
	Human	5.74	.797	27
	Total	5.64	1.077	62
Negative	AI	4.01	1.160	27
	Human	3.13	1.281	35
	Total	3.52	1.297	62
Total	AI	4.89	1.433	62
	Human	4.27	1.698	62
	Total	4.58	1.596	124

From the table above, we can conclude that the mean value for positive experience was higher for Human service, resulting in M=5.74, SD=.797, while M=5.56, SD=1.257 in AI. However, the difference is very slight, therefore we can say that customers had the same opinions about the service when put in positive scenario. However, in negative scenario, the higher mean had AI service, resulting in M=4.01, SD=1.160, while Human service was M=3.13, SD=1.281. This means that in negative scenario, people prefer more AI service, or at least they gave higher trust score to AI vs. Human service in negative scenario.

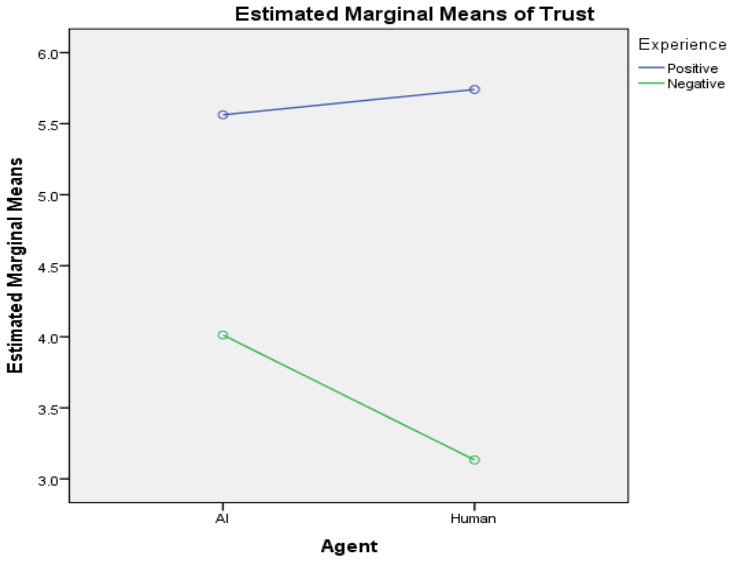
Tests of Between-Subjects Effects

Dependent Variable: Trust

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	152.072[a]	3	50.691	37.767	.000
Intercept	2593.725	1	2593.725	1932.448	.000
Experience	131.693	1	131.693	98.118	.000
Agent	3.736	1	3.736	2.784	.098
Experience * Agent	8.528	1	8.528	6.354	.013
Error	161.064	120	1.342		
Total	2911.889	124			
Corrected Total	313.135	123			

a. R Squared = .486 (Adjusted R Squared = .473)

The Experience results ($F(1)=98.118$, $p<0.001$), while Agent ($F(1)=2.784$, $p<.01$). Our interaction Experience*Agent is $F(1)=6.354$, $p<.013$, which shows that the interaction is statistically significant. The results show that 47.3% of the Trust variance was explained with agent and experience, i.e., there is a statistically significant difference in the level of trust depending on the AI or Human agent as well as the Experience (positive or negative). Those who have had a positive experience trust people agent more, while those who have had a negative experience trust AI agent more. In general, as expected, those with a positive experience have a higher level of trust comparing to those with negative experience (the blue line is well above the green).



b. PERCEIVED COMPETENCE as DV

Descriptive Statistics

Dependent Variable: Competence

Experience	Agent	Mean	Std. Deviation	N
Positive	AI	5.36	1.107	35
	Human	5.75	.894	27
	Total	5.53	1.030	62
Negative	AI	3.41	1.171	27
	Human	2.57	1.259	35
	Total	2.94	1.282	62
Total	AI	4.51	1.490	62
	Human	3.96	1.938	62
	Total	4.23	1.744	124

From the table above, we can conclude that the mean value for perceived competence in positive experience was higher for Human service, resulting in M=5.75, SD=.894, while M=5.36, SD=1.107 in AI. However, the difference is very slight, therefore we can say that customers had almost the same opinions about the service when put in positive scenario. However, in negative scenario, the higher mean had AI service, resulting in M=3.41, SD=1.171, while Human service was M=2.57, SD=1.259. This means that in negative scenario, people prefer more AI service, or at least they gave higher competence score to AI service in negative scenario.

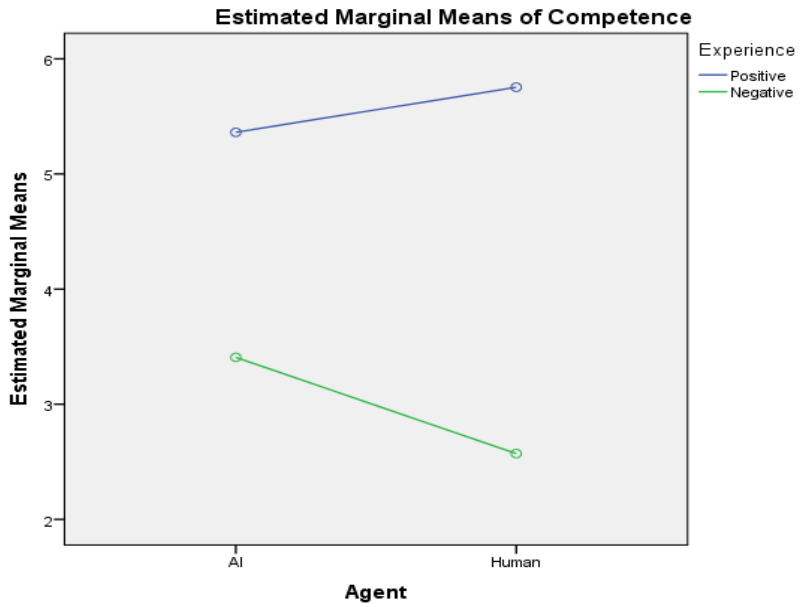
Tests of Between-Subjects Effects

Dependent Variable: Competence

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	222.025[a]	3	74.008	58.439	.000
Intercept	2226.839	1	2226.839	1758.368	.000
Experience	201.042	1	201.042	158.748	.000
Agent	1.508	1	1.508	1.191	.277
Experience * Agent	11.477	1	11.477	9.062	.003
Error	151.971	120	1.266		
Total	2596.778	124			
Corrected Total	373.996	123			

a. R Squared = .594 (Adjusted R Squared = .583)

The results show that 58.3% of the perceived Competence variance was explained with agent and experience, i.e., there is a statistically significant difference in the level of perceived competence depending on the Experience (positive or negative). Those who have had a positive experience (blue line) perceived humans as more competent, while those who have had a negative experience (green line) perceived AI agents as more competent. In general, as expected, those with a positive experience have a higher level of perceived competence of agents than those with negative experience (the blue line is well above the green).



c. SATISFACTION as DV

Descriptive Statistics

Dependent Variable: Satisfaction

Experience	Agent	Mean	Std. Deviation	N
Positive	AI	5.49	1.152	35
	Human	5.86	.722	27
	Total	5.65	.998	62
Negative	AI	3.57	1.115	27
	Human	2.61	1.245	35
	Total	3.03	1.276	62
Total	AI	4.65	1.478	62
	Human	4.02	1.932	62
	Total	4.34	1.741	124

From the table above, we can conclude that the mean value for satisfaction in positive experience was higher for Human service, resulting in M=5.86, SD=.722, while M=5.49, SD=1.152 in AI. However, the difference is very slight, therefore we can say that customers had almost the same opinions about the service when put in positive scenario. However, in negative scenario, the higher mean had AI service, resulting in M=3.57, SD=1.115, while Human service was M=2.61, SD=1.245. This means that in negative scenario, people prefer more AI service, or at least they gave higher satisfaction score to AI service in negative scenario.

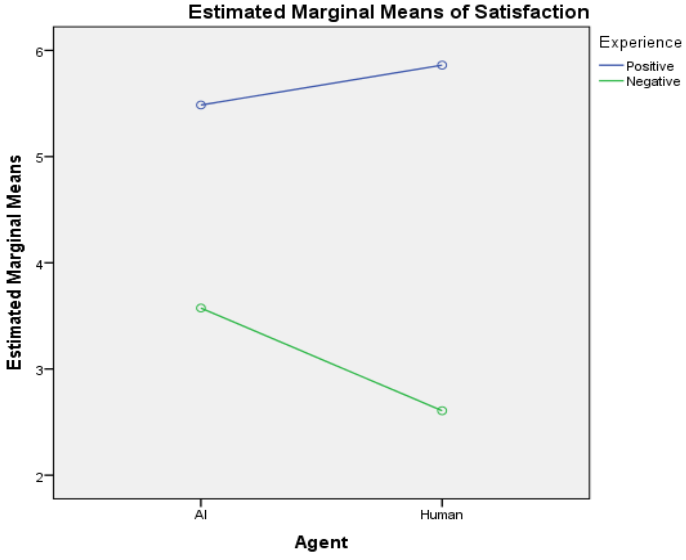
Tests of Between-Subjects Effects

Dependent Variable: Satisfaction

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	229.352[a]	3	76.451	63.854	.000
Intercept	2341.407	1	2341.407	1955.626	.000
Experience	203.354	1	203.354	169.849	.000
Agent	2.667	1	2.667	2.227	.138
Experience * Agent	13.732	1	13.732	11.469	.001
Error	143.672	120	1.197		
Total	2707.250	124			
Corrected Total	373.024	123			

a. R Squared = .615 (Adjusted R Squared = .605)

The results show that 60.5% of the Satisfaction variance was explained with agent and experience, i.e., there is a statistically significant difference in the level of guest satisfaction depending on the Experience (positive or negative).



Respondents who had a positive experience (blue line) show a higher level of satisfaction with human agents than with AI agents, while those who had a negative experience (green line) show a higher level of satisfaction with AI agents. In general, as expected, those with a positive experience have a higher level of satisfaction than those with a negative experience (the blue line is well above the green).

d. ENGAGEMENT as DV

Descriptive Statistics

Dependent Variable: Engagement

Experience	Agent	Mean	Std. Deviation	N
Positive	AI	5.14	1.463	35
	Human	5.86	.823	27
	Total	5.46	1.269	62
Negative	AI	3.57	.924	27
	Human	2.90	1.338	35
	Total	3.19	1.214	62
Total	AI	4.46	1.475	62
	Human	4.19	1.868	62
	Total	4.32	1.681	124

From the table above, we can conclude that the mean value for engagament in positive experience was higher for Human service, resulting in M=5.86, SD=.823 while M=5.14, SD=1.1463 in AI. However, the difference is very slight, therefore we can say that customers had almost the same opinions about the service when put in positive scenario. However, in negative scenario, the higher mean had AI service, resulting in M=3.57, SD=.924, while Human service was M=2.90, SD=1.338. This means that in negative scenario, people prefer more AI service, or at least they gave higher engagament score to AI service in negative scenario.

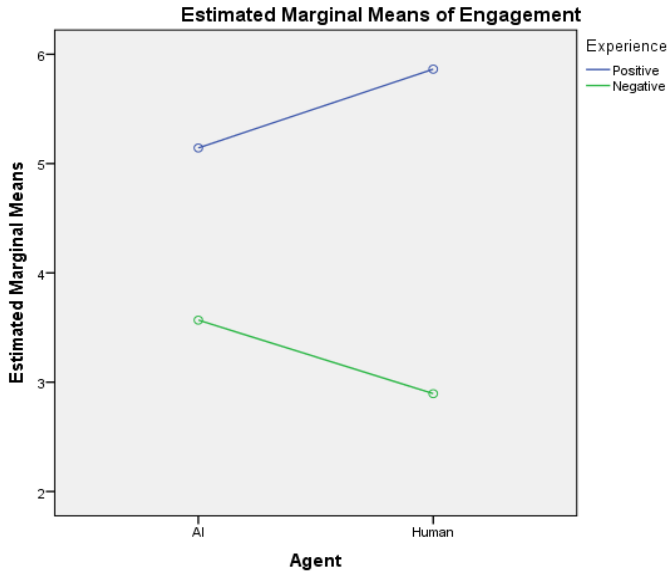
Tests of Between-Subjects Effects

Dependent Variable: Engagement

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	174.401[a]	3	58.134	40.240	.000
Intercept	2325.978	1	2325.978	1610.022	.000
Experience	157.351	1	157.351	108.917	.000
Agent	.018	1	.018	.012	.911
Experience * Agent	14.809	1	14.809	10.251	.002
Error	173.362	120	1.445		
Total	2664.667	124			
Corrected Total	347.763	123			

a. R Squared = .501 (Adjusted R Squared = .489)

The results show that there i san interaction between Experience*Agent, (F(1)=10.251, p<.01). The results show that 48.9% of the Engagement variance was explained with agent and experience, i.e., there is a statistically significant difference in the level of guest engagement depending on the Experience (positive or negative). Respondents who had a positive experience (blue line) show a higher level of engagement with human agents than with AI agents, while those who had a negative experience (green line) show a higher level of engagement with AI agents. In general, as expected, those with a positive experience have a higher level of engagement than those with a negative experience (the blue line is well above the green).



e. LOYALTY as DV

Descriptive Statistics

Dependent Variable: Loyalty

Experience	Agent	Mean	Std. Deviation	N
Positive	AI	5.33	1.417	35
	Human	5.93	.893	27
	Total	5.59	1.243	62
Negative	AI	3.60	1.025	27
	Human	2.83	1.287	35
	Total	3.17	1.234	62
Total	AI	4.58	1.521	62
	Human	4.18	1.913	62
	Total	4.38	1.733	124

From the table above, we can conclude that the mean value for loyalty in positive experience was higher for Human service, resulting in M=5.93, SD=.893 while M=5.33, SD=1.417 in AI. However, the difference is very slight, therefore we can say that customers had almost the same opinions about the service when put in positive scenario. However, in negative scenario, the higher mean had AI service, resulting in M=3.60, SD=1.025, while Human service was M=2.83, SD=1.287. This means that in negative scenario, people prefer more AI service, or at least they gave higher loyalty score to AI service in negative scenario.

