

# A Review of AI (Artificial Intelligence) Tools and Customer Experience in Online Fashion Retail

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## ABSTRACT

Artificial intelligence tools and processes have hugely impacted the ecommerce industry and the satisfaction of online customers. With technology largely pervading all facets of our lives, people want meaningful experiences. Artificial intelligence has the ability to deliver positive experiences for customers that help build brand trust and customer satisfaction. Whether you are using your smartphone, laptop, or voice assistants such as Alexa or Siri, service on the internet is gaining new ground. This paper does a literature review of the various technological advances that optimize the customer experience to evoke e-satisfaction (i.e., satisfaction while shopping online). E-satisfaction as a construct will be reviewed with its impact on customer purchase intention. This review will provide businesses and other researchers a frame of reference to conduct empirical studies in the area of AI and technology-enabled retail.

## KEYWORDS

Augmented Reality, Chatbots, Customer Experience, E-Satisfaction, NLP (Natural Language Processing), Online Customer Experience (OCE), Product Reviews, Recommendation Engines

## INTRODUCTION

Today artificial intelligence has come out of the realm of science fiction and has entered our homes. There are several web technologies used today in everyday life especially in the ecommerce world. AI (Artificial Intelligence) is viewed mostly as robotics but it has much larger technology range such as machine learning, natural language processing (NLP), learning systems, gaming systems and object detection (Greenberg, 2017). Today AI is touching us in all areas such as online shopping, health care and fraud detection. AI has the power to attract customers with personalization and interaction. This can then enhance the revenue of e-retailers. Today, marketers need to understand the huge potential impact of AI tools on online customer experience (OCE) and e-satisfaction. Several big e-commerce companies such as Amazon, Flipkart and Walmart have realized that mere web presence is not enough to retain their customers.

AI enables machines to achieve difficult and repetitive tasks so that humans can utilize their time and energy for more thinking tasks. AI has enhanced the entire ecommerce shopping experience by adding a touch and feel experience. Slowly AI is bridging the advantage gap between brick and motor stores and online stores. With the integration of AI technologies such as machine learning,

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deep learning, augmented reality, Virtual try-ons, Avatars and Chatbots in a website, the e-retailers are achieving the objective of providing convenience to customers and improving their online customer experience. This in turns helps the retailer to bring down returns an increase overall revenue generation. The objective of this article is to outline the different AI based technologies which impact online fashion retail.

## Artificial Intelligence

Artificial intelligence has been around for a long time but has recently shot into prominence with the advent of the internet. In the area of marketing not much research has been conducted related to AI. Research in AI till now has dealt with the more technical aspects of AI systems. Not much research is done about the effect AI techniques on customer experience. Artificial intelligence (AI) is the concept of intelligent machines being able to carry out tasks and enhance the tasks by learning from experience on their own Geisel (2018). They provide valuable automated solutions to complex problems Crittenden, Biel & Lovely (2019). Virtual try-ons like Lenskrafters, Virtual fit applications like NIKE FIT are some of the AI techniques which improve the customer experience in ecommerce.

## Methodology

In this paper a literature review focused on the area of marketing with respect to AI technologies has been conducted. The focus of the search is the customer experience and e-satisfaction derived from these tools. At the end of the literature review we should be able to specify a specific research questions which can then enlarge the existing body of research further.

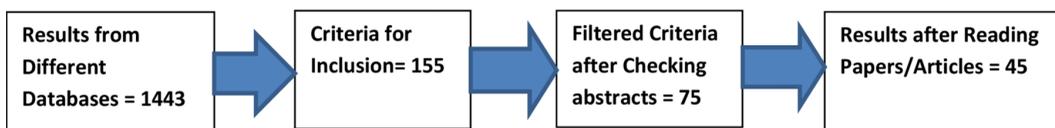
## LITERATURE REVIEW

The paper attempts an analysis of studies which use different types of technologies such as machine learning, recommendation engines, Fit intelligence services, virtual try-ons, personalization services such as chatbots and their impact on online customer satisfaction i.e. e-satisfaction.

