Repositório ISCTE-IUL

Artificial Intelligence in Digital Customer Journey

Abstract: Artificial intelligence (AI) is present in many business areas, being the marketing of the fashion industry one of them. In this sense, AI becomes relevant for firms, helping to acquire better consumer data and stand out from the competition by offering personalized, rich, and unique experiences. This study seeks to understand the current state of interaction that consumers have with the AI during the digital customer journey (CJ), in the fashion industry. This research focused on the fashion industry and addresses the following AI technologies: recommendation systems, chatbots and virtual testers. These variables were deepened through an online questionnaire and an evaluation of the offerings that various brands have on their websites and apps. The data shows that people who interact with AI are younger and have self-confidence, mainly looking for a quick response to their requests, mainly through recommendation systems, chatbots and virtual testers.

1. Introduction

This article seeks to relate two study variables, AI, and marketing, framed in the theme of the customer journey (CJ), becoming relevant in the sense of seeking to demystify the AI and demonstrate its applicability during the CJ specifically in the fashion industry, as well as the motivation that consumers currently demonstrate with it. We are facing an era of digital consumption where consumers choose digital channels to make their purchases (McKinsey & Company, 2020), which is highly relevant to study how to improve the experience of consumers while interacting with brands, which can provide AI technologies to their customers. Currently there are few articles that combine AI and marketing (Feng et al. , 2020) which motivated this research since its importance is high, especially when it is studied focusing on a specific industry, in this case the fashion industry, and it is possible to draw more practical conclusions for this industry.

The main objective of this article is to analyze the application that the AI has during the digital CJ, in the fashion industry. It aims to achieve three theoretical objectives, first exploring the union of AI and marketing, focusing on the CJ, in this case the digital. This objective seeks to draw a map in which the consumer uses the AI to meet their needs in all phases of the CJ. Secondly, to fill the gaps found in existing literature to date, complementing it by understanding the user experience of Portuguese consumers in this specific industry. Finally, this study aims to add value to the study of the art of AI in marketing and in the fashion industry, by understanding the reasons that are holding consumers not interacting with AI, in addition to what was previously mentioned regarding the consumers that interact.

This study aims to deepen the themes related to AI and digital CJ, namely through the search for answers to the research questions that were previously presented. To this end, the following structure has been designed: Section 1 comprises the literature review where the concept of AI is first sought to be decoded. The Marketing of AI concept will be presented below, which will lead the research to the next point: the application of AI technologies in the CJ. Finally, some of the benefits that the literature presents to consumers when interacting with these technologies will be highlighted. Section 2, methodology, includes the research questions and the methodology that was used to obtain the necessary answers, and a quantitative analysis was chosen through the elaboration of a questionnaire. This Section also includes a characterization of the sample, to facilitate the understanding of the analysis. In Section 3, the results obtained through the surveys are presented in the format of online questionnaires. Section 4 will discuss the results and compare them with the authors' theories presented in the literature review, with the purpose of trying to answer the research questions to deepen the research. Section 5 will present the conclusions, where some final considerations are to be gathered, as well as some contributions that this research offers to the study of these themes, it will also understand the limitations encountered throughout the research and, finally, some suggestions for studies to be carried out in the future.

2. Literature Review

2.1. Artificial Intelligence

AI refers to machines that can learn, ration and act by themselves, managing to make their own decisions when confronted with new situations, in the same way that human beings would do (Hao, 2018).

The development of AI was based on four lines of thought (Russel & Norvig, 2016), two of them refer to the process of thinking and reasoning: systems that think like human beings, that automate activities such as decision making, problem solving and learning, such as artificial neural networks; and systems that think rationally, that simulate the rational logical thinking of humans, that is, research on how to make machines capable of understanding, reasoning and acting, such as intelligent systems. While the rest refer to behavior:

systems that act as human beings, that is, computers that perform tasks similar to people, such as robots; and finally, systems that act rationally, that try to imitate the rational form of human behavior, such as intelligent agents. It is also relevant to mention that the lines of thought that think and act as human beings measure the success of how faithful they are to human performance, while those that think and act rationally measure success, comparing it to an ideal concept of intelligence, rationality. According to Russel and Norvig (2004) (as cited in Gomes, 2010) a system is considered rational if it performs everything correctly, with the data it has available. It is possible to say that the four dimensions presented above have been continued with a tension between those that are centered on human beings and those approaches centered on rationality (Gomes, 2010) - Figure 1.
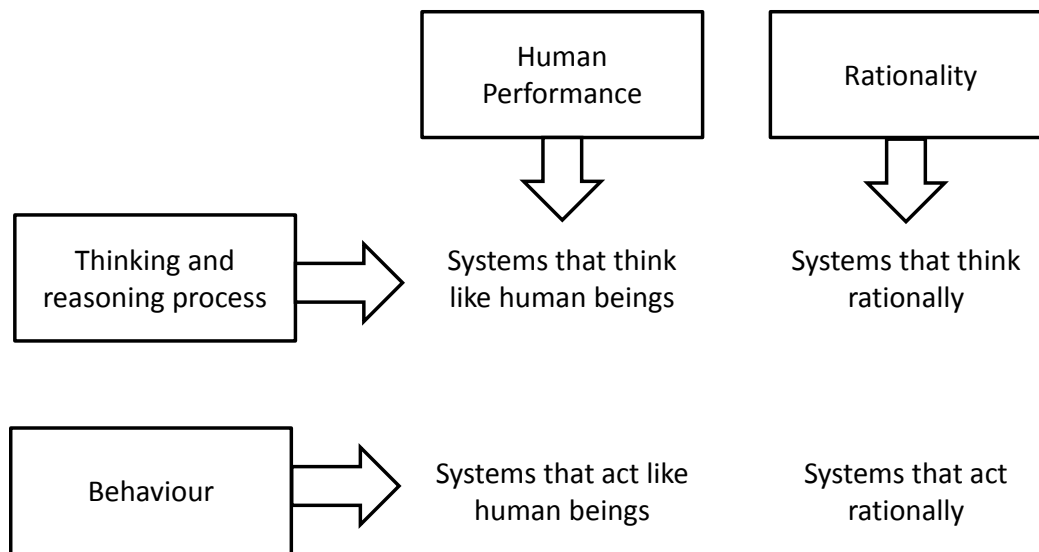
Figure 1 Summary of the lines of thought presented by Russel and Norvig (2016)

Source: Author's elaboration

2.2. Artificial Intelligence in the customer journey in the fashion industry

Thiraviyam (2018) presents the concept of Artificial Intelligence Marketing as a method of leveraging customer data or information to anticipate their next action and improve the CJ. The authors Overgoor et al., (2019) go deeper and define it as the "development of artificial agents that according to the information they have about consumers, the competition, and the company focus, suggest and/or take marketing actions to achieve the best results. More recently authors Jain and Aggarwal (2020) presented it as a technique that optimizes technology to enhance the experience of consumers.

