The Impact of Artificial Intelligence along the Customer Journey: A Systematic Literature Review

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ABSTRACT,
With technology increasingly taking over our lives, people have gained the need for meaningful experiences. Especially with the possibility of ordering almost any product you can think of on the Internet – either on your smartphone, your laptop, or even via your voice assistant – the term 'servitisation' is gaining ground. Artificial intelligence can be used by online companies to enhance customer experience and help companies adapt to 'servitisation'. But, artificial intelligence also has an effect on the way customers shop in brick-and-mortar stores, and therefore we see a diminishing gap between offline retailing (brick-and-mortar stores) and online retailing (e-commerce). With the emerging omni-channel environment coming into play, physical stores and online channels cannot be viewed as separate entities anymore. Instead, the two operate as a synergy. This omni-channel view of commerce makes the path-to-purchase of customers a lot more complex; increasing the importance of companies to clearly map out the path-to-purchase of customers and use technological advances to their advantage in order to optimise the customer experience along the customer journey. Artificial intelligence has the potential to positively influence this customer journey and therefore marketers have to understand how these advances have an impact on the customer experience in this ever-changing environment. Recommender systems can enhance customer personalisation; Conversational agents can enhance customer engagement. Individually and together they can improve the customer experience along the customer journey. This thesis provides businesses and other researchers with a framework on how recommender systems and conversational agents can aid companies in increasing the customer experience along the customer journey, while highlighting the importance of thoroughly understanding customer behaviour.

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1. INTRODUCTION

With technology increasingly taking over our lives, people have gained the need for meaningful experiences. Especially with the possibility of ordering almost any product you can think of on the Internet – either on your smartphone, your laptop, or even via your voice assistant – the term 'servitisation' is gaining ground. Also called 'experiential services', servitisation means that the customer experience is seen as the most important aspect of the product offering (Zomerdijk & Vos, 2010a).

Artificial intelligence (AI) is "taking us right back to our DNA of having one-on-one relationships with customers" (Parkes, 2018). AI has the potential to bring customers closer to online retailers with personalisation and interaction. AI is supposed to increase the customer experience, and therefore help companies to adapt to 'servitisation'.

But, AI does not only change the way online retailing is conducted. It also has an effect on the way customers shop in brick-and-mortar stores. And therefore, we see a diminishing gap between offline retailing (brick-and-mortar stores)[1] and online retailing (e-commerce)[2]. With the emerging omni-channel environment coming into play, physical stores and online channels cannot be viewed as separate entities anymore. Instead, the two operate as complementary. Omni-channel commerce entails multiple touchpoints across multiple channels (Braun & Carriga, 2017). This causes customers to use various channels before making a purchase either in the physical store or on the web site/app/voice assistant. This omni-channel view of commerce makes the path-to-purchase of customers a lot more complex. In an article written for Google, Hogg (2018) states that the customer journey is "like a sightseeing tour with stops, exploration, and discussion along the way – all moments when you need to convince people to pick your brand and stick with it instead of switching to a competitor."

This complexity makes it difficult for marketers to create a customer experience that is suited to the needs and preferences of customers. Therefore, it is important for companies to clearly map out the path-to-purchase of customers and use technological advances to their advantage in order to optimise the customer experience along the customer journey. The technological advances that are most relevant nowadays include artificial intelligence; these machine-learned technologies provide convenience to both businesses and customers.

The customer experience can be seen as the journey a customer goes through, starting from pre-purchase up to and including post-purchase (Lemon & Verhoef, 2016). Artificial intelligence has the potential to positively influence this customer journey and therefore marketers have to understand how these advances have an impact on the customer experience in this ever-changing environment. And, like mentioned before, the existence of an omni-channel e-commerce environment means that a seamless customer journey across all channels and touchpoints is required (Wagner, Schramm-Klein & Steinmann, 2018).

1.1 Research Questions

This thesis analyses the applications of one of the most recent technological advances: artificial intelligence. The two AI applications that will be reviewed in this thesis are **recommender systems** and **chat bots**.

This research will be conducted in order to answer the following research question:

"How can artificial intelligence techniques (recommender systems and chat bots) aid companies in increasing customer experience along the customer journey?"