The literature review has been conducted using keyword searches in pairs in the electronic database of Scopus using the following words: (1) e-satisfaction (2) Artificial Intelligence; (3) online retailing (4) online apparel retailing (4) Customer experience (5) virtual try-ons, (6) customer personalization through recommender systems (7) Augmented Reality, (8) Chatbots

The inclusion criteria for these keywords were in different combinations on research studies done in the last ten years. After checking all the abstracts of the articles and complete works, 45 articles that were relevant to this topic are chosen. These articles have been discussed and cited in the entire paper. For the literature review conducted

Figure 1. Literature review process used



For more technical topics such as recommendation engines, augmented reality and chatbots separate searches were done on Web of Science with different inclusion criteria. This will allow us to specify the different research gaps and questions emerging from this study (Tranfield & Denyer, 2003).

Since the areas of Artificial intelligence and other technologies such as recommendation engines etc. are of highly technical nature we have confined ourselves in our searches to articles in the area of marketing, particularly to their impact on ecommerce and online apparel retail.

## Customer Experience

The idea for today's customer is to create memorable experiences rather than physical products (Pine and Gilmore, 1998). Customers in the online world experience products not through physical interaction but with the help of verbal and visual stimuli on the website (Brakus, Schmitt, and Zarantonello 2009; Lemon and Verhoef 2016; Schmitt 1999; Verhoef et al. 2009). The entire customer journey over a period of time is an integral part of the customer experience. Bhandari et al. (2017) have reiterated that customers don't like to feel that they are being forced to buy the products that they do. Instead, they want the influence to be more subtle, i.e. they want engagement and to be convinced to buy because the products offered are superior. Online customer experience consists of four dimensions: informativeness (cognitive), entertainment (affective), social presence (social), and sensory appeal (sensory) (Anderson 1985; Pinker 1997). This has a great influence on e-satisfaction. Today, different artificial intelligence tools can help provide this "customer engagement". "Cyber Atmospherics" is the new term that has been coined which specifies the impact of virtual ambience of the website and its effect on online customer experience (OCE).

## Defining E-satisfaction

E-satisfaction, according to one definition is the customers' judgement of their online retail experience in comparison with the brick and mortar stores Szymanski and Hise (2000). A new construct called "customer information satisfaction" (CIS) was proposed for Web sites Wang et al. (2001) which describes the satisfaction with respect to the ecommerce site. As we know, *informativeness* is the primary cognitive dimension of the online customer experience (Lim and Ting 2012, p. 51). This helps the customer to make the purchase decisions by going through the entire customer decision making process. Research suggests that e-satisfaction is the outcome of online shopping convenience, merchandising (product information and product offerings) and site design Azam, Qiang and Abdullah (2012). Customer satisfaction is a culmination of two factors: Firstly it is the satisfaction that they experience with their most recent online purchase and secondly it is the cumulative satisfaction and online customer experience (OCE) garnered over a period of time with a specific website or e-retailer Chen and Dubinsky (2003). This is determined by the usefulness of the website. Usefulness can be defined as the extent to which online store provides helpful information to their customers and how it an ease their transactions (Chen & Ching, 2013). Over the last decade most of these features are powered increasingly by artificial intelligence technologies such as chatbots, products lists driven by AI powered recommendation lists and virtual try-on systems. Researchers have used the American Customer Satisfaction Index (ACSI) to measure the satisfaction of customers over a period of time (Chintagunta et al., 2012; Luo and Bhattacharya, 2006). Based on these instances or encounters, customers will compare their online and offline shopping experiences and make judgments about e-satisfaction (Cao and Li, 2015). According to Burke (2002), Ryding et.al (2016), customer satisfaction stems from convenience, product quality, value provided, and product selection provided in the e-store.