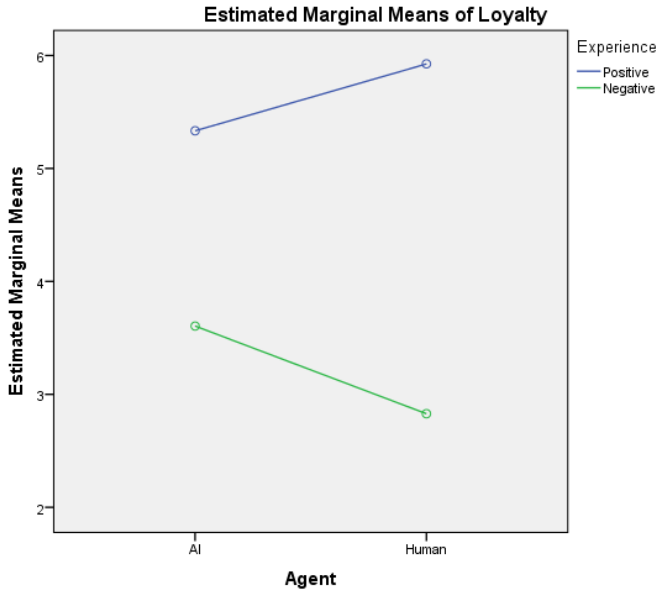
Tests of Between-Subjects Effects

Dependent Variable: Loyalty

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	196.798[a]	3	65.599	45.606	.000
Intercept	2385.623	1	2385.623	1658.513	.000
Experience	177.476	1	177.476	123.383	.000
Agent	.257	1	.257	.179	.673
Experience * Agent	14.282	1	14.282	9.929	.002
Error	172.609	120	1.438		
Total	2747.222	124			
Corrected Total	369.408	123			

a. R Squared = .533 (Adjusted R Squared = .521)

The results show that the interaction effect is significant ($F(1)=9.929$, $p<0.01$). The results show that 52.1% of the Loyalty variance was explained with agent and experience, i.e., there is a statistically significant difference in the level of guest loyalty depending on the Experience (positive or negative). Respondents who had a positive experience (blue line) show a higher level of loyalty with human agents than with AI agents, while those who had a negative experience (green line) show a higher level of loyalty with AI agents. In general, as expected, those with a positive experience have a higher level of loyalty than those with a negative experience (the blue line is well above the green).



f. BLAME as DV

Descriptive Statistics

Dependent Variable: Blame

Experience	Agent	Mean	Std. Deviation	N
Positive	AI	4.93	1.425	35
	Human	4.37	1.696	27
	Total	4.69	1.561	62
Negative	AI	4.69	.932	27
	Human	4.90	1.338	35
	Total	4.81	1.175	62
Total	AI	4.82	1.232	62
	Human	4.67	1.515	62
	Total	4.75	1.377	124

From the table above, we can conclude that the mean value for blame in positive experience was higher for AI service, resulting in M=4.93, SD=1.425 while M=4.37, SD=1.696 in Human scenario. This indicates that the mean value for Blame is higher for AI than human receptionist, meaning participants marked that AI/Human was resposible for their positive experience. However, in negative scenario, the higher blame mean had Human service, resulting in M=4.90, SD=11.338, while AI service was M=4.69, SD.932. This means that in negative scenario, people slighlty blame more human service than AI, therefore they think humans are more resposible than AI in negative service scenarios.

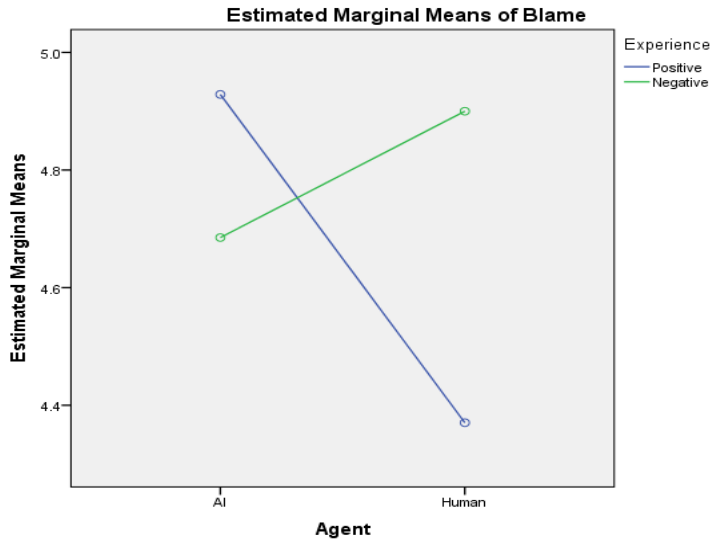
Tests of Between-Subjects Effects

Dependent Variable: Blame

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	5.906[a]	3	1.969	1.039	.378
Intercept	2717.715	1	2717.715	1434.518	.000
Experience	.624	1	.624	.330	.567
Agent	.899	1	.899	.474	.492
Experience * Agent	4.554	1	4.554	2.404	.124
Error	227.342	120	1.895		
Total	3026.250	124			
Corrected Total	233.248	123			

a. R Squared = .025 (Adjusted R Squared = .001)

The interaction is not significant (F(1)=2.404, p=0.124, > 0.05). The results show that only 0.1% the Blame variance was explained with agent and experience, i.e., there is no statistically significant difference in the level of guest blame levels depending on the Experience (positive or negative) nor agent. Respondents who had a positive experience (blue line) show a higher level of blame toward AI agents, while those who had a negative experience (green line) show a higher level of blame toward Human agents.



g. EMOTIONS as DV

Descriptive Statistics

Dependent Variable: Emotions

Experience	Agent	Mean	Std. Deviation	N
Positive	AI	5.13	1.223	35
	Human	5.38	1.070	27
	Total	5.24	1.157	62
Negative	AI	2.88	.862	27
	Human	2.73	1.006	35
	Total	2.79	.942	62
Total	AI	4.15	1.554	62
	Human	3.88	1.676	62
	Total	4.02	1.615	124

From the table above, we can conclude that the mean value for emotions in positive experience was higher for Human service, resulting in M=5.38, SD=1.070 while M=5.13, SD=1.223 in AI scenario. However, both means are quite high, since the highest is 7, and both services got above 5. On the other hand, in negative scenario, higher mean had AI service, M=2.88, SD=.862, while Human service had M=2.73, SD=1.006. This means that participants marked AI service slightly better regarding emotions in the negative scenario.

Tests of Between-Subjects Effects

Dependent Variable: Emotions

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	186.638[a]	3	62.213	55.560	.000
Intercept	1979.458	1	1979.458	1767.772	.000
Experience	183.130	1	183.130	163.545	.000
Agent	.063	1	.063	.056	.814
Experience * Agent	1.232	1	1.232	1.101	.296
Error	134.370	120	1.120		
Total	2321.040	124			
Corrected Total	321.008	123			

a. R Squared = .581 (Adjusted R Squared = .571)

The results show that 57.1% of the Emotions variance was explained with agent and experience, i.e., there is no statistically significant difference in the level of guest emotions depending on the Experience (positive or negative), F(1)=1.101, p=.296. Respondents who had a positive experience (blue line) show a higher level of emotions with human agents than with AI agents, while those who had a negative experience (green line) show a higher level of emotions towards AI agents. In general, as expected, those with a positive experience have a higher level of emotions than those with a negative experience (the blue line is well above the green).

The findings on the interaction of experience and agent imply the following:

- as expected, guests with a positive experience have a higher level of trust, perceived competence of agent, satisfaction, engagement, loyalty, and emotions.
- guests who have had a positive experience revealed higher levels of trust, perceived competence, satisfaction, engagement loyalty, and emotions towards human agents.
- guests who have had a negative experience revealed higher levels of trust, perceived competence, satisfaction, engagement, loyalty, and emotions towards AI agents.
- When it comes to blame, guests with positive experience would blame AI agents more, while people with negative experience blame human agents more.

Blame and Agent

H2: In negative experience, human service will be preferred, since people blame more machines.

This hypothesis was tested by doing a t-test and checking the difference between the responses of the respondents who had a negative experience with AI agent and those who had a negative experience with a human agent. A positive experience is transformed into missing data. The difference was tested for mentioned variables trust, competence, satisfaction, engagement, loyalty, blame, emotions, and contamination.

Group Statistics

	NegativeExperience	N	Mean	Std. Deviation	Std. Error Mean
Trust	AI	27	4.01	1.160	.223
	Human	35	3.13	1.281	.217
Competence	AI	27	3.41	1.171	.225
	Human	35	2.57	1.259	.213
Satisfaction	AI	27	3.57	1.115	.215
	Human	35	2.61	1.245	.210
Engagement	AI	27	3.57	.924	.178
	Human	35	2.90	1.338	.226
Loyalty	AI	27	3.60	1.025	.197
	Human	35	2.83	1.287	.218
Blame	AI	27	4.69	.932	.179
	Human	35	4.90	1.338	.226
Emotions	AI	27	2.88	.862	.166
	Human	35	2.73	1.006	.170
Contamination	AI	27	5.57	.816	.157
	Human	35	5.23	1.038	.175

The mean values for AI were higher in Trust (M=4.01, SD=1.160), Competence (M=3.41, 1.171), Satisfaction (M=3.57, SD=1.115), Engagament (M=3.57, SD=0.924), Loyalty (M=3.60, SD=1.025) and Emotions (M=2.88, SD=0.862). The Blame mean was higher in Human service resulting in M=4.90, while AI results in M=4.69.

Independent Samples Test									
	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Trust	.455	.502	2.789	60	.007	.879	.315	.249	1.509
Compet.	.077	.782	2.672	60	.010	.836	.313	.210	1.462
Satisf.	.141	.708	3.171	60	.002	.967	.305	.357	1.577
Engag.	3.782	.056	2.233	60	.029	.673	.301	.070	1.275
Loyalty	1.362	.248	2.567	60	.013	.776	.302	.171	1.381
Blame	5.454	.023	-.711	60	.480	-.215	.302	-.819	.390
Emotions	1.047	.310	.643	60	.523	.156	.242	-.329	.641
Contam.	4.253	.044	1.398	60	.167	.339	.243	-.146	.825

It is important to note once again that only individuals who have had a negative experience, either with an AI or a human agent, are included in the analysis here. When we talk about blame, emotions, and fear of contamination, there is no difference between people who have had AI as an agent or human as an agent. On the other hand, considering trust, competence, satisfaction, engagement, and loyalty, there is a statistically significant difference between respondents who had an AI agent and those who had a human agent. In particular, respondents who had a negative experience with an AI agent had higher trust, competence, satisfaction, engagement, and loyalty than those who had a negative experience with human. In other words, we can argue that a negative experience with AI has contributed less to a decrease in trust, perceived competence, engagement, and loyalty. We can also interpret this as a greater resentment of human agents because there has been a reduction in these variables. If we relate blame to these variables, then our results indicate that **people with negative experience blame people agents more than machines** (contrary to the hypothesized). On the other hand, if we analyze only the Blame variable, then we note that the respondents blame people more (the mean value is greater for human agent), but the findings are not statistically significant. With these results, we can **reject the second hypothesis**, since the results showed the opposite from what was predicted to happen based on the previous research. The new results could be influenced highly because of the coronavirus effect and fear of contamination, due to the high difference between male (70%) and females (30%) in the sample, due to age range, etc.

Agent, Experience and DVs

H3: the relationship between AI/human experience and DV is influenced (moderated) by fear of contamination. In particular for people high in fear of contamination the presence of AI/human will generate a higher/lower DV.

In this hypothesis, it is necessary to analyze the influence of the Agent on Trust, Competence, Satisfaction, Engagement, Loyalty, Blame and Emotions considering the moderating impact of fear of Contamination. Hence, the aim of this hypothesis is to analyze whether DV (trust, satisfaction, engagement, loyalty, blame and emotions) was influenced by the Agent and fear of Contamination. The perceived competence is not analyzed here because it should not be determined by fear of infection. The variable Fear was created, where Likert was recoded from 1-4 in 1 and from 4.01 to 7 in 2 (1 - those who are not afraid of contamination and 2 - those who are afraid of contamination). A two-way ANOVA was used to test this hypothesis. It compares the mean differences between the groups divided into two independent variables called factors. 5 ANOVA tests were performed, and the results are presented below.

3a. TRUST as DV

3a. The relationship between AI/human experience and Trust is influenced (moderated) by fear of contamination. In particular for people high in fear of contamination the presence of AI/human will generate a higher/lower Trust.

Descriptive Statistics

Dependent Variable: Trust

Agent	Fear	Mean	Std. Deviation	N
AI	Not afraid of Contamination	4.60	1.722	5
	Afraid of Contamination	4.91	1.421	57
	Total	4.89	1.433	62
Human	Not afraid of Contamination	4.67	1.361	10
	Afraid of Contamination	4.19	1.757	52
	Total	4.27	1.698	62
Total	Not afraid of Contamination	4.64	1.428	15
	Afraid of Contamination	4.57	1.623	109
	Total	4.58	1.596	124

As we can see from the table, almost all participants marked that they are afraid of contamination by coronavirus, therefore we do not have two different groups. The answers do not differ between agents. Around 90% of the participants marked they are afraid of coronavirus to a certain level.