It is through AI that applications are being made available that are changing the way each one of us makes our online purchases today, influencing the way consumers research products or brands, how they evaluate various alternatives, how they make their choices and consume products (Libai, et al., 2020). This article will focus on three AI technologies being made available by the fashion industry (Liang et al., 2020; Luce, 2019): recommendation systems, chatbots and virtual tasters.

2.2.1 Recommendation systems

The recommendation systems emerge thanks to machine learning that through predictive analysis seeks to understand the behavior and preferences of each individual consumer and recommend products that you

will probably like or buy (Luce, 2019). This technology plays a critical role in the discovery of products in e-commerce since it allows to increase the possibility of conversion of consumers to purchase since they present the right results to consumers (Luce, 2019). This technology is very relevant in the pre-purchase, that is, in the phase in which the consumer is considering several options to satisfy his needs and during the evaluation that he makes his options.

2.2.2. Chatbots

The chatbots present a solution that allows to support consumers throughout the CJ (Shim et al., 2012) through a chat with a virtual assistant capable of conducting conversations between client/brand through a virtual agent, answering customers 24/7, to simple and common questions without the need for human intervention (Kietzmann et al., 2018; Overgoor et al., 2019) and advise customers by reducing uncertainty playing a role of high importance in pre-purchase (Hoyer et al., 2020). The chatbots are based on NLP, more specifically word processing, presenting a high writing and text production capacity, allowing companies to acquire information from about clients, their tastes, among others (Comarella & Café, 2008; Jarek & Mazurek, 2019). In this way brands can reduce friction during product discovery and provide highly customized experiences to consumers seeking products, information, and customer service (Luce, 2019). Chatbots gain relevance in the fashion industry also in the purchase phase, as it allows customers to buy products with a simple click during the conversation with the virtual assistant (Luce, 2019; Shim et al., 2012). Additionally, customers can use chatbots for post-purchase customer service, where virtual assistants can provide feedback and recommend additional consumption, with this technology having a medium post-purchase impact (Hoyer et al., 2020).

2.2.3. Virtual tasters

Additionally, brands can provide consumers with AR experiences through the virtual tasters solution, facilitating their imagination (Hoyer et al., 2020) as it allows customers to "try" products online before buying them (Kim & Cheeyong, 2015; Shin & Baytar, 2014), through the CV that uses image and facial recognition (Jarek & Mazurek, 2019) to enhance customers' shopping experience by creating an emotional connection that complements the physical world (Hoyer et al., 2020). The interaction with this technology is particularly important in pre-purchasing (Hoyer et al., 2020) as it allows consumers to improve their knowledge of the products (Yim et al., 2017) and increase their curiosity, pleasure and fun when trying new products (Beck & Crié, 2018; Hilken et al., 2017; Scholz & Duffy, 2018). The incorporation of this technology works as a catalyst for action (Hoyer et al., 2020) by stimulating a better and faster response from the client (Murgai, 2018), where he will later become involved in the action (Epstude et al., 2016) which will eventually be reflected in the revenues, as well as decrease disappointment in the post-purchase (Jarek & Mazurek, 2019).

The representation presented in Figure 2 intends to summarize and exemplify a total path that a client can take with a brand if it makes available all the AI technologies previously presented. Thus, a representation of a client's touchpoints in the fashion industry is made, that is, the client's interactions with a brand either from the website or from an app, indicating each AI technology that can be used at each stage during the CJ.
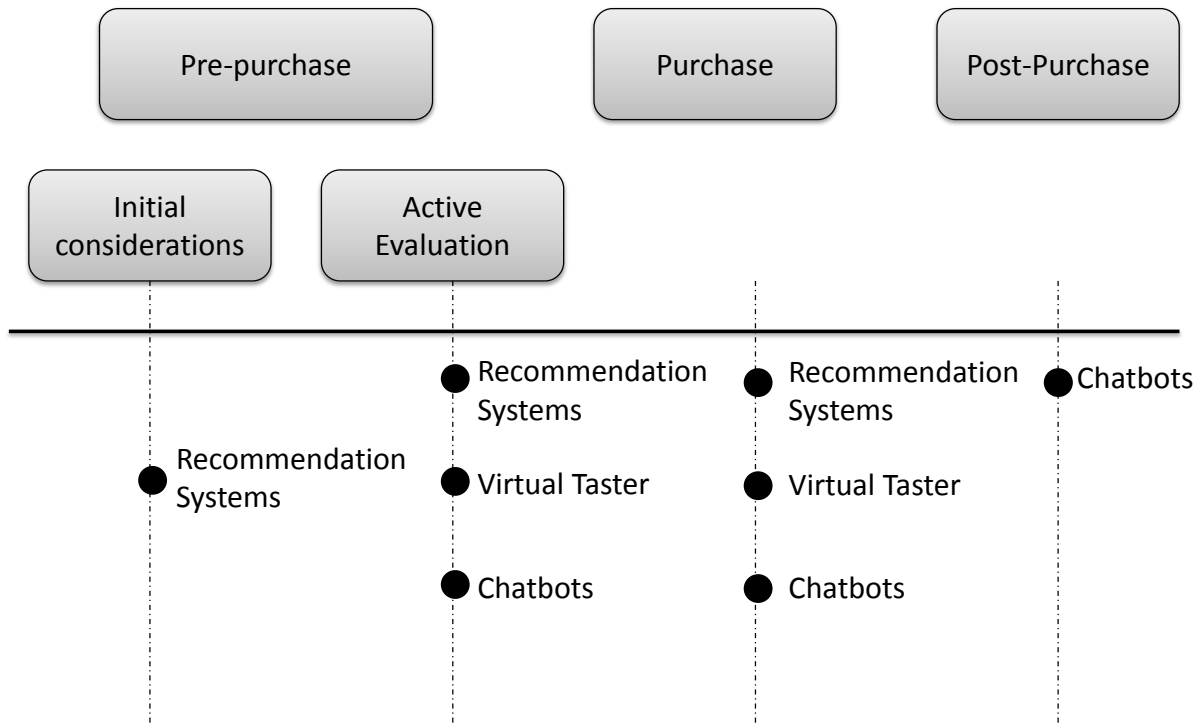
Figure 2 Digital CJ map