## Customer Personalization

Researchers have tried to understand the customer experience all along the purchase process from awareness to evaluation of the product to the post-purchase phase. The experience at each stage of the purchase process is evaluated and an explicit feedback is provided. Personalized recommendations can increase customer satisfaction, and customer loyalty Rustagi (2012), Bauer et al. (2014); Yang et al., 2017; Jannach & Ludewig, 2017; Kaci, Patel & Pkacirince; 2014). Pricing also plays a key role in purchase decisions. Zhao et al. 2015 have researched this aspect of a customer's willingness to pay

and personalized price promotions and their role in customer decisions. Machine learning algorithms provide personalization that simplifies the consumer decision making process and reduces customer effort (Ruchika et al., 2017; Seshadri et al., 2017). An algorithm called “Consumer Behaviour DNA”, that uses pattern mining can help companies in identifying various types of customer behavior Takahashi (2019).

Technology reviewed below allows e-commerce players to deliver personalization, superior product cataloging and product visualization to provide enhance customer experience and satisfaction in their e-stores.

## **Artificial Intelligence in Online Apparel Retailing**

The Indian e-commerce and particularly the fashion e-retailing is booming. India is one of the countries where the growth rate on e-commerce is phenomenal mostly because of the increase in use of smartphones. The increase in number of online shoppers, particularly in the current situation of the pandemic is forcing a lot of e-retailers to focus on technology to increase sales. According to India Brand Equity Foundation data, the online apparel industry in India holds 29 percent of share which is second only to electronics which has a 45% market share. Hence marketers need to focus on technologies such as recommendation engines, Natural language processing, chatbots, Neural Networks, Genetic algorithms, and other AI tools to enhance customer experience and e-satisfaction. For example, Wang (2014) analyzes AI applications in the online apparel segment. Innovative technologies cause market disruption and this can be traced in history of new products. Thanks to AI, consumers can appreciate better products availability, faster and accurate deliveries (Kati 2018). This paper reviews such innovative technologies which are currently being used. AI does not only change the way online retailing is conducted. It also has an effect on the way customers shop. Marketers have to map out which tools to use to their advantage in order to optimize the customer experience as they browse the website. Johnson, Tara (2019) explains why Artificial Intelligence is an integral technology of the online apparel industry today. AI can help in improving the several service features such as tailoring fits with mix and match, 24 hours of customer assistance and personalization services with chatbots. This improves the efficiency, reduces returns and improves repeat purchases.

## **Recommendation Engines**

Recommendation engines are machine learning algorithms that provide product recommendations for a specific customer based on their personalized history, so that it matches their needs accurately (Zhao, Pan & Yang, 2017; Yang, Ou & Zhou, 2017). Recommendation systems predict user preferences with the help of data mining algorithms and customer data from past purchases (Ruchika, Singh & Sharma, 2017). According to data analysts and researchers “Collaborative Filtering” is a popular recommendation technique used for product searches (Zhao, et al., 2017; Bauer & Nanopoulos, 2014). Collaborative filtering gives recommendations on products to customers based on their own past purchase behaviors. The intelligent part in this machine learning technique is that the recommender system is continuously learning and making the required changes based on the search results. Ahmeda et al. (2015) used machine learning and other mining techniques to study and understand customer buying behavior patterns and provide recommendations. Personalized recommendations are known to positively influence customer loyalty. ‘Behavioural Analytics’ can be a tool to understand the behavior of online customers (Even, 2019). He explained how machine learning algorithms are used to model customer’s behavior before purchase. This will save company time and money and one should understand this process in order to improve personalization and overall customer experience. Ecommerce today, through technology, provides immense opportunity to retailers to access global markets, even if they are a small player.