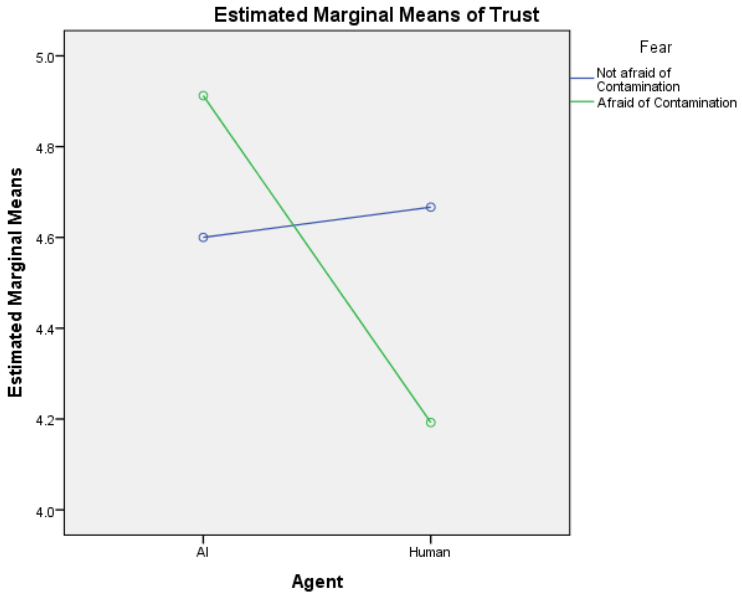
Tests of Between-Subjects Effects

Dependent Variable: Trust

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	14.186[a]	3	4.729	1.898	.134
Intercept	1002.163	1	1002.163	402.274	.000
Agent	1.267	1	1.267	.509	.477
Fear	.078	1	.078	.031	.860
Agent * Fear	1.837	1	1.837	.738	.392
Error	298.949	120	2.491		
Total	2911.889	124			
Corrected Total	313.135	123			

a. R Squared = .045 (Adjusted R Squared = .021)

The results show that there is no statistically significant interaction effect F(1) = .738, (p = 0.392), so we can interpret the main effects. From the table above we can see that there is no statistically significant difference in the Trust when it comes to AI or Human agent (p =0.477), and there is no statistically significant difference depending on the existence of Fear of contamination (p =0.860).



If we analyze the interaction effect of the agent and the fear of contamination on the trust in the chart, we see that individuals who are not afraid of contamination (blue line) has slightly higher trust in human agents. On the other hand, people who are afraid of contamination (green line) have more trust in AI agents. This result is expected considering that no contamination can occur with the AI agent. However, the interaction effect is not statistically significant, so **this hypothesis was rejected.**

3b. SATISFACTION as DV

3b. The relationship between AI/human experience and Satisfaction is influenced (moderated) by fear of contamination. In particular for people high in fear of contamination the presence of AI/human will generate a higher/lower Satisfaction.

Descriptive Statistics

Dependent Variable: Satisfaction

Agent	Fear	Mean	Std. Deviation	N
AI	Not afraid of Contamination	4.90	1.432	5
	Afraid of Contamination	4.63	1.492	57
	Total	4.65	1.478	62
Human	Not afraid of Contamination	3.68	1.724	10
	Afraid of Contamination	4.09	1.977	52
	Total	4.02	1.932	62
Total	Not afraid of Contamination	4.08	1.689	15
	Afraid of Contamination	4.37	1.753	109
	Total	4.34	1.741	124

As we can see from the table, almost all participants marked that they are afraid of contamination by coronavirus, therefore we do not have two different groups. The answers do not differ between agents. Around 90% of the participants marked they are afraid of coronavirus to a certain level.

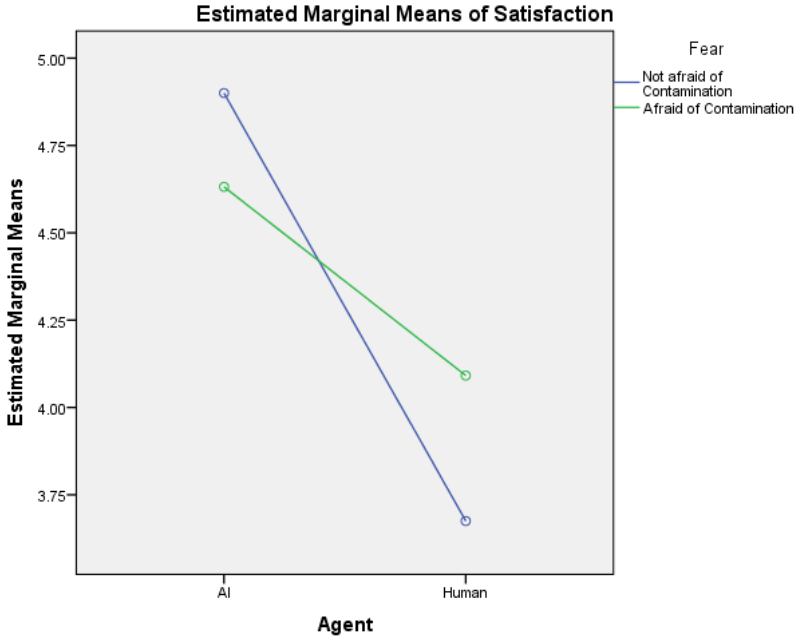
Tests of Between-Subjects Effects

Dependent Variable: Satisfaction

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	14.051[a]	3	4.684	1.566	.201
Intercept	888.482	1	888.482	297.008	.000
Agent	9.253	1	9.253	3.093	.081
Fear	.065	1	.065	.022	.883
Agent * Fear	1.392	1	1.392	.465	.496
Error	358.973	120	2.991		
Total	2707.250	124			
Corrected Total	373.024	123			

a. R Squared = .038 (Adjusted R Squared = .014)

The results show that there is no statistically significant interaction effect of Agent and Fear F(1)= .465, p = 0.496.



The figure depicts that people who are not afraid of contamination (blue line) reveal higher level of Satisfaction if they had AI agent. Similarly, people who are afraid of contamination (green line) show higher level of satisfaction with AI agent. Hence, respondents are generally more satisfied with AI agents and it doesn't depend on their fear of contamination. Hence, the **hypothesis** that AI/human experience and Satisfaction is influenced (moderated) by fear of contamination **is rejected**.

3c. ENGAGEMENT as DV

3c. The relationship between AI/human experience and Engagement is influenced (moderated) by fear of contamination. In particular for people high in fear of contamination the presence of AI/human will generate a higher/lower Engagement.

Descriptive Statistics

Dependent Variable: Engagement

Agent	Fear	Mean	Std. Deviation	N
AI	Not afraid of Contamination	4.33	1.716	5
	Afraid of Contamination	4.47	1.469	57
	Total	4.46	1.475	62
Human	Not afraid of Contamination	4.00	1.515	10
	Afraid of Contamination	4.22	1.939	52
	Total	4.19	1.868	62
Total	Not afraid of Contamination	4.11	1.531	15
	Afraid of Contamination	4.35	1.706	109
	Total	4.32	1.681	124

As we can see from the table, almost all participants marked that they are afraid of contamination by coronavirus, therefore we do not have two different groups. The answers do not differ between agents. Around 90% of the participants marked they are afraid of coronavirus to a certain level.

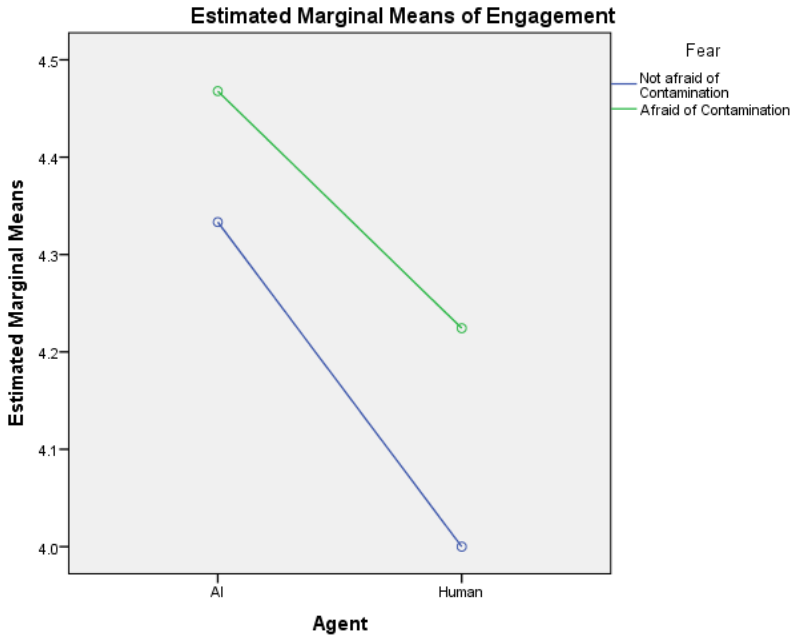
Tests of Between-Subjects Effects

Dependent Variable: Engagement

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2.745[a]	3	.915	.318	.812
Intercept	860.720	1	860.720	299.365	.000
Agent	.988	1	.988	.344	.559
Fear	.382	1	.382	.133	.716
Agent * Fear	.024	1	.024	.008	.927
Error	345.018	120	2.875		
Total	2664.667	124			
Corrected Total	347.763	123			

a. R Squared = .008 (Adjusted R Squared = -.017)

The results show that there is no statistically significant interaction effect of Agent and Fear F(1)=.008, (p = 0.927) on guest engagement.



As already mentioned, the interaction effect does not exist. In general, the findings show (chart) that respondents are more engaged with AI agents than human agents, whether they fear contamination or not. Hence, this **hypothesis is rejected** as well.

3d. LOYALTY as DV

3d. The relationship between AI/human experience and Loyalty is influenced (moderated) by fear of contamination. In particular for people high in fear of contamination the presence of AI/human will generate a higher/lower Loyalty.

Descriptive Statistics

Dependent Variable: Loyalty

Agent	Fear	Mean	Std. Deviation	N
AI	Not afraid of Contamination	4.27	2.204	5
	Afraid of Contamination	4.61	1.471	57
	Total	4.58	1.521	62
Human	Not afraid of Contamination	4.13	1.533	10
	Afraid of Contamination	4.19	1.991	52
	Total	4.18	1.913	62
Total	Not afraid of Contamination	4.18	1.704	15
	Afraid of Contamination	4.41	1.743	109
	Total	4.38	1.733	124

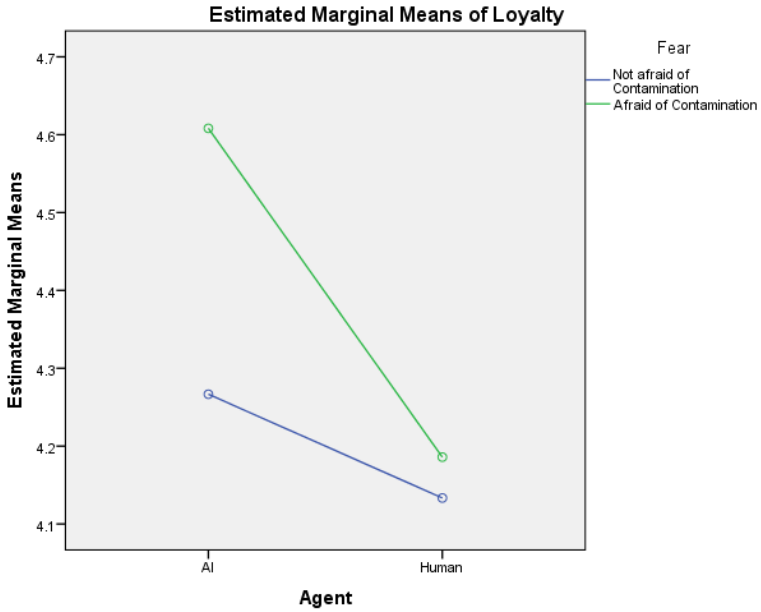
As we can see from the table, almost all participants marked that they are afraid of contamination by coronavirus, therefore we do not have two different groups. The answers do not differ between agents. Around 90% of the participants marked they are afraid of coronavirus to a certain level.

Tests of Between-Subjects Effects

Dependent Variable: Loyalty

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	5.600[a]	3	1.867	.616	.606
Intercept	877.847	1	877.847	289.553	.000
Agent	.917	1	.917	.302	.583
Fear	.461	1	.461	.152	.697
Agent * Fear	.248	1	.248	.082	.775
Error	363.808	120	3.032		
Total	2747.222	124			
Corrected Total	369.408	123			

a. R Squared = .015 (Adjusted R Squared = -.009)



Neither the interaction effect nor the direct ones are significant, which means that there is no difference in the Loyalty level of guests between the AI vs Human agents experience or the Fear of contamination level. Interestingly, respondents show a higher level of loyalty to AI agents whether they are afraid of contamination or not. Hence, this **hypothesis is rejected.**

3e. BLAME as DV

3e. The relationship between AI/human experience and Blame is influenced (moderated) by fear of contamination. In particular for people high in fear of contamination the presence of AI/human will generate a higher/lower Blame.