Source: Author's elaboration

2.3. Added value for consumers of interaction with AI

The application of AI technologies throughout the CJ offers benefits to consumers when they interact with them, which is reflected in their shopping experience. These interactions enable consumers to make purchases more conveniently and quickly, thanks to improved processes such as automated payments, better customer service, available 24/7 via chatbots (Jarek & Mazurek, 2019; Thiraviyam, 2018) and better information gathering (Hoyer et al., 2020). In addition, it allows for a new dimension in the consumer-brand relationship, in the sense that it allows the consumer to know the product, virtually, before acquiring it, through the RA with virtual tasters (Jarek & Mazurek, 2019; Thiraviyam, 2018). More interactive, lively, and richer experiences are created for consumers (Hilken et al., 2017; Yim et al., 2017), facilitating the rapid imagination of the consumer to the surround of a certain product going beyond the physical world (Hoyer et al., 2020). In this way it is possible to diminish the decline in the post-purchase (Jarek & Mazurek, 2019; Thiraviyam, 2018). And finally, it allows a high personalization of the post-purchase service that goes beyond the basic product and thus creates additional value (Jarek & Mazurek, 2019; Thiraviyam, 2018).

3. Methodology

3.1   Research Model

AI is increasingly present in the daily life of the community through various industries, one of which is fashion. As already presented by Liang et al. (2020) and Luce (2019) some of the advanced technologies of

AI that consumers can have direct contact with throughout the CJ in the fashion industry are ML for recommendation systems, PLN for chatbots and CV for virtual tasters through AR technology. However, it has proven pertinent to investigate how these technologies are being received by consumers, that is, with which in practice consumers most interact, as well as the relationship of interaction with the age group and the confidence that consumers have in AI technologies and finally, how often they interact. Motivated the following research question: Q1 - Which are the technologies of AI with more interaction by customers during the customer journey?

Once it is understood what AI technologies are available from companies that are having more interaction from customers, it becomes relevant to highlight what benefits they gain from having these technologies present during the CJ in the fashion industry. The literature has revealed a lot of added value that can justify the reasons that lead consumers to interact with these technologies. Among them, the fact that they are allowed to make purchases in a more convenient and faster way, enabling them to have very personalized shopping experiences and in another purchasing dimension that without the IA would not be possible, as presented by Hoyer et al. (2020), Jarek & Mazurek (2019), and Thiraviyam (2018). Therefore, this study aims to investigate what are the reasons that lead to interaction and additionally to non-interaction with AI technologies. Thus, the second research question was formulated: Q2 - What are the reasons that lead consumers to interact with AI technologies?

Complementing the issues presented above was the need to go beyond analyzing the technologies consumers are currently interacting with. The authors Comarella & Café (2008), Hoyer et al. (20209, Jarek & Mazurek (2019), Kietzmann et al. (2018), Kim & Cheeyong (2015), Liang et al. (2020), Luce (2019), McKinsey & Company (2019), Murgai (2018), Shim et al. (2012), Shin & Baytar (2014) and Thiraviyam (2018) have demonstrated to all AI technologies the usefulness that each one in the fashion industry, thus becoming a starting point for the next research issue applying to the CJ. Thus, it became relevant to analyze the usefulness that each AI technology has for consumers, then analyze the market by analyzing what technologies are being made available and by what kind of brands and comparing by technology the interaction and utility that each has in CJ in the fashion industry. Thus, was formulated the third and final question of research: Q3 - What are the perceptions of consumers at the level of usefulness of interaction with AI technologies, regardless of their current use?

To answer the questions presented, a quantitative approach was followed, through the adoption of the survey technique, in the format of a questionnaire for data collection. According to Bhattacherjee (2012) it is the method that best suits when the analysis unit of the study is people. According to Carmo and Ferreira (2008) in the questionnaires the researcher is absent in the act of inquiry. Regarding the questions these have a higher degree of directivity, since it is a structured questionnaire made up of closed questions, which are understandable to the respondents and not ambiguous. Throughout the questionnaire four types of questions were asked: identification questions, which aim to identify the respondent through specific social groups (gender, age and academic qualifications); rest/preparation questions, to introduce questions, a pause or change subject, which may not be dealt with later; information questions, to collect data about facts and opinions of the respondent; and finally, center questions, to verify the veracity of other questions inserted in another part of the questionnaire (Carmo & Ferreira, 2008). Regarding the type of answers to the questionnaire, answers were made available to respondents in multiple choice format for questions on characterization of respondents, or in others whose nature clearly required the definition of one or more options. In the others, respondents were asked to indicate their degree of agreement with the question asked, as these were questions that sought to evaluate their experience, opinion and attitude towards a given practice. For that, a Likert scale with five levels was used, where each extreme indicated semantically opposed positions, for example, "Level 1 - Terrible experience; Level 5 - Excellent experience". This method allows obtaining complex and subjective information, such as perceptions, attitudes, and opinions of the respondents (Cohen et al., 2007).

First, it was necessary to define a target population to later select a sample with some members of this population (de Vaus, 2002). This research was based on a pragmatic or inductive character and was conducted from a non-probabilistic sample for convenience, constituted according to the availability and accessibility of the elements addressed (Carmo & Ferreira, 2008). According to Battaglia (2008), researchers choose samples of this type for questions of ease in obtaining answers, because they allow exploring a research question relatively quickly.

However, due to their nature, coexistence samples are more prone to influences beyond the control of the researcher (Saunders et al., 2016) and do not allow for accurate general statements to be made about the population after the survey results have been surveyed by questionnaire. As mentioned above, the sample is cohabitation since the participants were selected from personal contacts and disseminated among their friends to increase the speed of response collection.