## Product Reviews

Products reviews are the singularly, the most important feature of online commerce, since this provides customers opportunity to access and read about the product features and compare them with competitors' products. They can do all this without stepping into a store, sitting in front of a laptop or using a smartphone (Wetzlinger, 2017). Good product reviews are a tool for customer engagement. Product variety is another area which can give an e-retailer competitive advantage. Chintagunta et al. (2012) and Luo and Bhattacharya (2006) argue that, the success of a retailer depends on their product variety. With respect to book reviews, research shows that, user contributed reviews have more credibility (Dimitrov, Zamal, Piper & Ruths (2015). Reviews are a way to elicit feedback, both explicit and implicit. Explicit ratings and reviews tell you the performance of products while implicit feedback is received via the sales and search history of a product (Bauer et al., 2014; Ruchika et al., 2017). An online retailer today offers as much product variety or more than offline retailers. The wide variety adds to the enhanced e-satisfaction levels (Gounaris and Dimitriadis 2003; Szymanski and Hise, 2000). Also, the price comparisons that can be done online allow a customer buy a product at the best possible price. This is very emotionally satisfying experience and can contribute enhanced e-satisfaction (Klaus, 2013). "Digital Nudging" is the term used Djurica & Figl, 2017 to describe the technology used on websites which allow customers to make fast decisions.

## Virtual Try-Ons

Another technology that is making a mark is Virtual Try-on's. This has received a lot of attention because it can be used to reduce merchandize returns. This technology uses 3D visualization and helps customers' assess the size and styles better. With a virtual try on technology, the users get the in-store experience of being able to assess the fit, size and look of the product. There are many apps and fit-intelligence services available now in the fashion industry. These systems can help users to decide on their likes and dislikes of a product. Virtual experience as studied by Klien (1998) talks about product attributes which can easily accessed on the internet. Virtual try on system reduce the perceived risk by providing an experience which is close to the in-store experience of an actual trial. For example, how the shade of the lipstick looks on you when you view it on the internet versus trying it on virtually using this technology. This format of information presentation can alter the weightage consumers give to these different attributes. Virtual try-on technology has the ability to convert the search attributes of a product to experience attributes, reducing the risk of purchase (Klien 1998). In India, the try-on technology has been popularized by Lenkart eyewear brand. Lenskart allows its users to try glasses on using realistic 3D models of themselves just by clicking a selfie with their cameras (Teresa Simon, 2016).

Other researchers have explored Artificial Intelligence technology in the fashion industry and believe that AI tools stimulate consumers to purchase online (Liang et.al, 2019)

## Augmented Reality

Augmented reality is a market disruptive technology that has emerged out of artificial intelligence which is taking the online business by a storm. In augmented reality there is an integration of the real world and virtual information (Lamantia, 2009) wherein the elements of the live view of a real-world environment are augmented by computer-generated sensory input such as sound, video, graphics data. AR can provide meaningful experiences for online shoppers thus reducing the purchase risk (MacIntyre et al., 2001). The aim of AR is to provide tools which reduce the lack of touch and feel in online shopping and by providing sufficient product information that enables them to evaluate the available products (Lu and Smith, 2007). Research has shown that AR enabled products, enable customers to make product choices easily. AR technology includes head gear like googles and visual equipment for the eyes. The retinal display allows visualization of the product as though you are standing in front of it. Augmented Reality uses QR Code system (Quick Response Code) which has become very popular and can even be used on your smart phone. In QR code, information is encoded and it has

a much larger capacity than a traditional UPC barcode. When the QR code is scanned using a code reader, it takes the customer directly to the product's location on the website and get more detailed information on the product. So a QR Code can also be used a promotional tool. Today, the camera on your smartphone can be used to scan QR codes for any product. In India today, a lot of payment applications use this QR code for payments of merchandise. Overall augmented reality can improve people's experiences and improve user confidence by enhancing the shopping experience (Lu and Smith, 2007). Today digital marketing campaigns using AR are becoming increasingly popular and enterprise applications with AR elements account for a large portion of e-retailer revenues.