Descriptive Statistics

Dependent Variable: Blame

Agent	Fear	Mean	Std. Deviation	N
AI	Not afraid of Contamination	4.40	1.432	5
	Afraid of Contamination	4.86	1.220	57
	Total	4.82	1.232	62
Human	Not afraid of Contamination	3.50	1.563	10
	Afraid of Contamination	4.89	1.412	52
	Total	4.67	1.515	62
Total	Not afraid of Contamination	3.80	1.533	15
	Afraid of Contamination	4.88	1.309	109
	Total	4.75	1.377	124

As we can see from the table, almost all participants marked that they are afraid of contamination by coronavirus, therefore we do not have two different groups. The answers do not differ between agents. Around 90% of the participants marked they are afraid of coronavirus to a certain level.

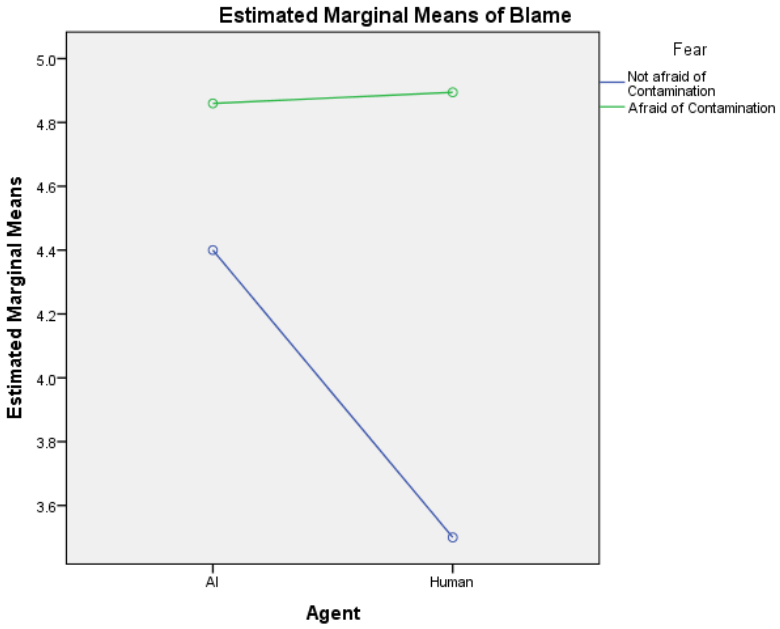
Tests of Between-Subjects Effects

Dependent Variable: Blame

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	18.003[a]	3	6.001	3.345	.022
Intercept	925.424	1	925.424	515.927	.000
Agent	2.224	1	2.224	1.240	.268
Fear	10.205	1	10.205	5.689	.019
Agent * Fear	2.594	1	2.594	1.446	.232
Error	215.245	120	1.794		
Total	3026.250	124			
Corrected Total	233.248	123			

a. R Squared = .077 (Adjusted R Squared = .054)

As with previous hypotheses, there is no statistically significant interaction effect here, but only a significant effect of Fear of contamination on blame F(1) =1.446, ($p<0.05$).



3f. EMOTIONS as DV

3f. The relationship between AI/human experience and Emotions is influenced (moderated) by fear of contamination. In particular for people high in fear of contamination the presence of AI/human will generate a higher/lower Emotions.

Descriptive Statistics

Dependent Variable: Emotions

Agent	Fear	Mean	Std. Deviation	N
AI	Not afraid of Contamination	4.32	1.963	5
	Afraid of Contamination	4.14	1.534	57
	Total	4.15	1.554	62
Human	Not afraid of Contamination	4.02	1.397	10
	Afraid of Contamination	3.85	1.735	52
	Total	3.88	1.676	62
Total	Not afraid of Contamination	4.12	1.541	15
	Afraid of Contamination	4.00	1.632	109
	Total	4.02	1.615	124

As we can see from the table, almost all participants marked that they are afraid of contamination by coronavirus, therefore we do not have two different groups. The answers do not differ between agents. Around 90% of the participants marked they are afraid of coronavirus to a certain level.

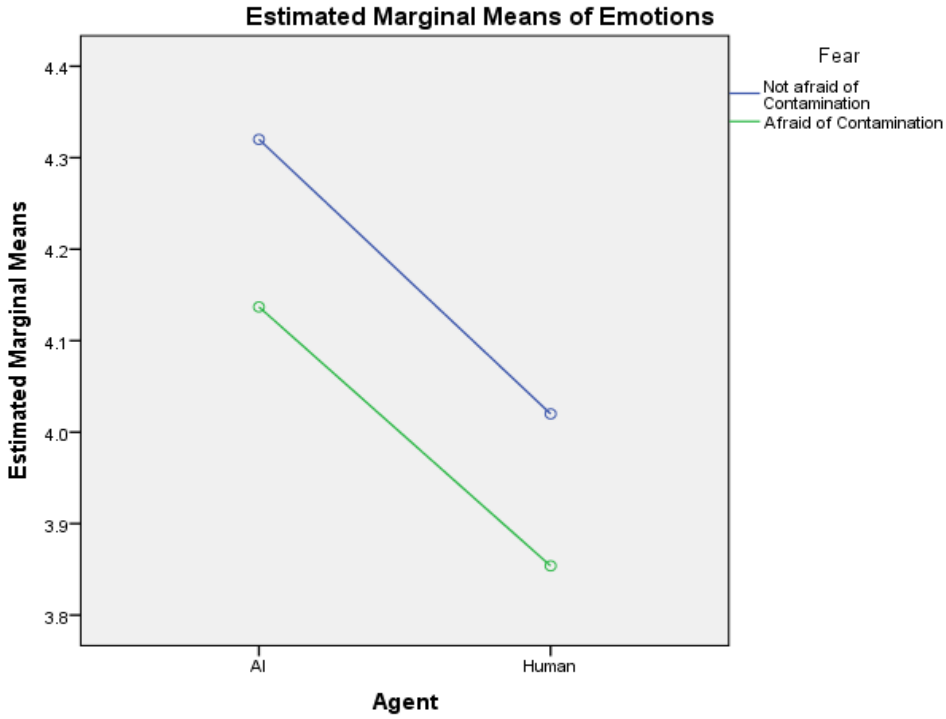
Tests of Between-Subjects Effects

Dependent Variable: Emotions

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2.662[a]	3	.887	.334	.800
Intercept	791.899	1	791.899	298.505	.000
Agent	1.009	1	1.009	.380	.539
Fear	.362	1	.362	.137	.712
Agent * Fear	.001	1	.001	.000	.986
Error	318.346	120	2.653		
Total	2321.040	124			
Corrected Total	321.008	123			

a. R Squared = .008 (Adjusted R Squared = -.017)

Neither the interaction effect nor the direct ones are significant, (F(1) =.000, p=.986, which means that there is no difference in the Emotions level of guests between the AI vs Human agents experience or the Fear of contamination level. Interestingly, respondents show a higher level of positive emotions towards AI agents whether they are afraid of contamination or not. Hence, this **hypothesis is rejected.**



Conclusion on Hypothesis 3

Hypothesis 3 assumes that the relationship between AI/human experience and DV is influenced (moderated) by fear of contamination. In particular, for people high in fear of contamination the presence of AI/ human will generate a higher/lower DV. Interestingly, this hypothesis was not confirmed for any of the analyzed dependent variables. It is particularly interesting that the respondents showed a higher level of satisfaction, engagement, loyalty, and emotion towards AI agents regardless of whether they are afraid of contamination or not. The reason for this result may be related to the structure of the sample. Namely, most of the respondents are in the age group of 18 to 24 years (as much as 70.2%). In other words, most respondents belong to Generation Z which is considered digital natives. It is very likely that the results would have been different if there were more respondents in the older age groups. In this regard, **the results of this study should be interpreted in accordance with the presented sample structure and most generalized to generation Z**. Also, since they are young people, they do not express a high level of fear of infection.

CHAPTER V: DISCUSSION AND CONCLUSION

GENERAL DISCUSSION ABOUT THE STUDY

As the COVID-19 rise the global fear of the virus spread, this directly influenced the travel bans and restrictions, and heavily affecting millions of hotels all over the world. The main things that changed in the hotel industry based on the COVID-19 are AI and robotics adoption, hygiene and safe environment, social touch limitation, and health care. But the question is, can AI help the hospitality industry, and in which ways? According to Ivanov & Webster, 2019a, the application of AI in the hospitality sector can be beneficial in terms of increasing the efficiency of work, the quality of services, and in reduction of overall financial costs, mostly in salaries. In the period of COVID-19, the main benefits of AI and robotics were and are the maintenance of social distance and better control of hygiene. However, on the other side, there are a lot of challenges that are making people skeptical about trusting the AI. This refers to the reductions in jobs, security and privacy systems issues, (Boyd & Holton, 2018; Huang & Rust, 2018), the confidentiality of the data, and lack of human touch (Tussyadiah, 2020; Tussyadiah et al., 2018). Regarding this study specifically, it is interesting to get some new data about the AI vs. Human service preference in the hotel sector after the COVID-19. We used this study to compare the data before and the data gathered from the analysis. The fact that clients prefer more AI vs. human service now is of crucial importance. This can be seen as customers' need, and as a motivator to managers to invest more in AI to make clients feel more secure, but also because AI can offer service much faster, make customers feel more unique, and feel their privacy and personal space is protected in this way. We can argue, how the fear of contamination influenced this output, since clients now blame more human receptionists in case of mistakes, than the AI. Despite the much current literature on Artificial Intelligence aversion and its' application problems in the hospitality sector, the study results suggest that Millennials and Gen Z currently do prefer AI service over Human receptionists. To add, the trust is higher in AI as well, as well as the overall satisfaction levels. However, we can discuss how this all can be driven by the fear of getting contaminated by COVID-19 since the majority had and showed some levels of fear of being infected with this virus. Furthermore, participants believe that the AI is more competent and able regarding the check-in process than the human receptionists. The study also showed that in a negative experience with AI, participants would continue using the service or be open to trying a self-service check-in desk.

The blame for the negative experience was higher for the Human receptionist versus AI self-check-in desk. Participants showed that they are more understanding when the machine makes a mistake than when a human does it, which differs from the previous research findings by Atabekov, A. & Yastrebov, O. (2018), that say that people blame more machines since they trust more humans based on the empathy.

CONCLUSION: LAST WORDS.

The last decade was marked by all the technological developments and applications. With the start of COVID-19 back in early 2020, it was predicted that the rise of AI technologies and adoptions in different sectors will be needed. AI has been applied all over the hospitality industry in the last five years, and we have already seen a lot of great examples of how can AI improve customer service, but also help the employees and companies run tasks smoothly, grow more effectively, and reduce the time and costs for production. In times of COVID-19, the application of AI devices would mean between service, faster deliveries of tasks, better security, and a safer and cleaner environment. Many argue how this period might not be good to apply these technologies based on the high costs of implementations, but it is conceivable that with the smallest investments in AI, the managers can achieve much for their clients. The purest and simplest examples of AI like Chatbots and self-service desks show how easily we can improve our service, and offer our guests the safest and fastest solutions. AI has gradually succeeded to find its' way in the tourism and hospitality industry and is mostly praised for reducing the tasks that had to be carried out manually or repetitive tasks. (World AI Show, 2019). The AI itself is making the hospitality sector more competitive since it can drastically reduce costs and improve overall customer service and satisfaction. Many leading hotel chains as InterContinental Group or Esplanade Hotel in Croatia, are already creating their personalized apps making it easier for guests to have 24/7 fast information, services, and in-room controls (InterContinental.com, 2021). This is adding value to the quality of the company, and creating an additional competitive advantage. To add, it is believed that COVID-19 will be a driver to technology innovation in hospitality, as its' arrival has given a breakthrough in its current applications (Ivanov et al., 2020). The importance lies in managers seizing this opportunity, and using it for new re-inventions and re-innovations for building a new strategy to attract and keep the customers. The creative innovations of AI can offer a whole new high-touch, but also high-tech service. Only by combining AI with human service, a new paradigm can be created, in which AI can offer better tourism, even a superior one to that before the COVID-19.

Research contribution (managerial contribution)

The present research will have important contributions for both marketing theory and the practice, responding to calls for more empirical generalizations that provide a better understanding of the effect of negative experiences as well as coronavirus on the customer's preference between AI and Humans service in the hospitality industry. As it was discussed in the first part, people's fear towards other humans has increased as a coronavirus consequence, since people fear getting affected if being too close to others, unknown and non-confident person. From a research standpoint, it will contribute to extant research on the general application of AI in the hospitality industry. From a managerial standpoint, I argue that the results of the study will provide several important insights and implications for different interest groups, including marketers, organizations, institutions, and public policymakers.

The most important insights for managers gathered from this research paper are as following:

1. Approximately 90% out of 124 participants stated that they are afraid of coronavirus spread or being contaminated. This is an important insight since this implies that it is important to show to guests all the measurements done in fight against COVID-19 spread. It would be beneficial to apply as many measures and technologies which can protect the guests and make them feel safe.
2. People do feel comfortable with AI technologies, and they showed a preference when choosing between AI vs Human service. This can make managers feel more confident if wanting to apply AI technologies within their hotels, since previous researches showed contrasting results, where people did not trust the technologies, and preferred human assistance more. This is a positive sign of client's mind and attitudes changing.
3. People blame more humans than AI service when negative experience happens like slow check-in, missing reservation etc. This is another important insight for managers since previous studies showed that people would usually blame more AI only on the basis of higher empathy with other humans, and prejudice about AI being untrustworthy. This indicates that there could be overall higher satisfaction and trust levels, since clients are more forgiving towards the AI.