In this sense, an online questionnaire was placed, which was built through the Google Forms application associated with a link to make it possible to use it via Internet. After the survey was completed, the data were imported via Excel into the IBM® SPSS® Statistics - Version 26 statistical analysis program, and the results were analyzed and consequently elaborated through the necessary outputs for the composition of this research. The main objectives of the survey were to collect as much information as possible about current consumer use and their opinion about the usefulness of being able to extract from interaction with AI during the process of purchasing an online fashion product.

In terms of quantitative analysis, the technique of analytical statistics was considered, to help infer results on the form of independence tests based on non-parametric tests, and descriptive statistical analysis, using the exposure of results obtained through tables and charts with a set of techniques and rules that summarized the information collected from the questionnaires in a dispersion of data in the form of percentages and frequencies (Vilelas, 2020).

Briefly, the first stage of this research involved bibliographic research and information processing; the second, the transfer of the theoretical construct to the field of observation to obtain the best possible confidence in terms of results; the third, field work and the collection of data resulting from questionnaires and, finally, the fourth, which consisted in the quantitative analysis of data.

As far as external validity is concerned, i.e., the possibility of generalizing the results found to other contexts or samples, this study has reinforced some of the existing theory regarding AI technologies made available to clients during the digital CJ in the fashion industry. Additionally, new information was discovered on this same theme, allowing contextual analyses to be carried out in the future by comparing results between different countries in this field of research. Figure 3 illustrates the research model used in this study.

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                    │     Literature Review       │
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                    │  -  Marketing of Artificial │
                    │     intelligence            │
                    │  -  Artificial intelligence on │
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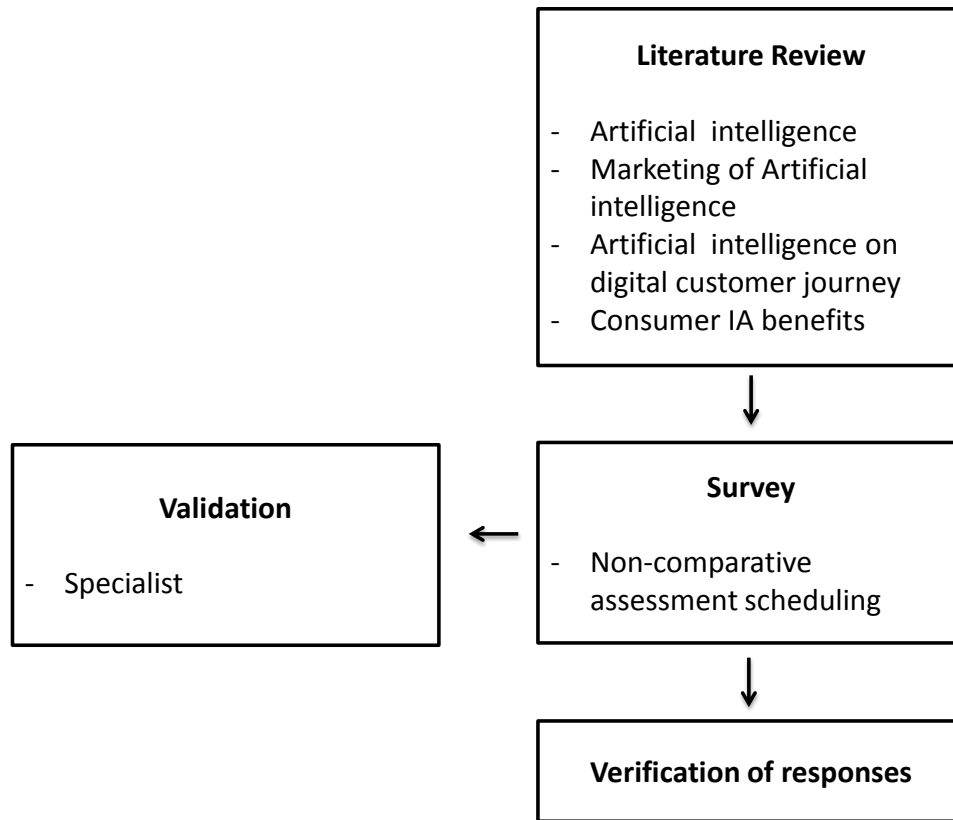
Figure 3 Research model

Source: Author's elaboration

Table 1 tries to give an account of the specific research questions that were formulated in order to respond to the general objective of the study, while trying to establish a relationship between them and the theoretical perspectives present in the literature review carried out and that are at its origin.

Table 1 Analysis model that relates: objectives and research questions, literature review and analysis techniques

Objective	Research Issues	Literature Review	Data analysis technique used
Analyze the application of AI during the digital customer journey in the fashion industry	(Q1). What are the most interactive AI technologies for consumers during the customer journey?	(Liang et al., 2020); (Luce, 2019).	Descriptive analysis Association analysis Non parametric test
	(Q2.) What are the reasons that lead consumers to interact with AI technologies?	(Hoyer et al., 2020); (Jarek & Mazurek, 2019); (Thiraviyam, 2018).	Descriptive analysis
	(Q3). What are consumers' perceptions of the usefulness of interacting with AI technologies, regardless of their current use?	(Comarella & Café, 2008); (Hoyer et al., 2020); (Jarek & Mazurek, 2019); (Kietzmann et al., 2018); (Kim & Cheeyong, 2015); (Liang et al., 2020); (Luce, 2019); (McKinsey & Company, 2019); (Murgai, 2018); (Shim et al., 2012); (Shin & Baytar, 2014); .	Descriptive analysis Matrix of attributes

Source: Author's elaboration

- Sample Characterization

The collection involved 130 respondents, who responded to an online questionnaire, of which 80 (61.5%) were female and the remaining 50 (38.6%) were male. Regarding the age group of the respondents, we can say that the study managed to reach all ages, being 39 (30%) of the respondents aged between 18 and 24 years, 29 (22.3%) from 25 to 30 years, 11 (8.5%) from 31 to 40 years, 37 (28.5%) from 41 to 59 years, and finally 14 (10.8%) of the respondents 60 or more years. In this way, the ages between 18 and 30 years of age, and 41 to 59 years of age are more prominent. As far as academic qualifications are concerned, 22 (16.9%) have a secondary education or equivalent, 54 (41.5%) have a degree, 50 (38.5%) have a master's, MBA or post-graduation, and the remaining 4 (3.1%) have a PhD.