In order to create a clear structure in discussing the research questions, the following sub-questions will be covered:

a. *"How can recommender systems help companies increase customer personalisation?"*
b. *"How can chat bots help companies increase interaction and customer engagement?"*

The impact of these two applications on the customer experience and the overall customer journey will be analysed by the means of a literature review. Recommender systems are put in place in order to provide the customer with a personalised and convenient experience. For companies to be able to provide this it is of key importance to understand customer behaviour. Chat bots are a means of companies to provide the customer with an almost human-like interaction. This will increase customer engagement and eventually also customer loyalty, as I will explain further on in this thesis. In order to learn from an example in practice, an analysis of Amazon.com's artificial intelligence efforts is made. This will include both its online channels and its (various forms of) physical stores. Businesses can learn from Amazon's innovative artificial intelligence endeavours and omni-channel synergy.

This thesis will be structured as follows: First the academic and business relevance of the research will be discussed, highlighting the current research gap. After this the main concepts will be defined in order to increase understanding and clarity. The method of research will be discussed afterwards, followed by the literature review. To increase understanding even further and to provide an example from practice, Amazon.com will be discussed as a 'best practice' case study. This thesis will be concluded with a discussion of the results, which will include a conceptual framework which can be seen as an overarching summary and extension of the existing literature. This is followed by implications for research and practice, limitations, and recommendations for future research

1.2 Academic Relevance

Artificial intelligence is a recent domain of research. Especially in the area of business and marketing, very little research about AI has been conducted. Most of the research in AI is focused on the more technical aspects and the installing of AI systems. There is little information available about the effect AI techniques can have along the customer journey. It is known that artificial intelligence is a useful tool for companies to use in order to improve customer experience. However, no research has been conducted specifically on how AI can impact the customer experience along the customer journey. This thesis brings existing literature on artificial intelligence and the customer journey together in order to paint a clear picture of the effect of selected AI techniques on customer experience along the customer journey; filling the current research gap.

1.3 Business Relevance

It is important for businesses to follow the latest technological advancements in order to keep up with their competitors. Especially in this digital age, characterised as fast-moving, in which e-commerce, mobile devices, and the Internet of Things are gaining more and more ground. It is not only important for companies to *apply* technological advancements like artificial intelligence; perhaps it is even more important to *thoroughly understand* those techniques and their impacts in order to apply it with the utmost precision and accuracy. AI requires

[1] The terms offline retailing, brick-and-mortar stores, offline stores, and offline channels are used interchangeably.
[2] The terms online retailing, e-commerce (stores), web sites, and online channels are used interchangeably.

companies to not only understand the technological aspects, but also the behaviours of their customers in order to increase the fit between AI applications and customer needs. This all should be taken into account in order to potentially improve the customer experience along various touchpoints along the customer journey and eventually increase customer loyalty and bottom line. In this thesis I provide companies with a framework of the effects AI applications can have on the customer journey in order to enhance the customer experience. In addition, companies can learn from Amazon.com and their AI applications and omni-channel synergy, since Amazon is one of the most innovative companies in the world in terms of using technology to their advantage.

1.4 Research Goal

The objective of this research is to gather information from existing research in artificial intelligence in the area of customer experience and form a clear understanding of the effects various AI techniques can have on the customer experience at various touchpoints along the customer journey. The aim is to fill a gap in research which will be of use in the business environment and help companies increase awareness of seeing technological advancements as opportunities to improve the customer experience in the complex omni-channel environment.

2. CONCEPTS

2.1 Customer Journey & Customer Experience

The customer journey has been a widely studied marketing concept. There is no set definition in terms of the steps within the customer journey, as this will most likely vary between industries and even companies.

One of the most cited papers in the area of customer experience is that of Lemon and Verhoef (2016). They define the customer experience as "a customer's journey' with a firm over time during the purchase cycle across multiple touch points" (p. 74). They define the customer journey as the whole customer experience, "flowing from pre-purchase to purchase to post-purchase" (pp. 74-75).

Meyer & Schwager (2007) use almost the same definition, however, they highlight the fact that the customer experience is the subjective response that customers form when connecting with touchpoints. So, they put more focus on the fact that the customer experience is very much a concept formed by opinions and thus can vary between individuals. Therefore it is important for marketers to understand individual customers' behaviour and apply segmenting.