### **Image Interactivity Technology**

Image interactivity technology (IIT) uses the Stimulus-Organism-Response (S-O-R) model as its framework to examine the customer responses to the cues provided in the shopping environment (Bitner, 1992; Donovan & Rossiter, 1982; Mehrabian & Russell, 1974). It bases its theory in psychology of shopper whose experience is a combination of cognitive and affective responses. IIT of a retail Web site (S) may influence consumers' affective (i.e., shopping enjoyment) and cognitive (i.e., perceived risk) shopping experiences (O), which consequently affect approach responses (R) toward the site Fiore, Jin, & Kim (2015). The amount of information on a website has impact on the customer's affective response (Eroglu, Machleit, & Davis, 2003). According to Eroglu et al. (2003), there are two levels cues in IIT(Image Interactivity technology), one is the utilitarian and pertains to the actual task of shopping, while the other is the higher level cue which is hedonic and pertains to enjoyment of shopping. Image interactivity technology (IIT) allows the creation and manipulation of product with the help of mix and match, product zoom features etc. A 3D virtual model helps customers to simulate actual experience with the product and environment reducing perceived product risk and increasing the entertainment value of the online shopping process (Fiore, Kim and Lee, 2005).

Experimenting with experience (EA) is a new phenomenon in online apparel shopping today. This is the concept of experimenting with new or different apparel, shoes and other accessories and how they look on a person (Gurel & Gurel, 1979). Cosbey (2001) showed that EA adds to the enjoyment or hedonic factor of online apparel shopping. Fiore et al. (2003, 2004) in their extensive research examined the influences of EA on using these new technologies such as mix and match, product zoom or enlargement and 3D virtual modeling. They have shown that it has a positive effect in terms of both enjoyment and reducing the perceived risk of shopping. A lot of retailers today such as Nike, Levis and H&M, Speedo use 3-D virtual models to capture their shopper's attention.

### **Chatbots**

With the increase in "conversations commerce", chatbots are becoming very popular for rendering customer service. Personal assistance no longer is dependent on physical people but has been taken over by dialog systems and virtual assistants like Alexa and Siri. Chatbots plays an important role in customer communication. Chung et al (2018) studied the e-services of chatbots and how it influences customer satisfaction. A "chatbots" is a natural language processing (NLP) intelligent agent which can imitate a human conversation (Bala et al., 2017). It uses AI techniques to communicate through software such as instant messaging, websites or mobile apps. Lommatzsch (2018) has shown that chatbots can answer specific questions related to specific scenarios. This is based on previous behaviour of the customer. They guide the customer to ask the right questions and lead them like a human customer service representative in a polite and patience manner. Marwade et al. (2017) say that chat bots provide conversation to the customer which enhances customer experience. Research shows that chatbots are supposed to interact and provide solutions to problems based on the context and since they use machine learning and deep learning algorithms, they are continuously learning. However, the news is not all positive with chatbots. Consumers report a feeling of frustration with chatbots because they cannot understand or misinterpret the questions and hence give incorrect answers and some repeat the same answers in a loop. Johnson & Shumanov (2021) have explored the

possibility of a matching customer (human) personality with the corresponding machine personality using language, so the future may hold more humane and empathetic bots.

### **Business Implications and Future Course of Research**

Not only is it important for businesses to use the latest AI technologies but they should enhance their technological tools periodically to keep up with their competitors. Also, it is advised that online retailers should communicate with their customers regularly about their shopping experience on the website and offer high quality after-sales service (Yen and Lu, 2008). This literature review brings out some of the artificial intelligence technologies and the research gaps which exist in the impact of these technologies on online customer experience (OCE). Some of the research questions which emerge from this review are:

RQ1: What are the factors which influence customers to adapt to technology in the online space?

RQ2: Which AI techniques have most impact on customer personalization and customer experience?

### **CONCLUSION**

Not only should companies apply advanced AI technologies in their business but they should understand their relevance and whether they are sustainable in the long run. They have to assess the impact of a specific tool in relation to their business and then choose the right technology to provide a cost effective solution to their customers. These technologies are sources of value creation and future research can be conducted to understand how the customer experience is influenced by technology adoption. In conclusion below a summary of the value creation of these technologies:

**Recommender Systems:** Simplifies decision making and reduces information overload. They also integrate the product reviews and collate the behavior of other consumers. They use past purchase behavior to provide personalization and display content which the consumer might like to view.