Table 2 Characterization of the sample

(N=130)

		N	%
Gender	Female	80	61,5
	Male	50	38,6
Age group	18 - 24 years	39	30
	25 - 30 years	29	22,3
	31 - 40 years	11	8,5
	41 - 59 years	37	28,5
	+ 60 years	14	10,8
Academic qualifications	High school or equivalent	22	16,9
	Degree	54	41,5
	Master / MBA / Post Graduation	50	38,5
	PhD	4	3,1

Source: Author's elaboration

4. Results

4.1. Interaction with AI technologies

Of the 130 respondents covered in this study only 72 (55.4%) recognize the use of AI technologies during the CJ of fashion products, and the remaining 58 (44.6%) do not interact with them.

Table 3 Consumer interaction with AI

	N	%
Interacts with AI	72	55,4
Do not interact with AI	58	44,6
	130	100

Source: Author's elaboration

It becomes relevant to analyze the association that the interaction has with the age group (Table 4). Thus, the analysis of the Coefficient Eta was performed, since we are referring to a quantitative variable, age range, and another nominal one, the interaction with AI technologies. The relation between the age group and the interaction of consumers with AI technologies has an association of moderate intensity (Stage=0.507), that is, 25.7% of the variation of the interaction with the technologies is explained by the age group (Stage^2=0.257).

Table 4 Step Coefficient

	Eta	Square
Age group * Interaction with AI technologies	0,507	0,257

Source: Author's elaboration

Additionally, we verify that the minimum and maximum age value is the same for both interactions with these technologies, 18-25 years, and +60 years respectively. However, it is clear that most respondents who claim to interact with AI technologies in the fashion industry are more focused on younger age groups, mainly between 18 and 30 years old. The opposite happens when we analyze the non-interaction with these technologies, where it focuses more on respondents of higher age group, that is, from 41 years old.

Additionally, it was possible to ascertain how often respondents interacted or not with these technologies (Table 5), thus 35.4% of the 130 respondents interact on a monthly basis and 31.5% experienced it only once. On the other hand, 17.7% interact with these technologies weekly. Only 3.8% never interacted with these technologies and as their antithesis 3.8% interact daily.

Table 5 Frequency of interaction with AI

	N	%
Never interacted	5	3,8
Tried it once	41	31,5
Annually	10	7,7
Monthly	46	35,4
Weekly	23	17,7
Daily	5	3,8
Total	130	100

Source: Author's elaboration

In order to better understand consumer interactions, consumer confidence in AI technologies was analyzed

using the likert scale (Table 6). For level 1 it was considered that the respondent does not trust and level 5 as totally trusting. Thus, 36.9% of the 130 respondents trust the technologies, 31.5% trust a lot, 12.3% do not, 10.8% trust little, and finally, only 8.5% trust totally.

Table 6 Trust in AI

	N	%
1 - I don't trust	16	12,3
2 - I trust little	14	10,8
3 - I trust	48	36,9
4 - I trust a lot	41	31,5
5 - I fully trust	11	8,5
Total	130	100

Source: Author's elaboration

Thus, interaction can be influenced by whether an individual has confidence in AI technologies. For better understanding, the non-parametric chi-square independence test (Table 7) was performed, which is based on the following hypotheses:

H0: The interaction with AI technologies is independent of the confidence that consumers have in AI, in the population.

H1: The interaction with AI technologies is not independent of the confidence that consumers have in AI, in the population.

First, it is necessary to check the conditions of applicability. Since both variables are qualitative; the percentage of cells with an expected frequency below 5 is 10% (<20%); and there are no cells with an expected frequency below 1 since the lowest expected frequency value is 4.91, the applicability conditions are checked. Since $Sig = 0.000 < 0.05$ (Pearson's Chi-square = 22.255) the decision is to reject H0 and it can be assumed that the variables are associated in the population.

Table 7 Pearson's Chi-square Test

	Value	gl	Asyntotic Significance (Bilateral)
Pearson Chi-square		4	0,000
Reason for likelihood	23,748	4	0,000
N of Valid Cases	130	4	

- 1 cell (10.0%) expected a count less than 5. The minimum expected count is 4.91.

Source: Author's elaboration

Then, the Cramer V coefficient (Table 8) was analyzed to evaluate the intensity and association of variables. Since the Cramer V corresponds to 0.414 the variables have a moderate intensity of association.

Table 8 Cramer V Test

		Value	Approximate Significance
Nominal by Nominal	Fi	0,414	0,000
	V for Cramer	0,414	0,000
N of Valid Cases		130	

Source: Author's elaboration

From Table 9 it is possible to try to describe this association. The minimum value for respondents who do not interact with the technologies is 1 - I don't trust, while those who do interact are 2 - I trust little. Regarding the maximum for the respondents who do not interact, it is 4 - I trust a lot, while for those who interact, it is 5 - I trust totally. Regarding the confidence levels for those who do not interact 25% trust little

(Q1=2), and 75% trust (Q3=3). The confidence levels of those who interact 25% trust (Q1=3) and 75% trust a lot (Q3=4). It is clear that the respondents who do not confide in AI technologies choose not to interact with them, and the position occurs when the respondent trusts.

Table 9 Cross Table Reliability of AI * Interaction with AI

			Interaction with AI technologies		
			No	Yes	Total
Confidence in AI technologies	1 - I don't trust	N	14	2	16
	2 - I trust little	N	9	5	14
	3 - I trust	N	22	26	48
	4 - I trust a lot	N	10	31	41
	5 - I fully trust	N	3	8	11
Total		N	58	72	130

Source: Author's elaboration

Of the 130 respondents, 72 claim to interact with AI technologies throughout the process of purchasing fashion products. Thus, it has become important to understand with which technologies these most interact to answer research question 1. It is possible to conclude that the vast majority (72.20%) interact with the product recommendations that brands offer them. A high number of respondents interact with chatbots (37.50%), finally, a small part of respondents (16.70%) interacts with virtual tasters through AR.

4.2. Reasons for interaction

To answer the second research question, it was sought to understand why consumers interact with these technologies. According to the study currently conducted, what leads to the interaction of most respondents is to obtain a quick response at any time (68.10%). The following reasons were most frequent to obtain advice/recommendations from brands (47.20%) and to obtain ideas and inspiration for future purchases (37.5%). The least frequent reason is to "try" products before buying them to see how they will look (12.5%).