Zomerdijk & Voss (2010a) and Tax, McCutcheon & Wilkinson (2013) all define the customer experience from the viewpoint of experiential service delivery. They agree that an experience is often built over a longer period of time and includes various actors; creating a network.

In another research Zomerdijk & Voss (2010b) conducted, various service providers state that customer experience is at the heart of the service offering and should be shaped proactively in order to stay ahead of competitors. And as Bolton, Gustafsson, McColl-Kennedy, Sirianni & Tse (2014) highlight, too many companies only think about perfecting their product offering, while more focus should be placed on forming a customer journey which in result will improve the experience customers will have with your company. They say that the customer experience should be viewed as being a process and not an outcome.

Google uses a customer journey definition which describes the most critical touch points to be 'micro-moments'. These micro-moments are "the moments when we turn to a device – often a smartphone – to take action on whatever we need or want right now" (Google, 2015, p.4). This definition is a lot more focused on today's digital age and the high percentage of smartphone use in information search and purchasing.

Taylor (2017) describes the customer journey as a collection of interactions between customer and firm. This is a rather simplified definition, stating nicely what the customer journey entails. And since this simplified definition does give clarity, I have combined all of the above mentioned definitions into a clear and simplified definition, while still containing all constructs: *"The customer experience consists of the subjective responses customers form when interacting with a company. These interactions take place over a period of time at various touchpoints and across various channels; from the pre-purchase stage up to and including the post-purchase stage. Together all of these interactions and experiences form the customer journey."*

2.2 Artificial Intelligence

Novel technologies have the potential to disrupt businesses and the industries they are present in. One such technology is artificial intelligence.

Artificial intelligence (AI) is defined by Crittenden, Biel & Lovely (2019) as "the concept of machines able to carry out tasks in a way we would consider smart; providing valuable, automated solutions to problems" (p. 9). They also state that AI is connected with several other technical innovations like robots and machine learning. Machine learning includes the self-learning skill of machines without needing much programming and robots are able to carry out tasks otherwise performed by humans.

Geisel (2018) describes artificial intelligence in the following way: "A true artificially-intelligent system is one that can learn on its own. We're talking about neural networks (…) which can make connections and reach meanings without relying on pre-defined behavioural algorithms. True AI can improve on past iterations, getting smarter and more aware, allowing it to enhance its capabilities and knowledge" (p. 116).

Both of these definitions highlight the fact that AI can be viewed as 'smart' and 'automated' systems. Overall, these definitions do not seem to be very specific and are quite technical. Throughout this thesis, I will discuss various AI techniques and applications in the context of business and marketing, which hopefully will paint a clearer picture of what artificial intelligence actually entails in a business context.

3. METHODOLOGY

The amount of research that has been conducted on the topic of 'artificial intelligence in marketing' is limited. Since artificial intelligence is still quite a recent topic, most research in this area is either still in progress or has not been conducted yet. However, research in artificial intelligence in other areas is available and contributes to our understanding of AI in business.

In this thesis, the research I conducted is focused on the area of marketing; entailing the customer experience and the customer journey. In order to understand the impact AI has along the customer journey I have conducted a literature review, which combines existing research related to this topic. The aim of a literature review is "to enable the researcher both to map and to assess the existing intellectual territory, and to specify a research question to develop the existing body of knowledge further" (Tranfield & Denyer, 2003, p. 208).

The literature search includes pairwise searches in the electronic database Scopus of the following keywords: (1) Customer Journey; (2) Artificial Intelligence; (3) E-commerce. (Initially the focus in this research was placed on e-commerce, however as explained later, various articles included a discussion on online versus offline retailing: the 'omni-channel' environment.) Since it seemed very unlikely to find many sources which would include all of those keywords at the same time, this pairwise search was conducted with the aim of finding literature within those realms. The inclusion criteria were: English language; Area of Business, Management, and Accounting (if a high amount of results in order to narrow it down); and Period of 2014-2019 (only for those pairwise searches including artificial intelligence). The exclusion criterion was: Duplicates. After checking the abstracts and whole texts and consequently keeping articles that were relevant to my research, 40 literature sources remained, which are summarised in Appendix A (Appendices) with the topics they discussed. For the process of literature search see Figure 1. For more general information on artificial intelligence and the customer journey, separate searches have been conducted including various inclusion criteria like area and period in order to manage the amount of results.