4. The replacement of human front desk staff with self-service check-in desks would mean better protection, improvement in the operational efficiency of the hotel, decreased costs in terms of wages, better customer service, available 24/7, more time for staff to focus on the personalised approach towards the guest, rather than on the repetitive tasks.

This paper will offer an analysis of drivers of trust in the AI application, which is connected with the ability to guarantee a safe and healthy environment, which we can never 100% guarantee when it comes to humans since we cannot trach their movements and contacts with others. Furthermore, the managers should take into account the way how they present, share, promote their application of AI in hotels since this can lead to customer loyalty and also a competitive advantage in this specific situation we are dealing with coronavirus. Regarding this study specifically, it is interesting to get some new data about the AI vs. Human service preference in the hotel sector after the COVID-19. We used this study to compare the data before and the data gathered from the analysis. The fact that clients prefer more AI vs. human service now is of crucial importance. This can be seen as customers' need, and as a motivator to managers to invest more in AI to make clients feel more secure, but also because AI can offer service much faster, make customers feel more unique, and feel their privacy and personal space is protected in this way. Marketing implications lie in enhancing the AI perception to enhance trust, which will lead to positive brand equity and have an increased profit margin as a final result. This is why this paper is important to consider since it offers an insight into the previous problems between AI and hospitality, which is now much needed to be used as a change of strategy to survive.

Limitations and future research

The current study has only examined a narrow number of factors that could be connected and have an impact on the changes in preference between AI vs. Human service in the hospitality field. In future research, other variables could be tested and included as moral and ethical issues, corporate reputation, or employee opinions. Furthermore, the study was done on 124 participants, therefore as future research, it would be beneficial to do the same research on a much larger sample. Thirdly, the sample consisted of approx. 70% men, 30%women, which could also have an impact on our results. Based on the fact that there is a much higher percentage of men in the science, technology, engineering, and mathematics (STEM) workforce (Garcia, J.M., & John, J., 2019), there could have been some biased answers, or more answers that are in benefit of AI rather than humans, since there was a 70-30 ration between genders. Therefore, it would be more appropriate to have a balance between males and females or to even do research on this topic by dividing the groups by gender. To add, the sample age range was 18-40, resulting in 92.6%. This was targeted only because Millennials and Gen Z are the drivers of the major changes in customer behavior. These generations are the ones that would like to see more technology applied in the everyday life, and enjoy having more unique and personalized experiences (Brown, E., 2019). However, it would be interesting to have a sample that would contain different generations, to analyze the deviations and differences between them as groups. Regarding the impact of COVID-19 on the hotel industry in general, the availability of big data and analytics should be used to collect as much data from the online users and hotel guests regarding AI, their impact on health, health care practices, and more. Furthermore, it would be worthwhile to examine how can AI help managers avoid similar potential crises in the future, which means how to apply good crisis management, and offer AI solutions for the same. This would be highly beneficial in terms of examining the plans for infectious disease control and the support and crisis management schemes offered by the government. Lastly, it would be of proper benefit for future studies to include the examination of what could be the potential positive outcomes or lessons the managers and/or companies gathered. This, in particular, can include in-depth interviews with the managers of the leading hotels worldwide, by surveys, experiments, etc.

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APPENDIX

A. TYPES OF SOFT AND HARD ADVENTURE TOURISM, CBI, 2021. The European market potential for adventure tourism.

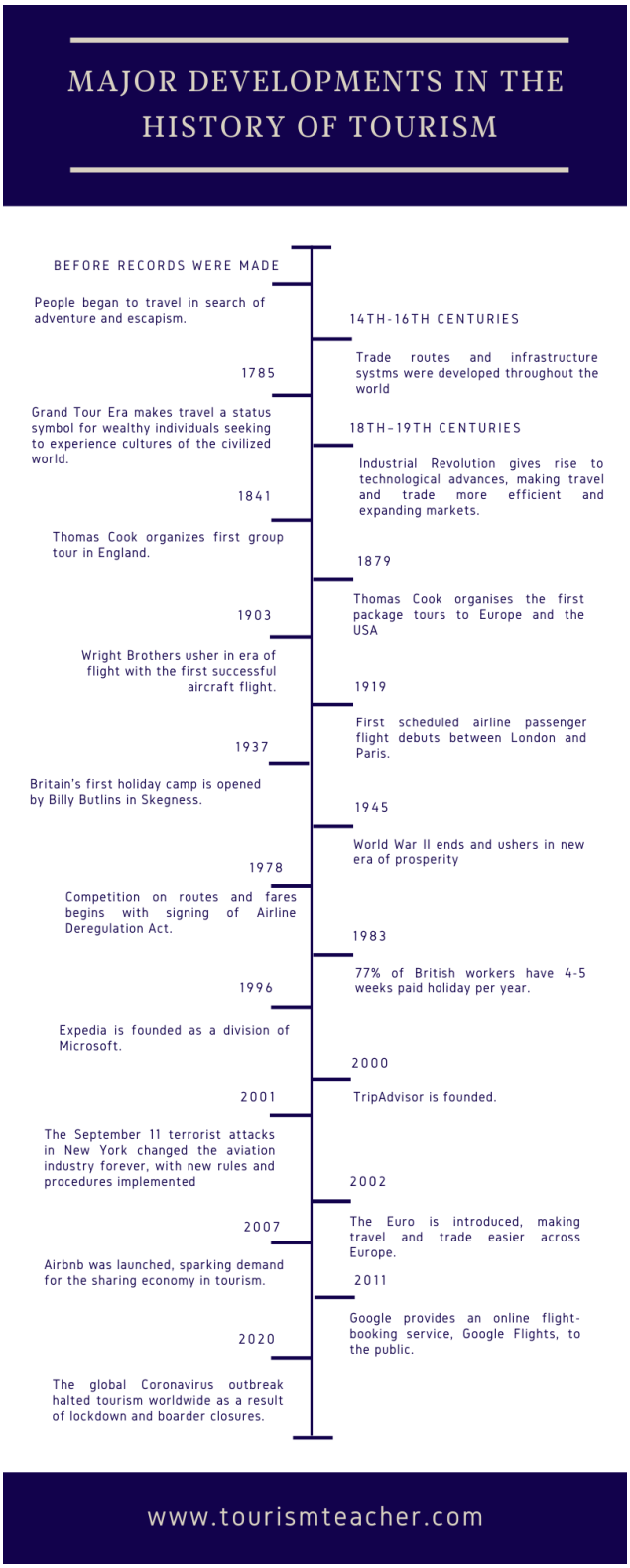
Niche market		Example
Soft adventure niche markets		
Wildlife watching	Wildlife watching involves viewing wildlife in their natural habitats. It includes different types of safaris, such as 4x4, walking, fly-in, river/canoe and safaris on horseback. The niche also includes trips to view marine life.	Green safaris in Zambia offers high-end and sustainable safaris.
Birdwatching	Birdwatching is defined as tourist travel for the specific purpose of observing wild birds in their natural habitats. The niche is sometimes referred to as 'birding' or 'avi-tourism'.	Tanzania birding offers bird watching experiences in Tanzania.
Fishing	Fishing tourism involves travel away from home for the primary purpose of fishing, either in freshwater or saltwater. Fishing is sometimes referred to as angling.	Enjoy sustainable sea-fishing with a local in Indonesia.
Walking	Walking tourism refers to trips in which walking in the natural environment forms a significant part of the trip. It includes hiking, trekking and long-distance walking, and includes specialist techniques such as Nordic walking.	Wild Frontier Travels is a British tour operator offering walking holidays, in many developing country destinations.
Cycling	Cycle tourism refers to recreational visits away from home which involve leisure cycling as a fundamental and significant part of the trip. It includes cycling types such as road cycling, mountain biking and cycle touring.	Rock, Road and Rhino offers a cycling tour through the Sahara, starting in Egypt and arriving in Sudan.
Water sports	Water sports tourism refers to sports that take place on the water, such as windsurfing, kitesurfing, canoeing, kayaking, water skiing and coasteering.	SurfCamps offers surf holidays to destinations like Costa Rica.
Diving	Diving tourism refers to tourism trips for the primary purpose of scuba diving. Dive tourism includes diving activities, such as wreck diving, cave diving and free diving.	Eco-Resorts, offering the possibility to watch the whale migration in Kenya.

Sailing	Sailing tourism refers to any holiday where the main purpose of the trip is to sail or learn how to sail.	Sail with Kamarind in Kenya on a dhow, a traditional Arab sailing boat.
	Hard adventure niche markets	
Land based adrenaline	Adrenaline activities refer to hard adventure activities which require a high level of expertise to take part in and usually involve an element of personal risk.	ActiveTours offers mountain climbing tours of several days in Pakistan.
Snow and ice-based adrenaline		LifeTrek offers multiple-day multiple-day ski adventures in Georgia.
Air-based adrenaline		Bstoked offers paragliding all around the world, including in Morocco, Kenya, South Africa and Tanzania.

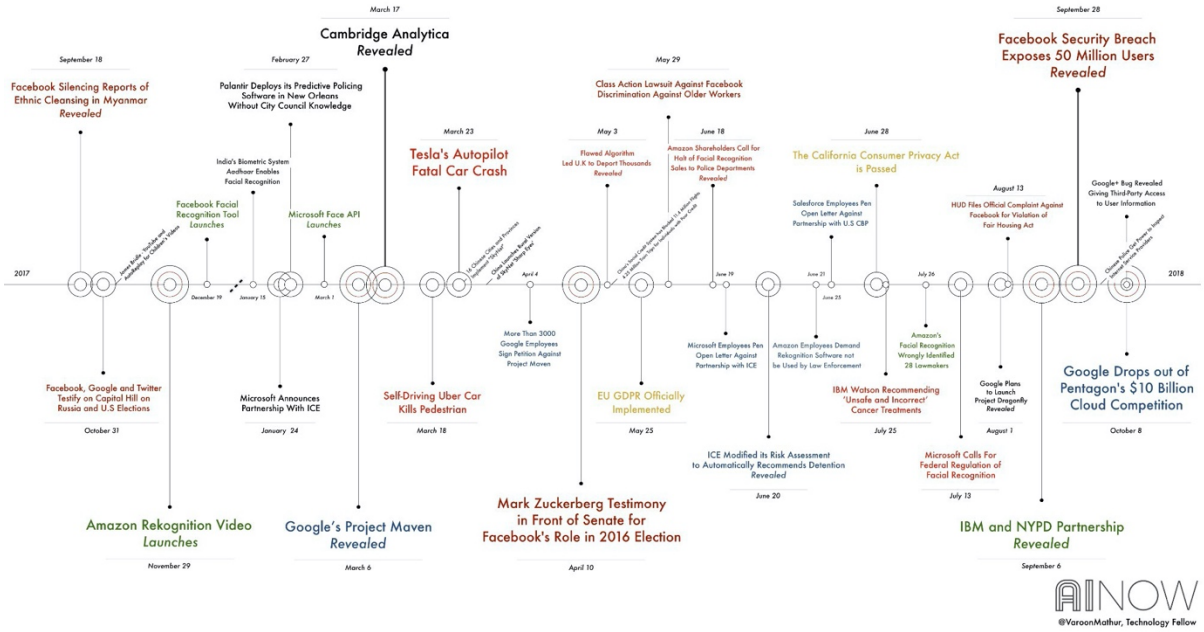
B. ADVENTURE TRAVEL SEGMENTS

CBI, 2021.

C. Major Developments in the History of Tourism. www.tourismteacher.com



D. Historical developments of AI.



E. Summary table of AI tools used in hospitality for better customer service

List of AI tools	**Market Size**	**First appeared**
Chatbots	$1.25 billion by 2025	1966
Self-service technology ATM	$40 billion by 2025	1967
Self-service kiosks	$20.9 billion by 2022	1977
Biometric authentication and identification	$33 billion by 2023	Late 1960s-early 1970s
Voice control and recognition	$21 billion by 2024	From 1980s
Contactless Payments	$5,4 billion by 2027	Ca. 2005
Smart Rooms	$18 billion by 2021	From 2015

APPENDIX F. PRETESTING SURVEY.

LUISS

Hello! My name is Belmina Bajrović, a Marketing Analytics and Metrics student at Luiss Guido Carli. May I take a few moments of your time to ask some questions for thesis purposes? Your answers to this research will only be used for academic purposes, and will be kept completely anonymous.

This study is about customer's familiarity and attitudes towards some of the main AI tools used in hospitality. Only a limited number of individuals are being surveyed; thus, your opinions on these topics are very important to the success of the project. Please answer as openly and truthfully as you can – there are no right or wrong answers! It will only take you 5 minutes to complete the survey.

Thank you for participating!