On the other hand, it is relevant to understand why 58 of the respondents did not interact with these technologies. It is also clear that most of the reasons are important for consumers who take this non interaction option, among them the fact that they are not willing to be part of the preconceived idea that AI by automating processes can replace human professionals (31%), as well as the fact that these consumers do not feel comfortable with interaction with machines or robots (27.6%). Additionally, respondents do not remember to use them (24.10%) and feel manipulated by following brand recommendations (22.40%). Additionally, 20.70% of the respondents do not know when they can use them, 10.60% feel it is a violation of their privacy, and finally, 5.20% choose to use them since they are aware of negative experiences.

In order to complement the previous analysis, it became relevant to understand whether respondents who currently do not interact with these technologies consider a future interaction, since these technologies allow them to obtain a personalized and interest-oriented shopping experience. It is possible to visualize that 57% of the 58 respondents may consider this interaction, which together with the 19% who manifest consider a future interaction demonstrates a possible positive trend for the future of these technologies and their use in the CJ in the fashion industry. Only 24% maintain their current position, that is, not interact, even with the benefits they present.

4.3. Utility of AI technologies

After the respondents were confronted with several statements about the usefulness of these AI technologies and were asked to choose all the options that they considered useful the brands made available during the digital CJ. Table 10 presents these results were in the second column it is identified for each of these situations which technology is used. It is clear that in general the technology that was considered most often useful was the chatbots, where together 83.3% of respondents highlighted them. However, 48.6% considered this technology more useful in the pre-purchase and 34.7% in the post-purchase. Next was the recommendation system, by 56.9% of the inquired, being that the inquired consider useful "to have recommendations of products that the brands suggest to you in their websites". Finally, the AR was considered useful by 33.3% to "try products before buying them (virtual tasters)".

Table 10 Utility of each AI technology

Response options	AI Technology	N	%
Have product recommendations that brands suggest to you on their websites	Recommendation systems (Predictive Analysis - ML)	41	56,9
Have a virtual agent (chatbots) at your disposal, during 24/7, to be able to clarify your doubts in the pre-purchase	Chatbot (PLN)	35	48,6
Have a virtual agent (chatbots) at your disposal, for 24/7, to support you in the post-purchase	Chatbot (PLN)	25	34,7
Use augmented reality to try products before you buy them	Virtual tasters (CV)	24	33,3

Source: Author's elaboration

To complement the analyses previously presented, it was felt the need to carry out a comparison between technologies that are currently interacting during the CJ and those that the respondents consider useful. It is evident that for chatbots, and virtual tasters the usefulness is much higher than the current interaction with these technologies. The opposite is true when we analyze the recommendation systems in which the current interaction is superior to the utility. It is also relevant to highlight the fact that the usefulness of AR, in virtual tasters, is twice as much as the current interaction.

4.4. Complementary results

To complement the results presented above, two introductory questions were asked to all respondents in which it is sought to understand the behaviors of respondents during phases of the CJ (Table 11). Initially it was sought to understand if in the initial phase of discovery, the respondents conducted research on fashion products online and if they compared more than one option that aroused interest through the websites of their products. Most respondents (83.1%) recognize that they use brand websites to perform this analysis.

Table 11 Interaction with brand websites to conduct surveys

		N	%
When you are undecided between more than one option to satisfy your need or desire, do you compare these options using the websites of the brands?	Yes	108	83,1
	No	22	16,9
		130	100

For those respondents interacting with AI, it was attempted to understand whether the recommendation systems were being efficient, and whether overall the interaction with these technologies was really revolutionizing their purchasing experiences (Table 12). Therefore, the 72 respondents consider that the recommendation systems that have already interacted never hit 100% with their preferences. However, 36 respondents (50%) consider that the recommendations were to their liking many times, and 29 of those surveyed (40.3%) that are only sometimes correct. In the most negative poles of this subject a small number of respondents considered that they never or rarely got it right, 3 (4.1%) and 4 (5.6%) respectively.

Table 12 Assertiveness of recommendation systems

		N	%
As a rule, do the fashion product recommendations that brands suggest to you on their websites meet your preferences?	1 - Never	3	4,1
	2 - Rarely	4	5,6
	3 - Sometimes	29	40,3
	4 - Many times	36	50
	5 - Always	0	0
		72	100

The 72 respondents were also asked if they considered interacting with virtual tasters, through the use of AR, could diminish the purchase decision. Most of the respondents (66.7%) consider that this application could diminish the post-purchase deception as it can be analyzed in Table 13.

Table 13 Virtual tasters for decreasing post-purchase decline

		N	%
Do you consider that by using AR applications, such as virtual tasters, you can diminish the post-purchase deception?	Yes	48	66,7
	No	24	33,3
		72	100

To gain an insight into the perception of respondents interacting with these technologies, an attempt was made to understand their agreement with the possibility of these technologies making consumer experiences more convenient and faster (Table 14). Thus, 41.7% agree that these technologies make experiences more convenient and faster and 30.6% neither agree nor disagree. Only 16.7% agree totally with the statement, however 2.7% disagree and 8.3% agree little. So we can conclude that the implementation of these technologies for consumers has a positive trend.

Table 14 Purchasing experience with AI

		N	%
"Shopping through AI technologies has become a more convenient and fast	1 - I disagree	2	2,7
	2 - I agree little	6	8,3

experience".	3 - I neither agree nor disagree	22	30,6
	4 - I agree	30	41,7
	5 - I totally agree	12	16,7
		72	100

The respondents were also asked about their degree of knowledge regarding the concept of AI (Table 15), which gave the following results: 43.9% of all respondents reveal knowledge about the subject, 22.3% know little, 20.8% know a lot, 9.2% know a lot or work in this area, and finally, only 3.8% are not familiar with the concept, so I have no knowledge. It was possible to realize a descriptive analysis which revealed that the average knowledge of the respondents of the present study is 3.0923, that is, they know about the concept.

Table 15 Degree of knowledge about AI

		N	%
Degree of knowledge about the IA concept	1 - I don't know anything	5	3,8
	2 - I know little	29	22,3
	3 - Sei	57	43,9
	4 - I know a lot	27	20,8
	5 - I know a lot / Work in the area	12	9,2
		130	100
	Average		3,0923

It has become interesting to understand whether the knowledge individuals have about AI influences the confidence they have for this technology. Thus, a correlation analysis was performed, through Spearman's Ro, between both ordinal qualitative variables: degree of knowledge about the concept of AI and confidence. A small correlation between the two variables of 0.289 was found, being a low moderate value, and strong conclusions cannot be drawn, as we can see in Table 16, so the knowledge about AI can have some influence on the confidence that individuals feel with AI.