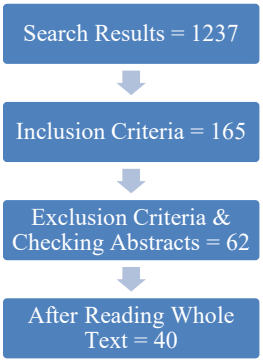

Figure 1: Process Literature Search

Furthermore, I analysed Amazon.com as a case study with the use of articles, press releases and news articles. This case study is useful for companies, since they can use Amazon as a best practice example in terms of enhancing their customers' experience with the use of technologies like artificial intelligence.

4. LITERATURE REVIEW

As mentioned before, research in the realm of artificial intelligence and its effects on business (especially marketing) is rather limited. Artificial intelligence is still a rather novel phenomenon and therefore most research available is only focused on its workings and technical aspects; not its applications and effects. The main literature search conducted for this literature review includes research in the following domains: (1) The customer journey in e-commerce; (2) Artificial intelligence in the customer journey; (3) Artificial intelligence in e-commerce; (4) Artificial intelligence in the customer journey in e-commerce. Most research has been conducted in the third domain – artificial intelligence in e-commerce – which can be explained by the fact that most artificial intelligence applications are present in online channels, and therefore most research is focused on e-commerce.

I have categorized the information gathered in analysing the literature into several sub-domains: (1) Omni-Channel, (2) Customer Experience/Customer Journey, (3) Customer Personalisation through Recommender Systems, and (4) Customer Engagement through Chat Bots. In the gathered literature, these concepts and AI techniques were mostly discussed.

4.1 Omni-Channel

In this section I will discuss the synergy between online and offline channels: the omni-channel view of commerce.

With the e-commerce industry rising rapidly, many people assume that brick-and-mortar stores will no longer be around in the future. Mainly because customers highly value the convenience and speed of e-commerce shopping (Reinartz, Wiegand, & Imschloss (2019). However, Rogojanu, Suciu, Ditu & Pasat (2018) claim that brick-and-mortar stores are a vital part of the customer's shopping experience; and with the rise of e-commerce it is of growing importance that retailers combine the online and offline world, forming a synergy between the two. Grewal, Motyka & Levy (2018) state that omni-channel retailing is more than the offering of products via multiple channels: "It is the coordination of offerings across retail channels that provides a seamless and synchronized customer experience, using all of the retailer's shopping channels" (p. 87). This way the benefits of all channels can be leveraged, creating a synergy.

Brick-and-mortar stores and e-commerce web sites both have their own pros and cons. *Cons* of *offline stores* for customers include: Less product information available and non-customised experience (Hilken et al., 2018). For retailers, cons of offline stores include: Less data gathered which can be used for understanding customer behaviour. *Cons* of *online channels* for customers include: Difficult to envision an online offering in a real-world environment (Hilken et al., 2018). For retailers, cons of online stores include: High amount of product returns. With the help of technological advancements like artificial intelligence and augmented reality the disadvantages of each channel can be diminished. Furthermore, the synergy between both levels makes many inconveniences of either channel obsolete. For example, product information can be sought online on a mobile phone while shopping in a brick-and-mortar store. According to a report published by Google (2015), 82% of people who own a smartphone, use their device in order to search information about purchases they are about to make in a physical store.

The *pros* of *online channels* can also be distinguished into advantages from the customers' perspective and from the retailers' perspective. Retailers have to opportunity to reach more customers, keep larger inventory, and diminish their costs (Vakulenko, Schams, Hellström & Hjort, 2019). Customers have the opportunity to read reviews, find extensive product information, benchmark with competitors and can shop online whenever they like and can do it from the comfort of their own homes; providing the customers with flexibility (Wetlinger, Auinger, Kindermann & Schönberger, 2017). Besides this, customers also have the opportunity to benchmark offers with other brands or web sites; it is said that buying a product at the best possible price is emotionally significant and can contribute to a nicer customer experience (Klaus, 2013). *Pros* of *offline stores* include: Sensory experience with a product; if specific questions, in-store experts might be able to answer these, Atmosphere will improve customer experience; etc. The pros/cons of e-commerce channels and brick-and-mortar stores are summarized in Table 1 and 2 respectively.