2. SELF-SERVICE KIOSK: a device that allows a consumer to interact directly with a company, receiving a service at their own convenience. The most common example of this is purchasing tickets for a train or bus stop, ATMs, self-service kiosks at the supermarket or hotels.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
I am familiar with Self-Service Kiosks as an AI tool.	O	O	O	O	O
I have already used Self-Service Kiosks.	O	O	O	O	O
I find Self-Service Kiosks useful.	O	O	O	O	O
I trust Self-Service Kiosks when having some minor issues or questions.	O	O	O	O	O
I think Self-Service Kiosks are safe to use in terms of privacy.	O	O	O	O	O
I would like to use/see more Self-Service Kiosks in the future.	O	O	O	O	O
I have a positive experience with Self-Service Kiosks.	O	O	O	O	O
I like (would like) to use Self-Service Kiosk because it is fun, entertaining and trendy.	O	O	O	O	O

3. BIOMETRICS: is the measurement and statistical analysis of people's unique physical and behavioral characteristics. The technology is mainly used for identification and access control or for identifying individuals who are under surveillance. Examples: fingerprint or facial recognition for fast check-in or when entering the hotel rooms, use of biometric passports etc.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am familiar with Biometrics as an AI tool.	○	○	○	○	○
I have already used Biometric technologies.	○	○	○	○	○
I find Biometrics useful.	○	○	○	○	○
I trust Biometrics when having some minor issues or questions.	○	○	○	○	○
I think Biometrics are safe to use in terms of privacy.	○	○	○	○	○
I would like to use/see more Biometric technologies in the future.	○	○	○	○	○
I have a positive experience with Biometrics.	○	○	○	○	○
I like (would like) to use Biometric technologies because it is fun, entertaining and trendy	○	○	○	○	○

4. VOICE CONTROL: allows the user to activate or control a wide range of home automation and AV devices simply using their voice, as opposed to pressing buttons to using a touchscreen interface device. Example: Alexa can answer some questions that guests have, it can allow guests to request anything, from specific music to alarms, the local weather report, their schedule and tasks, recommended restaurants etc.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
I am familiar with Voice Control as an AI tool.	○	○	○	○	○
I have already used Voice Control technologies.	○	○	○	○	○
I find Voice control devices useful.	○	○	○	○	○
I trust Voice Control devices when having some minor issues or questions.	○	○	○	○	○
I think Voice Control devices are safe to use in terms of privacy.	○	○	○	○	○
I would like to use/see more Voice Control technologies in the future.	○	○	○	○	○
I have a positive experience with Voice Control devices.	○	○	○	○	○
I like (would like) to use Voice Control technologies because it is fun, entertaining	○	○	○	○	○

5. SMART ROOMS: The goal of an IoT smart hotel room is to provide guests with greater control over the environment. When visitors stay in a smart room, they have convenient options for controlling and automating various settings for lights, thermostats, door locks and more by tablets, mobile phones, smart watches or apps.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
I am familiar with Smart Room as an AI tool.	○	○	○	○	○
I have already used Smart Room technologies.	○	○	○	○	○
I find Smart Room devices useful.	○	○	○	○	○
I trust Smart Room devices when having some minor issues or questions.	○	○	○	○	○
I think Smart Room devices are safe to use in terms of privacy.	○	○	○	○	○
I would like to use/see more Smart Room technologies in the future.	○	○	○	○	○
I have a positive experience with Smart Room devices.	○	○	○	○	○
I like (would like) to use Smart Room technologies because it is fun, entertaining	○	○	○	○	○

1. CHATBOTS: At the most basic level, a chatbot is a computer program that simulates and processes human conversation (either written or spoken), allowing humans to interact with digital devices as if they were communicating with a real person.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am familiar with Chatbots/Virtual Assistants as an AI tool.	○	○	○	○	○
I have already used Chatbots.	○	○	○	○	○
I find Chatbots useful.	○	○	○	○	○
I trust Chatbots when having some minor issues or questions.	○	○	○	○	○
I think Chatbots are safe to use in terms of privacy.	○	○	○	○	○
I would like to use/see more Chatbots in the future.	○	○	○	○	○
I have a positive experience with Chatbots.	○	○	○	○	○
I like (would like) to use Chatbots as a tool because it is fun, entertaining and trendy.	○	○	○	○	○

APPENDIX G: MAIN STUDY SURVEY.

LUISS Università Guido Carli

Hello! My name is Belmina Bajrovic, a Marketing Analytics and Metrics student at Luiss Guido Carli. May I take a few moments of your time to ask some questions as a research for my thesis? Your answers to this research will only be used for academic purposes, and will be kept completely anonymous.

This study is about customer's experience in the Hospitality industry. Only a limited number of individuals are being surveyed; thus, your opinions on these topics are very important to the success of the project. Please answer as openly and truthfully as you can – there are no right or wrong answers!

Thank you for participating!

→

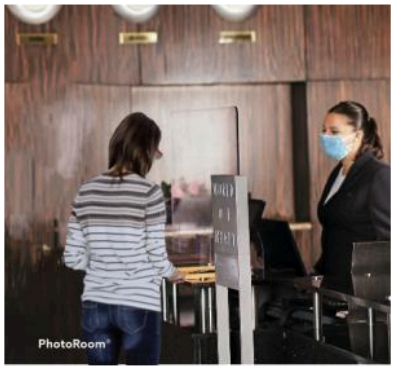
On the following page you will find a short scenario and a picture as a support. You will have to answer the questions regarding that scenario, therefore, it is crucial you read it carefully. There will be a 20 seconds min. timing, after 20 seconds you will be able to continue with the survey.

→

SCENARIO 1: POSITIVE HUMAN SERVICE EXPERIENCE.

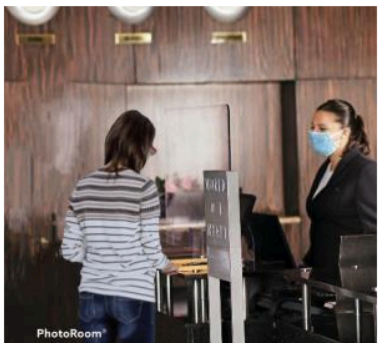
Please read carefully the following scenario.

Imagine a vacation for this summer. You decided to pay directly on the website, with refundable option. The hotel you have booked sent you an e-mail with some information, including the news about the sanitary measures that they introduced in order to prevent the spread of the coronavirus and improve customer service. Once arrived in the hotel, you find the receptionist with double masks, that gives you the key-card of your room. Everything goes smoothly, you can easily enter in your room, moreover, the receptionist informed you that touristics maps of the locations are available, and kindly give you information about breakfast time schedules and check-out date and time.



SCENARIO 2: NEGATIVE HUMAN SERVICE EXPERIENCE.

Imagine a vacation for this summer. You decided to pay directly on the website, with refundable option. The hotel you have booked sent you an e-mail with some information, including the news about the sanitary measures that they introduced in order to prevent the spread of the coronavirus and improve customer service. Once arrived at the hotel, you find the receptionist with double masks, that gives you the key-card of your room. Everything goes wrong, the key-card did not work, and you had to go back to the reception for requiring assistance*. After the problem was fixed, you asked about touristics maps of the locations, but the receptionist did not give them, and also the provided information about breakfast time schedules and check-out date and time were wrong and provided rudely.*



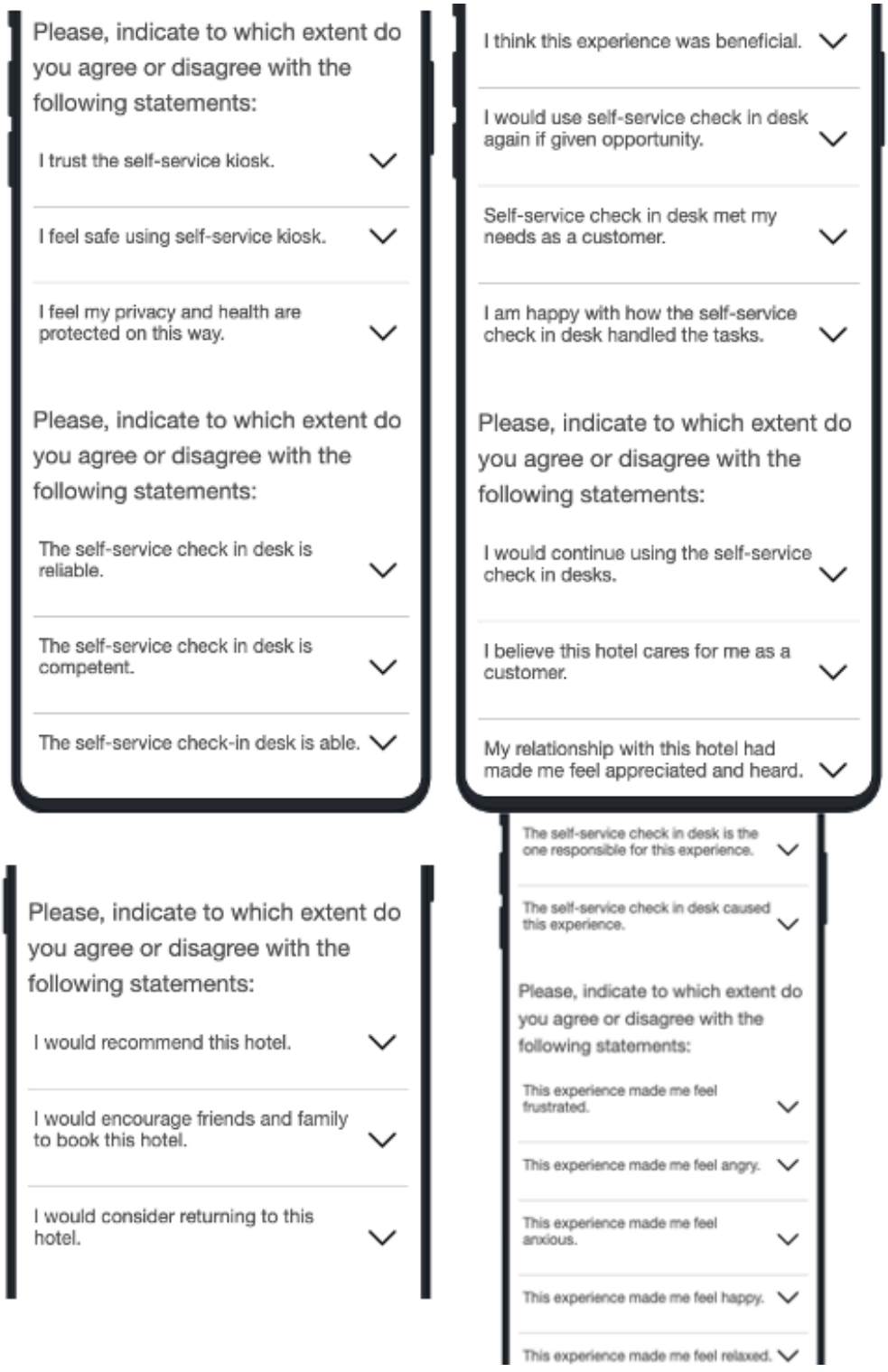
SCENARIO 3: POSITIVE AI SERVICE EXPERIENCE.

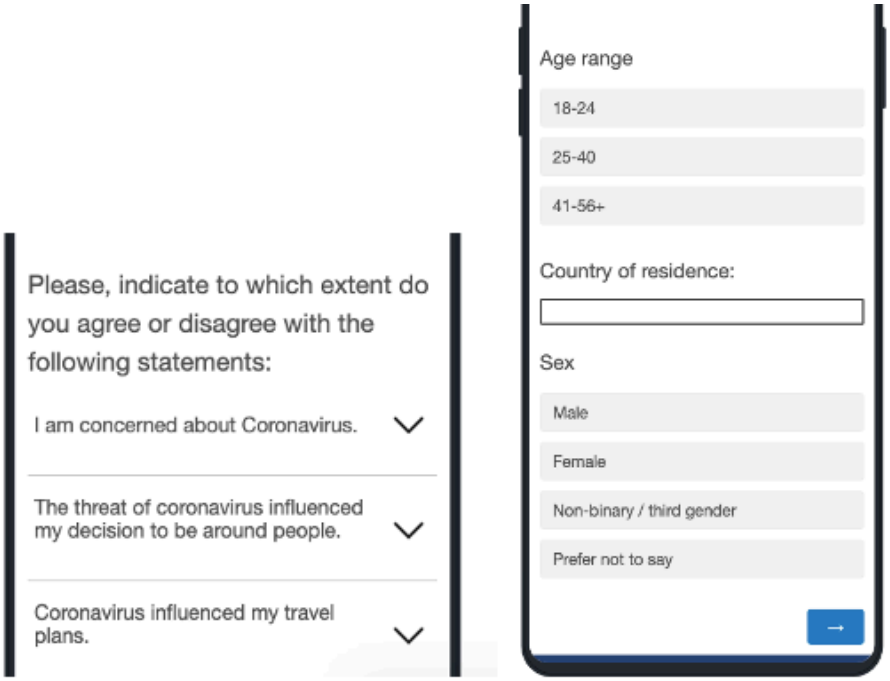
Imagine a vacation for this summer. You decided to pay directly on the website, with refundable formula. The hotel you have booked sent you an e-mail with some information, including the news that they introduced a new self-service check in desk in order to prevent the spread of the coronavirus and improve customer service. When you came, you had to scan the bar code you received with your booking confirmation, and then the system will automatically give the key-card of your room. Once arrived to the hotel, you try the self-service check in desk, everything goes smoothly, and each step is easy to follow. You obtain the key-card and you can easily arrive to your room without any human assistance. Moreover, the self-service check in desk can offer touristics maps of the locations clicking the related option, and automatically it informs you about breakfast time schedules and check-out date and time.

SCENARIO 4: NEGATIVE AI SERVICE EXPERIENCE.

Imagine a vacation for this summer. You decided to pay directly on the website, with refundable option. The hotel you have booked sent you an e-mail with some information, including the news that they introduced a new self-service check in desk in order to prevent the spread of the coronavirus and improve customer service. When you arrived, you had to scan the bar code you received with your booking confirmation, and the system automatically gives you the key-card of your room. Once arrived to the hotel, you try the self-service check in desk, everything goes wrong, and each step was difficult to follow. Eventually you obtain the key-card but once arrived in the room it did not work, then you had to call the customer service number ask for human assistance. Moreover, the self-service check in desk can offer touristics maps of the locations, but this time it did not work, as well as the automatic information about the breakfast time schedules and check-out date.