Table 16 Spearman's Root Test between knowledge degree * confidence in AI

		Confidence in AI technologies
Degree of knowledge about the IA concept	Correlation coefficient	0,289**
	Sig. (2 ends)	0,001
	N	130

** Correlation is significant at level 0.01 (2 ends)

4.5. Matrix of attributes

To complement the results obtained with the questionnaires, a matrix of attributes (Table 17) was carried out comparing the offer that 14 brands from different ranges make available to their customers during the digital CJ, that is, fast fashion brands, sports brands, and luxury brands. This comparison is presented in Table 6.16. where brands are divided by range, and technologies that are directly connected to the brands' websites and apps, such as recommendation systems, chatbots and virtual tasters, will be compared. Thus, for the technologies of websites and apps the systems of recommendation are present in most of the brands under study, this is not the case with the chatbots, which are more available by fast fashion brands and luxury brands. The availability of virtual tasters is currently more present in some sports and luxury brands.

Table 17 Matrix of attributes

		Recommendation system	Chatbot	Virtual Proofreaders
Sports brands	Deeply			
	Rip Curl			
	Adidas			
	Nike			
Fast fashion brands	Mango			
	Massimo Dutti			
	Victoria's Secret			
	Sacoor Brothers			
	Levi's			
Luxury brands	Gucci			
	Farfetch			
	Dior			
	Louis Vuitton			
	Prada			

5. Discussion

5.1 Technologies of AI with more interaction by consumers during the customer journey?

In order to complement the literature this study concluded that those who interact with AI technologies throughout the digital CJ of fashion products are in a younger age group and feel confidence in these technologies, this can be justified by the fact that they are generations technologies, the so well known: Millennials and generation z. These are very connected with the technologies which make them more open to technological innovations and to understand and interact with them. Additionally, it was possible to conclude that among the three AI technologies selected for this study, considering Liang et al. (2020) and Luce (2019), i.e., recommendation systems, chatbots, virtual tasters, currently the one with more interaction by consumers in the fashion industry are the recommendation systems. Supplementing this information, it was possible to determine the frequency of interaction that consumers have with these technologies, being that it is monthly, followed by weekly that these interactions are given more. Being rare the daily interactions with them.

5.2 Reasons that lead consumers to interact with AI technologies?

As previously mentioned, consumers recognize many benefits when interacting with AI technologies, which leads them to this same interaction. This study can highlight two main reasons that lead consumers to interact with AI technologies, being them a better customer service through the search for quick answers at any time, provided by chatbots, and better information gathering that is obtained by product recommendations that meet user preferences. Thus, this study shows agreement with the authors Hoyer et al. (2020), Jarek & Mazurek (2019) and Thiraviyam (2018) regarding the shopping experience that these technologies offer. AR facilitates consumers' imagination as it allows them to "try" products virtually, which has made it possible to prove agreement with the literature regarding the decrease in post-purchase decline, which coincides with Jarek & Mazurek (2019) and Thiraviyam (2018). Therefore, according to the authors, this experience becomes more comfortable and faster, which was proven with this study, thanks to the AI technologies mentioned above and by the facial recognition to make payments in safety. Complementing the reasons presented and discussed above, this study reveals one more. Thus, the knowledge that a consumer has about AI may influence the confidence he feels to interact with AI, however this is merely indicative and does not present a strong relationship. We can thus believe that it is one of the

reasons that leads consumers to interact with AI during the CJ, since trust drives the interaction, they have with AI.

This study also complemented the literature in the sense that it provided relevant insight into the understanding of consumers who are currently choosing not to interact with these technologies, thus losing part of a revolutionary experience that these technologies offer, as well as companies in relation to information about these customers that could guide them to their strategy. Therefore, this study highlights those consumers who are not interacting with these technologies have a higher age range and is justified mainly by the lack of confidence they have in these new technologies, do not want to contribute to the replacement of human jobs with machines (a preconceived idea of these technologies, which is wrong). However, there is a positive trend for this behavior to change in the future, since these technologies have many advantages for consumers, as previously mentioned.

5.3 Consumer perceptions of the usefulness of interacting with AI technologies, regardless of their current use?

With this study it was possible to conclude that many consumers currently use brand websites when they are at the initial consideration stage to conduct research on products. This research can be fostered by recommendation systems, where brands resort to ML to perform predictive analysis, later making available on their websites and apps the recommendation systems. With this study it was possible to conclude that these are currently being made available by many brands in the fashion industry and have much interaction and utility for consumers. This can be justified by the fact that the recommendations that customers receive coincide with their preferences, which meets Luce (2019) and can increase the range of valid options to their choice. Additionally, these conclusions are also in line with the authors Kietzmann et al. (2018), Liang et al. (2020) and Luce (2019) as they are critical mainly in the discovery of products in e-commerce, but also in the stage of active evaluation in real time. Therefore, brands that are not making this technology available to their customers should consider it, since they can also benefit from its outcomes.

More recently, some brands have bet on AR through CV technology, presenting virtual tasters' solutions. Through this study it was possible to conclude that there are few brands that make it available, and we can find this technology mainly when we are browsing luxury brand apps, which may justify the fact that currently the interaction with this technology is low. However, many consumers find it useful as it allows them to try products virtually before buying them, which goes against Hoyer et al. (2020), Shin and Baytar (2014) and Kim and Cheeyong (2015). It is concluded that it is a good bet for the brands, and all those who still don't make it available should consider doing so, as they can achieve better results after this implementation and a win-win relationship would be established both for the clients and the brands.

This study led us to agree with Murgai (2018) since chatbots allow to guide the consumer throughout the CJ, having quite useful recognized by consumers what goes with Luce (2019) and Shim et al. (2012), since in the pre-purchase it allows the minimization of friction in the discovery of the product through a highly personalized customer service, and if they would like to proceed with the purchase, they direct us to the conclusion and payment, and also in the post-purchase, having however a greater utility in the pre-purchase, according to what this study found and that meets with Hoyer et al. Currently the chatbots are not being made available by many types of brands, being found more in fast fashion brands, so the rest are losing a way to stand out and lose contact with the client that at the same time could provide them with more information about clients (Comarella & Café, 2008; Jarek & Mazurek, 2019).