Table 1: Pros and Cons Online Shopping

E-Commerce Channels	
Pros	**Cons**
Wide product assortment	Reality of product may be different than expectations
Reviews available	Little/No human interaction
Extensive product/benchmark information available	If not satisfactory has to be returned → High amount of product returns
Flexibility	Information overload
A lot of data available → Experience can be personalised	

Table 2: Pros and Cons Offline Shopping

Brick-and-Mortar Stores	
Pros	**Cons**
Sensory experience with product	Very little product/benchmark information available
Questions can immediately be answered	Generic customer experience
Store atmosphere	Waiting lines
Human interaction	Little data gathered

The pros of online commerce are very similar to the cons of offline commerce, and vice versa. Therefore enhancing the omni-channel synergy with the use of artificial intelligence will provide both the customer and the retailer with the best of both worlds.

As can be seen in Table 1, e-commerce provides customers with a wide range of products (big assortment) and a wide range of offers (possible to find the lowest offer). Besides being a 'purchasing platform', the Internet can also be used as an 'information search platform', giving customers the ability to compare products, offers, and stores (Ahmeda, Shehaba, Morsya & Mekawiea, 2015). With the synergy of online and offline stores and especially with the wide adoption of mobile phones, customers nowadays also have access to this information.

As also mentioned in Table 1, e-commerce provides the customer with more choices and more convenience. Liu (2018) provides an example of offline retailers integrating this into their stores. He highlights the importance of brick-and-mortar stores having to reinvent themselves with the use of technological advances. An example of such reinvention is the concept of autonomous stores. He defines these as "an example of cyber-physical human systems that incorporate advanced artificial intelligence (AI) through abound embedded sensors and computations" (p. 336). Simply put, autonomous stores enable customers to pick up products without having to scan them and walk out of the store without checkout. One example of such store is Amazon GO, which will be further discussed in the section about Amazon.com.

However, there are more examples of the benefits of AI in offline retailing. Grewal et al. (2018) list some AI technique for indoor shopping markets, like iBeacons and Smart Parking. These techniques allow for companies to gather real-time data in order to better their understanding of customer behaviour. In later sections I will discuss the importance for companies of understanding customer behaviour.

Even though e-commerce provides retailers with a lot of advantages, like lower transaction costs and possibility of larger product assortment, it also comes with disadvantages in terms of an increase in the amount of returns. Especially clothing retailers have to deal with high product return rates, since customers cannot physically try on garments (Liu et al., 2017). In order for retailers to diminish costs associated with returns in combinations with environmental concerns, a solution needs to be applied. One such solution is garment fitting through virtual garment try on. This is an application of artificial intelligence which can rapidly and automatically predict garment fit without actually having to try on the garment in real life (Liu et al, 2017). Not only will this application diminish the rates of return, it will also increase the satisfaction of customers, who do not have to deal with uncertainty of garment fit and the hassle of returning a product.

4.2 Customer Journey & Customer Experience

Mangiaracina, Brugnoli & Perego (2009) define an e-commerce customer journey map as consisting of five phases: landing on the web site, product identification, product presentation, shopping cart, payment and order completion. This article was written in 2009 and only looks at the web site as a technological construct. This is an outdated view and with the rise of the omni-channel perspective and new technological advances like artificial intelligence it is very important to redefine this journey to encompass all touchpoints. The following two frameworks, if combined and adjusted to AI, are suited to use in today's technological age.

Karimi, Papmichael, Holland (2014) acknowledge the complexity of decision-making and therefore add two extra stages – formulation and appraisal – to one of the most common consumer decision-journey maps: (1) Need Recognition, (2) Formulation, (3) Information Search, (4) Evaluation of Alternatives, (5) Appraisal, (6) Purchase, (7) Post-Purchase Behaviour. They highlight the importance of understanding individuals' decision-making style and consumer knowledge, since these can have an effect on the decision-journey process. These researchers showcase the importance of fully understanding the individual customer's behaviour and its decision-making journey. In this thesis I will showcase this importance, but from perspective of technological applications: the effect artificial intelligence can have on this understanding in order to increase the customer experience along the customer journey.