QUESTIONS FOR ALL 4 SCENARIOS:





About the scenario that you read at the beginning of the study, to which extent the reception was ...

A human receptionist	2	3	4	5	6	An automatic check in desk

To which extent the experince that you read at the beginning of the study was ...

A negative experience	2	3	4	5	6	A positive experience

CHAPTER VI: SUMMARY OF THE THESIS

SUMMARY

The impact of some external factors, natural disasters or sudden changes in politics can catch us unready to work under such circumstances. We find ourselves in the situation where we do not know how to approach the business, and what to do in order to keep our business vital no matter the factors that can affect us. It is not arguable that the Covid-19 pandemic has been an unwelcome surprise globally. With its' spread, it affected a lot of different industries, but mostly those that rely on direct human interactions. AI was always presented as a good way to make things faster, better, and safer. Nevertheless, AI is mainly seen as a threat to humans, since there is a fear of being replaced by it. Specifically, the hospitality industry was always seen as a people's business, therefore, this industry is invariably the slowest in the adoption of AI (Drexler, N. & Lapre, V. 2019). However, since the hospitality industry is currently one of the top three most affected industries by coronavirus worldwide, this urges for hotels' re-innovations and applications of new systems and strategies. Seeing that the crisis specifically in this sector is big, it is believed that managers will be more open to change the old belief of hospitality being a people's business, and use the AI to create better protection and more safety (McKinsey & Company, 2020).

AI is being adopted in many hotels around the world in order to make them stay firm and create a feeling of a safe and secure environment for their upcoming guests. The reshaping of the hospitality industry has begun, creating a new, innovative way of service offers to the customers like chatbots, robots, hotel kiosks, voice-controlled devices, and similar. According to the Glion Institute of Higher Education (2020), a leading hospitality institution, the role of artificial intelligence in hospitality will be of crucial importance in the recovery process from the post-covid crisis. Glion (2020) explains in their article how the focus will be on offering ***'high tech, no touch'***. The changes will include changing the non-functional decorative furniture with devices that are intelligent and digital. They called it the 'Hotel of Things', describing all the devices in the hotel that can communicate and have the ability to provide and send data. All devices are controlled by the app on our smartphones or by our voices. Wise C. (2020) from PBS news also explains how the implementation of AI is now determining.

Considering people are usually being resented over the increasing automation of labor, Covid-19 is showing the opportunity of how the two, humans and AI, can work together in new ways to find the best solutions to the fastest recovery of the hospitality and tourism sector. AI has become an extremely active topic in the last two years, especially in the hospitality industry, since this industry is the one in which customers indeed love the human touch since it gives them a feeling of a home. However, due to the still-active situation of COVID-19, there is a rising question if hospitality should change their way of working, and create a non-human environment and offer services with full AI and automation.

Literature gap and objectives

To date, research on consumers' perception and preferences between AI and Human service in hospitality industry (after or during COVID-19) is still not developed. There is a lot of missing information regardless of the trust changes of customers towards the AI. The relationship between the AI as non-human touch and COVID-19, the virus that is transmitted by the human interaction, is still not well explained or analyzed. In particular, the marketing literature had analyzed the general impact of COVID-19 on the AI, and some facts or assumptions were given, there has been seen a higher usage and application of AI, but there are no specific numbers of the percentual changes in trust/fear or the overall customers' attitude about the AI application after the COVID-19 experience.

Research question: ***Research question: When and under what circumstances experience influence the customers' preference between Human touch vs. AI?***

This research question aims to address deficiencies in the current changes in customers' preference between AI vs. Human service depending on the experience they are having. The main question is if the people will start trusting more AI than humans when it comes to their health and if their previously established fear and negative attitude towards AI will be changed since their current fear towards human interaction is higher. According to the article published by Howard A. and Bornstein J. (2020), the consumers' previous approach towards AI and their perception regarding the lack of trust and increase in fear could be affected highly after coronavirus. Besides, one of the previously noted negative feelings about AI is anxiety, which was experienced when encountered with robots (Nomura et al., 2006; 2008).

Even after vaccines and the pandemic retreats, it is hard to imagine our lives, especially travel, tourism, and hospitality sectors, returning exactly to how it was until the start of 2020. Before COVID-19, most people had some level of apprehension towards AI, since they found it unnecessary in hospitality (people's business). However, ever since it has been proven how much AI can help stop the spread of COVID-19, we can see this attitude being changed (Howard A. & Bornstein J., 2020). During COVID-19 lockdowns there was a noticeable increase in comfort with digital technologies and AI usage. People did not only show a positive attitude but their appetite for them as well (Deloitte, 2020). Furthermore, consumers may be slow to return to old habits and crowds, therefore creating new ways of working and offering new customer experiences will be essential for the recovery and survival of hospitality. As explained in Deloitte, 2020 article regarding 'The future of hospitality', trust will be essential. As by BBC.com article written by Thomas Z. (2020), "People usually say they want a human element to their interactions but Covid-19 has changed that," says Martin Ford, a futurist who has written about the way's robots will be integrated into the economy in the coming decades. Also, CEDEFOP (2020) believes that AI adoption is being part of the EU's new reality in a post-coronavirus world. Demaitre E. (2020) wrote for therobotreport.com that the coronavirus pandemic is changing consumer comfort with AI. By their research, 21% indicated that they are now more comfortable having full contact with AI agents, while in the previous studies almost 90% preferred to deal with human representatives. Ruel H. & Njoku E. (2020) wrote for emerald.com insights regarding AI redefining the hospitality industry. AI application in this period could redesign structures and processes in the hospitality (Ivanov and Webster, 2017; OECD, 2018; Cain *et al.*, 2019; Prentice *et al.*, 2020), which can lead to competitive differentiation for hotel businesses, much needed in this time (Pizam and Shani, 2009; Bellou and Andronikidis, 2009; Jooss, 2018; Zlatanov and Popesku, 2019).

The power of tourism and travel industry

Starting from the tourism and travel industry as an important point for this study, it is important to highlight its' size and power. In 2007 the World Tourism Organisation (WTO) published that tourism brought US$855 billion, and gave roughly 100 million jobs (UNWTO, 2008), while in the 2019 tourism sector had US$8.9 trillion contributions to the world's GDP, covering 330 million jobs, which means that this sector covers 1 in 10 jobs around the world, with US$948 billion capital investment, resulting in 4.3% of total investment worldwide (Wttc.org).

The global hotel industry market size also grew exponentially in the last few decades. In 2018, the retail value of the global hotel industry was 600.49 billion U.S. dollars (Statista, 2019). The hotel industry contributed 8.81 trillion U.S. dollars to the global economy in 2018. In the same year, it was measured that the global occupancy rate of the hotels (the share of total rooms available which are occupied or rented at a given time), increased across all the continents, with Europe having the highest occupancy rate at 72.4 percent, closely followed by the Asia Pacific region with 70.6 percent (Statista, 2019). As a consequence of the coronavirus, in 2020, a decrease of around 42.1% in the global revenue for the travel and tourism industry happened, compared with the previous year (Statista, 2019). Starting from this crucial information, the inspiration for this research paper lies in investigating the client's change in behaviours regarding the AI vs. human service in the hospitality industry. The goal is to investigate to which length did COVID-19 impacted the hospitality, and if and how did it change the application of technology in hotel sector. In 2021 it was forecasted that the worldwide revenues for AI will grow 16,4% annually. It is forecasted to reach around 126 billion U.S. dollars by 2025 (Statista, 2020). The question is if and on which ways can AI contribute to better customer service excluding human presence? Technology has been used more in the last decade to improve customer experience in hospitality. Also, decision-making through decision support tools, databases, and modelling tools assists the manager's job. Thanks to expert systems, sophisticated expertise can be met by any manager (Romanovs, 2000). By technological developments, we can have increased staff productivity and time saved, as well as reduced response time to satisfy guest requests. The majority of the process in the hotel business is now automated and supported by different software and systems, which can help with mass email offers, check-ins and check-outs, and similar. Demographic changes are always suggesting to be followed and analyzed.

AI and hospitality

Since hospitality is a highly 'people's business, it is important to know when and what to apply from AI in your business. With the implementation of AI in some parts of the business, we make jobs easier for our staff, so that they can concentrate on the things AI cannot fully deliver, understanding the guests' needs, ideas, creativity, empathy, feelings, relationships, and feeling of home. For instance, there are some examples of AI being used in the hotels for room service, virtual personal assistants, or chatbots, that can be used to answer some easy questions or problems our guests can have, and save the time of our staff (Pallister, S., 2019).

Technology in the Hospitality industry is mainly used to resolve the pain points in travel and reservation systems, to increase the quality of customer service, and make information available much faster. Some of the first signs of AI being implemented in the Hospitality industry were smart booking systems, voice, and text-based assistants, and IoT. IoT helped connected motion sensors, room control, and smart voice or movement control in the rooms. With this, guests get a personalized experience (Maruti Tech, 2019). With the usage of Big Data and Machine learning, hoteliers can now forecast ups and down in demands with shifts in seasons and customer choices. From this information, they can create and design their strategy and action plan, that helps optimize their service offering, prices, and costs (Maruti Tech, 2019). With the incorporation of AI in demand and revenue forecasting, hoteliers can get easy and fast results. The three main metrics that could be used: occupancy rate, Average Daily Rate, and Revenue per available room. The demand probability is usually built on seasonal choices, current trends, hotel history, local events, and similar (Maruti Tech, 2019). Example of a hotel business that has applied some AI smart devices is Accor Hotel in Paris, which is focused on changing smart rooms with personalized services. This includes voice-activated virtual assistants, IoT interconnected devices, room amenities control for music, temperature and lighting, personalized activity suggestions, and similar. Another example is Hilton Hotels with their energy program, where they with the LightStay program predict energy, water, and waste usage and costs (Bryant, J.G., 2020). However, in order to know what to apply and how to use AI in order to improve the customer service quality, it is important to know your target market. Shifting needs and expectations of the customer are changing the hospitality business and how they interact with their customers. Millennials and Gen Z are the drivers of the major changes in customer behaviour, which leads to manager's changes in their services and way of interacting with the customers (Brown, E.,2019). When analyzing the customers' overall satisfaction, we can notice a slight decrease going from 94.6 in 2019 to 92.5 percent in 2018. This is the main indicator that customers are increasing their standards, and want to see more new, innovative ways of serving (Brown, E., 2019). Gen Z and Millennials stated their preference for a search engine, virtual assistant, or FAQ help centre when it comes to resolving issues (Brown, E., 2019). Furthermore, the reports show that younger generations are more comfortable in general with AI application and usage, and they are more enthusiastic about contacting support over chat, 44%. We can see the usage of virtual assistants each day, and how much help they give. The simplest example is the help on Just Eat or other delivering applications, wherein one step, just by providing your order number, you can get help and information needed. (Brown, E., 2019).

Customer's problems in trust with AI application

The main challenges for AI were the impact it has and will have on the society and labour. One of the biggest AI impacts on society is the ***automation of labo***r since it can directly displace labour or create new jobs in new areas. Historically, the human labor substitution with automation had led to the creation of complementary jobs in the long run. Some theories show how automation increases productivity growth. However, people are afraid of changes and generally of being replaced. Another threat is the one for the nature, since for making AI technologies a lot of energy and also pollution can me created. On the other hand, AI can be used in preventing the pollution, and for better sustainability. As for everything in life, there are always two sides that we can choose as human to do. It is up to us which side will we use more, and for which purposes will be apply AI technologies. Other challenges are also from economic side, since the costs of investing in these technologies can be quite high. Again, there is another picture, where we can see how AI has the potential to add 16% to the current global economic output and affect o the average contribution to productivity growth (McKinsey, 2018).). Moreover, with labor automation, Artificial Intelligence could add up to approx. 11% or around $9trillion to global GDP by 2030. AI also increases innovation in products which could deliver up to about 7% or around $6trillion of GDP by 2030. Back in 2018, research showed that 95% of the respondents want to pass routine tasks to AI, but only half of them trust it (Medium.com, 2018). Here we can see how at that time customers still haven't had full trust when it comes to AI. As we can assume, the biggest challenges with AI are the trust and loss of identity, but here is the point where we raise the question if this period of coronavirus is the perfect one to gain customers' trust in AI and use this situation to modernize, digitalize and use automation. AI is for sure our future, the key point is just the time when it will be applied throughout the whole hospitality field, and the question of when it will be the best to start redesigning with the AI application regarding the problems of human trust attitudes toward AI.

Methods and hypothesis

According to the thesis title: ***The evaluation of customers' attitudes and preferences in AI vs. Human hotel service scenarios based on the type of experience*****,** the aim of this study is to try and test the relationships between different AI vs. Human service experiences, which will be manipulated in order to see the changes in reactions between AI and Human service scenarios.

In this case, our IV will be AI vs. Human. The moderato will be the positive/negative experience, and as a consequence we will have a 2 (Ai vs. Human) x 2 (positive vs. negative) factorial design of the experiment. Our study will contain eight DVs that we want to test in order to see if any of those are significant. DVs are trust, satisfaction, engagement, loyalty, emotions, blame, perceived competence, fear of contamination.

The data collection method was based on pretesting and main study. In the pretesting the aim was to collect the data about the most preferable AI tools out of five offered. Data about each AI tool's familiarity and preference was gathered. Around 40 answers were collected, since all participants were exposed to all questions. In the main study, I collected 124 responses by experimental design as a research method in order to test the cause-effect relationship between DV and IV. The stimulus remained visible during all the time in which respondents were answering the questions, aimed at discovering the customers' attitudes towards AI vs. Human hotel service based on manipulated situations.