This study brings new insights in top of the previous literature regarding the impact that age and trust can have in the interaction that consumers can have with AI technologies. It also shows that today the use of AI is still narrowed to brands chosen by consumers with medium-high economy capacity and in two main areas: accessories and footwear. Also, the research brought new insight on what are the reason that make consumers not to interact with AI technologies, being the main being comfortable in establish a buying

relationship with a technology instead of human professional. But the main conclusion is that what previous research pointed out as an import dimension to have in future business models, is now a must have dimension in developing new business models. AI technology is now critical resource when developing organizations' strategy. These conclusions can contribute to increase the existing knowledge in this area by proving and complementing the existing literature to date, and additionally give a more practical perspective to brands to rethink their digital marketing strategies. However, this study allows new questions to be formulated to be studied in this field, as it has the characteristic of being constantly changing, especially as it is quite current. Thus, the themes IA and CJ digital, in the fashion industry, will evolve over time becoming essential to ensure that the study of these themes has continuity. It will be very interesting later to buy the current studies with futures.

6. Conclusion

The research in this article had the primary objective of understanding how AI technologies are being applied in the digital CJ in the fashion industry. After the review of the literature, as well as the answers to the research questions, it was possible to draw some final considerations that, in a certain way, allow deepening the study of the proposed themes.

To achieve the mentioned objective, a bibliographic survey was carried out to analyze the existing scientific documents on this subject to date. Thus, focusing only on some AI technologies that consumers can interact with during the digital CJ were selected three based on Liang et al. (2020) and Luce (2019): recommendation systems, chatbots and virtual tasters. Through an analysis combining three factors (the availability offered by the brands, the current interaction of consumers with the technologies and the utility imagined by consumers) and as well as the added value for brands and consumers it was possible to draw conclusions.

First, this study complemented the existing literature explaining the relationships between age, trust, and interaction with AI technologies. It became clear that consumers who interact with these technologies are on average from a younger age group and allied to this comes the willingness with the technologies, which makes them feel confident in AI technologies to interact with them. The opposite scenario occurs when we analyze the profiles of consumers who say they do not interact with these technologies. This way, the great motivation becomes to convert these consumers to trust in AI technologies and to embark on the experiences that these technologies may bring them.

Among the three technologies selected for this study are product recommendation systems that have the most interaction by consumers today. This can be explained by the fact that the recommendations these systems are delivering to customers are in line with their Luce (2019) preferences. This in turn conveys a strong and grounded sense of usefulness in future interactions. It is also relevant to mention that there are many brands that today offer product recommendation systems, and as it was possible to conclude these are effective and customers like them. It becomes clear that brands that are not yet providing this technology should rethink their strategy.

Regarding the chatbots, although they are made available by many brands, especially the fast fashion ones, they do not have as much interaction as the recommendation systems. However, there are many consumers who consider them useful, especially in pre-purchase (Hoyer et al., 2020), since they allow a highly personalized customer service, which will minimize friction in product discovery (Luce, 2019; Shim et al., 2012).

Currently virtual tasters are not yet being targeted by many consumers, this is justified by the fact that there are relatively few brands making this technology available. It is more present in luxury brands such as

Gucci, and in some sports like Adidas, being more used for accessories and footwear. However, all brands should consider this technology for their strategies since many consumers find it useful, since it makes it easier for the imagination to "try" the products before buying them (Hoyer et al., 2020; Shin & Baytar, 2014; Kim & Cheeyong, 2015), believing that in this way they can diminish their post-purchase deception (Jarek & Mazurek, 2019; Thiraviyam, 2018).

Additionally, it was possible to conclude that the benefits of these technologies presented by Hoyer et al. (2020), Jarek and Mazurek (2019) and Thiraviyam (2018) as providing better customer service, getting better product recommendations and the possibility to virtually "try" the products before buying them lead to this same interaction. However, to complement the literature, we tried to understand the reasons that lead to the opposite action: the non-interaction with AI technologies. The main reasons are that they do not want to contribute to the automation of processes that may replace human professionals and for not feeling comfortable interacting with these technologies.

When looking at the practical implication of this research, it can be found some relevant business implications. As new generations come to play as power consumers, organizations will need to strongly invest in AI technologies as younger people are more comfortable using them. Special focus will need to be on recommendation agents that allow a better user experience in pre-purchase activities. All these new applications will have a major contribution to customer loyalty. Nevertheless, a point of caution must be made so to avoid that the misuse of this technology can impact the brand image. In short, we can state that the fashion industry can benefit from the integration of AI throughout the digital CJ. It is also relevant to highlight that we are facing a dynamic environment in which the changing factor is present in society daily, which will change consumer behavior. Thus, it becomes essential to meet the needs of consumers and additionally satisfy them on the path they travel with the brand until the end of the purchase and in the post-purchase, with the aim of achieving consumer loyalty. However, brands should act with great caution in order not to compromise their image in any moment.

The limitations of the study are the fact that the analysis was based on a survey by questionnaire, where the information collected implies a simplification of social reality. In this way, the analysis and the conclusions conditioned their viability and quality, also thanks to the fact that the sample was reduced. Additionally, it proved to be complex to evaluate concepts such as trust and interest on a Likert scale of 1 to 5, since the feelings of the respondents do not manifest themselves on a scale. Regarding external validity, that is, the possibility of generalizing the results found to other contexts or samples, although this study has strengthened some of the existing theory regarding AI technologies that the fashion industry already implements this cannot be generalized or representative

There is a great need to continue the research that unites these two themes: AI and CJ. First because it is a theme that presents relatively few research and because it is in constant change since it becomes essential to continue updating this information, mainly because we are in the era of digital transformation in which technology is more and more present in our daily lives. Additionally, it would be interesting to extend this study to other countries where it would be possible to analyze the difference in mentality and consumer behavior between different cultures, where one is more advanced than Portugal and others less. Trying to understand what makes these countries more open to interact with these technologies and outline strategies to implement in the countries that are more limited in this sense. This study could be complemented with a corporate vision where one would seek to understand what technologies brands choose to use, why, and what financial results they bring. It would also be interesting to understand where brands feel a failure and take these challenges to IA experts and seek answers to them.

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