**Augmented Reality, Interactive Image and Virtual Try-On's:** They provide a means of product assessment and provide a product presence in the online world which reduces perceived risk.

**Chatbots:** Speed up the information search process by asking the right questions. They provide personalized interaction and communication using past behavior and can be used as a feedback mechanism to gauge customer satisfaction. They provide real time information and responses when communicating with the customer.

Reinartz, Weignand & Imschloss(2019) have come up with new sources of value creation in this digital age. These sources include a combination of automation and personalization while giving the customers enough control.

This paper analyses some of the AI applications and their impact of customer experience in online retail. It can be a framework for future researchers to conduct empirical research. Figure 2 gives the list of topics pertaining to technology enabled retail that have been researched.

Figure 2. Overview of the 45 articles reviewed from different sources and their specific areas

Authors Reviewed for the Journal Paper	Areas of focus in each article related to the review paper
Ahmeda et al. (2015)	Recommender Systems; E-Commerce
Ayanso et al. (2009)	Technology enabled retail, content management, telepresence
Azam, A., Qiang, F. and Abdullah, M. I. (2012)	Consumers' e-commerce acceptance model
Bauer & Nanopoulos (2014)	Recommender Systems; Customer Satisfaction
Benamati et. al (2010)	Trust and TAM in e-commerce
Bhandari et al. (2017)	Customer experience, Online customer experience
Cao & Li (2015)	e-satisfaction, cross channel retail
Chen and Dubinsky (2003)	e-satisfaction; e-services
Chung et. Al (2018)	customer satisfaction
Devika et al. (2016)	Recommendation engines
Djurica & Figl (2017)	Product Reviews
Even (2019)	Customer engagement; recom mendations, Customer Behaviour;
Freitas et al. (2016)	Digitisation; E-Commerce
Greenberg (2017)	Artificial intelligence
Jannach & Ludewig (2017)	Recommender Systems; Customer Personalisation
Johnson & Shumanov (2021)	Chatbots, personalization, machine learning
Kaci et al. (2014)	Recommender Systems
Kim & Forsythe (2009)	Sensory enabling technology in online apparel shopping
Kim & Forsythe (2008)	Virtual Try-ons for online apparel retail
Klaus (2015)	Measuring Online Customer Experience
Lamantia (2009)	Augmented Reality
Lemon & Verhoef (2016)	Customer Experience, Customer Journey
Leong et al. (2017)	Chat Bots; Machine Learning
Lommatzch (2018)	Chat Bots
Marwarde et al. (2017)	Chat Bots; Recommender Systems; Customer Personalisation; Conversational Commerce
Moriuchi (2019)	Chat Bots; Customer Engagement; Customer Satisfaction
Niu et al. (2017)	e-Commerce; Customer Engagement
Nisar (2017)	e-satisfaction in e-commerce
Papadopoulou (2007)	e-trust using Virtual reality
Piyush et al. (2016)	Conversational Commerce; chatbots
Poushneh(2017)	Augmented Reality, User experience
Ruchika et al. (2017)	Recommendation engines; ML; Customer Experience
Rustagi (2012)	Personalization
Seshadri et al. (2017)	Product recommendation
Shankar(2018)	AI in retail
Sobhahah et.al (2015)	customer satisfaction, e-satisfaction
Steinhoff et al. (2018)	Chat Bots; Site Personalization;
Takahashi (2019)	Consumer Behavior, e-satisfaction
Vázquez et al. (2014)	Product Reviews; product comparisons
Verhoef et al. 2009	Virtual Try-Ons
Wang (2014)	AI in online clothing
Wetzlinger et al. (2017)	Omni-Channel; Customer Personalisation
Yang et al. (2017)	Recommender Systems; E-Commerce
Zhao et al. (2015)	Customer Personalisation
Zhao et al. (2017)	Recommender Systems; Machine Learning

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