First hypothesis made is about the general preference between AI vs. Human service in the hospitality. This will be tested through the DVs, meaning that we will compare the means of some of the most appropriate DVs in AI vs. Human service scenarios, and through this conclude the clients' preference. In the research done in 2019, 73% out of 530 shoppers explained how they prefer self-service kiosks (King, R. 2019) rather than human service. The main reasons for this belief are that clients think they are faster (58%), safer (44%), and easier to use (43%), (Oliveira, A., Maia, M., Fonseca, M., and Moraes, M. 2020). This is why it is supposed that in the positive experience, people will prefer more self-service check in desk, since they also make them feel safe and protected, and can offer secure service (NationalCash, 2017). From this we can suppose out first hypothesis:

H1: Self-service check in desk will be more preferred among guests than human receptionist.

Second hypothesis is concentrated on the negative experience output. We will check the preference between AI and Human service when customers are met with negative experience in both scenarios. The levels of blame will be tested, meaning it will be tested towards whom are clients 'gentler' in blaming for negative check in experience. Blame is considered to be a social regulation, since its' primary function is to publicly regulate the behaviors.

Moreover, the negative emotions are strongly connected with blame, since blame judgements are often followed by anger or frustration, which are easily revoked by feeling of injustice (Wranik, T. and Scherer, K., 2010). When it comes to judging technologies, it is often difficult to say who is the one to blame, is it the programmers, manufacturers, AI itself or others? To add, perceived blame will be more likely assigned to technologies vs. Humans, since humans will be easier to other humans, and make quicker judgments towards the AI (Atabekov, A., & Yastrebov, O., 2018). From this we can create our second hypothesis:

H2: In negative experience, human service will be preferred, since people blame more machines.

Furthermore, I would like to investigate if the fear of contamination will have effect on the customer's preference and their behavior regarding AI vs. Human service scenarios. We can suppose that the fear of contamination in clients can have an impact on the relationship between trust and Self-service check in desk since if can switch the preference from Human service to AI service just because people fear being infected with COVID-19. According to Mertens G., Gerritsen, L., Duijndam, S., Salemink, E., and Engelhard, I.M., (2020) article on 'Fear of the coronavirus' topic, health anxiety, worry and safety behaviors were related to increased fear of getting contaminated by the current coronavirus. To add, there was a noticeable human distrust and social disruption noted from the beginning of COVID-19 (European Parliament, 2020). From this, we can argue how the fear of contamination can lead to changes in preference between AI and Human service in hospitality sector. We can suppose our third hypothesis:

H3: The relationship between AI/human and DV is influenced (moderated) by fear of contamination. In particular for people high in fear of contamination the presence of AI/human will generate a higher/lower DV.

RESULTS

From the experiement done on the 124 participants, 70.2% were male, and 22.6% were female. 70% of the participants were in the age range 18-24, therefore beloning to the group of Millenials, which is an important information to have, since each age groups has different preferences and behaviours.

For the first hypothesis,, respondents expressed a higher level of trust, perceived competence and satisfaction towards the AI agent than towards the human agent. If we tie preferences to satisfaction and trust, as well as perceived competence, then we can argue that **the first hypothesis is confirmed**. In other words, self-service check in desk is more trusted and perceived as more competent among guests than human receptionist, and it causes greater satisfaction of guests (hence, more preferred).

The findings on interaction of experience and agent imply the following:

- as expected, guests with a positive experience have a higher level of trust, perceived competence of agent, satisfaction, engagement, loyalty, and emotions.
- guests who have had a positive experience revealed higher levels of trust, perceived competence, satisfaction, engagement loyalty and emotions towards human agents.
- guests who have had a negative experience revealed higher levels of trust, perceived competence, satisfaction, engagement loyalty and emotions towards AI agents.
- When it comes to blame, guests with positive experience would blame AI agents more, while people with negative experience blame human agents more.

For the second hypothesis, respondents who had a negative experience with an AI agent had higher trust, competence, satisfaction, engagement, and loyalty than those who had a negative experience with human. In other words, we can argue that a negative experience with AI has contributed less to a decrease in trust, perceived competence, engagement, and loyalty. We can also interpret this as a greater resentment of human agents, because there has been a reduction in these variables. If we relate blame to these variables, then our results indicate that **people with negative experience blame people agents more than machines** (contrary to the hypothesized).

On the other hand, if we analyse only the Blame variable, then we note that the respondents blame people more (the mean value is greater for human agent), but the findings are not statistically significant. With these results, we can **reject the second hypothesis**, since the results showed opposite from what it was predicted to happen based on the previous research. The new results could be influenced highly because of the coronavirus effect and fear of contamination, due to high difference between male (70%) and females (30%) in the sample, due to age range etc.

Hypothesis 3 assumes that the relationship between AI / human experience and DV is influenced (moderated) by fear of contamination. In particular, for people high in fear of contamination the presence of AI / human will generate a higher / lower DV. Interestingly, this hypothesis was not confirmed for any of the analysed dependent variables. It is particularly interesting that the respondents showed a higher level of satisfaction, engagement, loyalty and emotion towards AI agents regardless of whether they are afraid of contamination or not. The reason for this result may be related to the structure of the sample. Namely, most of the respondents are in the age group of 18 to 24 years (as much as 70.2%). In other words, most respondents belong to Generation Z which is considered digital natives. It is very likely that the results would have been different if there were more respondents in the older age groups. In this regard, **the results of this study should be interpreted in accordance with the presented sample structure and most generalized to generation Z**. Also, since they are young people, they do not express a high level of fear of infection.

GENERAL DISCUSSION & CONCLUSION

As the COVID-19 rise the global fear of the virus spread, this directly influenced on the travel bans and restrictions, and heavily affecting millions of hotels all over the world. Main things that changed in the hotel industry based on the COVID-19 are the AI and robotics adoption, hygiene and safe environment, social touch limitation and health care. But the question is, can AI really help the hospitality industry and on which ways? According to Ivanov & Webster, 2019a, the application of AI in hospitality sector can be beneficial in terms of increasing the efficiency of work, the quality of services and in reduction of overall financial costs, mostly in salaries. In the period of COVID-19 the main benefits of AI and robotics were and are the maintenance of social distance and better control of hygiene.

However, on the other side, there are a lot of challenges that are making people be sceptic about trusting the AI. This refers on the reductions in jobs, security and privacy systems issues, (Boyd & Holton, 2018; Huang & Rust, 2018), the confidentiality of the data and lack of human touch. (Tussyadiah, 2020; Tussyadiah et al., 2018). Despite of the many current literature on the Artificial Intelligence aversion and its' application problems in hospitality sector, the study results suggests that Millennials and Gen Z currently do prefer AI service over Human receptionists. To add, the trust is higher in AI as well, as well as the overall satisfaction levels. However, we can discuss how this all can be driven by the fear of getting contaminated by COVID-19, since majority had and showed some levels of fear of being infected with this virus. Furthermore, participants believe that the AI is more competent and able regarding check-in process than the human receptionists. The study also showed that in negative experience with AI, participants would still continue using the service or be open to try self-service check in desk. The blame for the negative experience was higher for Human receptionist versus AI self-check in desk. Participants showed that they are actually more understanding when the machine makes a mistake, then when a human does it, which differs from the previous research findings by Atabekov, A. & Yastrebov, O. (2018), that say than people blame more machines, since they trust more humans based on the empathy. This can again be explained by the fear of contamination x trust. Since the trust towards human decreased in general in period of COVID-19, and the fear of contamination increased, the blame in humans can be seen as a subconscious output of this relationship.

The last decade was definitely marked by all the technological developments and applications. With the start of COVID-19 back in the early 2020, it was predicted that the rise for AI technologies and adoptions in different sectors will be needed. AI has been applied all over hospitality industry in the last five years, and we have already seen a lot of great examples of how can AI improve the customer service, but also help the employees and companies run tasks smoothly, growth more effectively, and reduce the time and costs for production. In times of COVID-19, the application of AI devices would mean between service, faster deliveries of tasks, better security, and safer and clean environment. Many argue how this period might not be good to apply these technologies based on the high costs of implementations, but it is conceivable that with the smallest investments in AI, the managers can achieve much for their clients. The purest and simplest examples of AI like Chatbots and self-service desks shows how easily we can improve our service, and offer to our guests the safest and fastest solutions.

AI has gradually succeeded to find its' way in the tourism and hospitality industry, and is mostly praised for reducing the tasks that had to be carried out manually or repetitive tasks. (World AI Show, 2019). The AI itself is making hospitality sector more competitive, since it can drastically reduce costs and improve overall customer service and satisfaction. Many leading hotel chains as InterContinental Group or Esplanade Hotel in Croatia, are already creating their own personalised apps making it easier for guests to have 24/7 fast information, services and in-room controls (InterContinental.com, 2021). This is definitely adding value to the quality of the company, a creating an additional competitive advantage.

Research contribution, limitations and future research

The present research will have important contributions for both marketing theory and the practice, responding to calls for more empirical generalizations that provide a better understanding of the effect of negative experiences as well as coronavirus on the customer's preference between AI and Human service in hospitality industry. As it was discussed in the first part, people's fear towards other humans has increased as a coronavirus consequence, since people fear getting affected if being too close to others, unknown and non-confident person. From a research standpoint, it will contribute to extant research on the general application of AI in the hospitality industry. From a managerial standpoint, I argue that the results of the study will provide several important insights and implications for different interest groups, including marketers, organizations, institutions, and public policymakers.

The most important insights for managers gathered from this research paper are as following:

1. Approximately 90% out of 124 participants stated that they are afraid of coronavirus spread or being contaminated. This is an important insight since this implies that it is important to show to guests all the measurements done in fight against COVID-19 spread. It would be beneficial to apply as many measures and technologies which can protect the guests and make them feel safe.

2. People do feel comfortable with AI tecnologies, and they showed a preference when choosing between AI vs Human service. This can make maagers feel more confident if wanting to apply AI technologies within their hotels, since previous researches showed contrasting results, where people did not trust the technolgoies, and prefered human assistance more. This is a positive sign of client's mind and attitudes changining.
3. People blame more humans than AI service when negative experience happens like slow check-in, missing reservation etc. This is another important insight for managers since previous studies showed that people would usually blame more AI only on the basis of higher empathy with other humans, and prejudice about AI being untrustworthy. This indicates that there could be overall higher satisfaction and trust levels, since clients are more forgiving towards the AI.
4. The replacement of human fron desk staff with self-service check-in desks would mean better protection, improvement in the operational efficiency of the hotel, decreased costs in terms of wages, better customer service, available 24/7, more time for staff to focus on the personalised approach towards the guest, rather than on the repetitive tasks.

This paper will offer an analysis of drivers of trust in the AI application, which is connected with the ability to guarantee a safe and healthy environment, which we can never 100% guarantee when it comes to humans since we cannot trach their movements and contacts with others. Furthermore, the managers should take into account the way how they present, share, promote their application of AI in hotels since this can lead to customer loyalty and also a competitive advantage in this specific situation we are dealing with coronavirus. Regarding this study specifically, it is interesting to get some new data about the AI vs. Human service preference in hotel sector after the COVID-19. We used this study to compare the data before and the data gathered from the analysis. The fact that clients prefer more AI vs. human service now is of crucial importance. This can be seen as customers' need, and as a motivator to managers to invest more is AI in order to make clients feel more secure, but also because AI can offer service much faster, make customers feel more unique, and feel their privacy and personal space is protected in this way.

Marketing implications lie in enhancing the AI perception to enhance trust, which will lead to positive brand equity and have an increased profit margin as a final result. This is why this paper is important to consider since it offers an insight into the previous problems between AI and hospitality, which is now much needed to be used as a change of strategy to survive.

The current study has only examined a narrow number of factors that could be connected and have an impact on the changes in preference between AI vs. Human service in the hospitality field. In the future research, other variables could be tested and included as moral and ethical issues, corporate reputation or employee opinions. Furthermore, the study was done on 124 participants, therefore as a future research it would be beneficial to do the same research on the much larger sample. Thirdly, the sample consisted of approx. 70% men, 30%women, which could also have an impact on our results. Based on the fact that there is a much higher percentage of men in the science, technology, engineering and mathematics (STEM) workforce (Garcia, J.M., & John, J., 2019), there could have been some biased answers, or more answers that are in benefit of AI rather than humans, since there was a 70-30 ration between genders. Therefore, it would be more appropriate to have a balance between males and females, or to even do a research on this topic by dividing the groups by the gender. To add, the sample age range was 18-40, resulting in 92.6%. This was actually targeted only because Millennials and Gen Z are the drivers of the major changes in customer behaviour. These generations are the once that would like to see more technology applied in the everyday life, and enjoy having more unique and personalised experience (Brown, E., 2019). However, it would be interesting to have a sample that would contain different generations, in order to analyses the deviations and differences between them as groups. Regarding the impact of COVID-19 on hotel industry in general, the availability of big dana and analytics should be used in order to collect as much dana from the online users and hotel guests regarding the AI, their impact on health, health care practices and more. Furthermore, it would be worthwhile to examine how can AI help managers avoid the similar potential crises in the future, which means how to apply a good crisis management, and offer AI solutions for the same. This would be highly beneficial in terms of examining the plans for infectious disease control and the support and crises management schemes offered by the government. Lastly, it would be of proper benefit for future studies to include the examination of what could be the potential positive outcomes or lessons the managers and/or companies gathered. This, in particular, can include the in-depth interviews with the managers of the leading hotels worldwide, by surveys, experiments etc.