A study by Klaus (2013) defines functionality and psychological factors as two of the most important dimensions that influence online customer experience. He defines the online customer service experience as "the customers' overall mental perceptions of their interactions with the online service provider and other customers expressed in its dimensions functionality and psychological factors" (p. 18). Functionality includes the following sub-dimensions: Usability, Product Presence, Communication, Social Presence, and Interactivity. Psychological factors include the following sub-dimensions: Context Familiarity, Physical Distance, and Value for Money. The functionality factors are mostly associated with web site functionality, since this article stems from 2013. However, these factors are very well suited to be applied today to AI techniques implemented in online channels and its impact on the customer experience. In the chapter 'Discussion & Conclusion', I will line the discussed AI techniques – recommender systems and chat bots – along the customer journey with the help of these two (Karimi et al., 2014; Klaus, 2013) frameworks. This way the impact artificial intelligence can have on the customer experience will be shown with clarity fitting in today's digital age.

The following sections can be visualised as pictured in Figure 2.

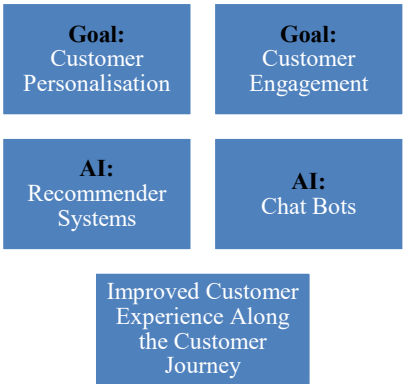

Figure 2: Visualisation Sections 4.3-4.4 & 6

4.3 Customer Personalisation

Rogojanu, Suciu, Ditu & Pasat (2018) note that it is important to understand customer behaviour, since this information can be used to define a target market and approach them accordingly, catering to their needs and desires. Google (2015) highlight the importance of 'being useful'. It is important to provide relevant information to customers at the right moment. In addition, Google (2015) also emphasises the importance of 'being quick'. One of the steps that should be taken by companies in the process of 'being quick' is the anticipation of needs. Companies need to look at a customer's past behaviour in order to be able to segment customers and present them with a relevant message according to their needs. It is ever so important to understand customer behaviour and accordingly create a frictionless experience for the customer.

Takahashi (2019) discusses an algorithm called "Consumer Behaviour DNA". This algorithm (with the use of pattern mining) helps companies in identifying various types of customer behaviour. With this information, companies are able to better segment customers, and increase their understanding of their needs/preferences. And, with this understanding and information about purchasing behaviour, companies can apply recommender systems in order to best target their customers and personalise their services accordingly.

4.3.1 Recommender Systems

Machine learning is a discipline found in artificial intelligence and allows for an algorithm which can provide predictions and learn from itself (Braun et al., 2017). This algorithm uses big data which has been collected by means of data mining. The lines between machine learning, data mining and artificial intelligence are rather blurred and they all seem to be intertwined (Chamatkar & Butey, 2015). However, Ahmeda et al. (2015) refer to data mining as including machine learning in order to help firms understand customers and provide recommendations.

Recommender systems (also called machine learned filters) provide recommendations which are personalised for a specific customer in order to match their interests as closely as possible (Zhao, Pan & Yang, 2017). These recommendations include the proposition of alternative products, complementary products, etc. (Yang, Ou & Zhou, 2017). These systems predict user preference with the use of previous behaviour data mining (Ruchika, Singh & Sharma, 2017). Various researchers name collaborative filtering as one of the most used recommendation techniques in the field of AI (Zhao, et al., 2017; Bauer & Nanopoulos, 2014). Collaborative filtering provides recommendations to customers based on their own past behaviours and similarities with other customers' past behaviours. (Zhao, Zhang, Friedman & Tan, 2015; Zhao et al., 2017; Ruchika et al., 2017). Past behaviour can be distinguished into two categories: (1) Explicit Feedback (ratings and reviews), and (2) Implicit Feedback (purchases and search history) (Bauer et al., 2014; Ruchika et al., 2017). With the use of information technologies, customers are finding themselves in a fast-pace environment constantly encountering decision-making both in the online- and offline world (Djurica & Figl, 2017). Reviews and ratings from other customers and recommendations can aid customers in this constant decision making.

Vázques et al. (2014) state that it is important to know at which stages in the purchase funnel customers are gained or lost. This can be done by real-time monitoring and understanding customer experience. If this is done correctly, customers can be transformed from browsers into buyers. As can be seen by the use of the term 'purchase funnel', these researchers initially focused mainly on the customer journey starting from awareness up to and including purchase. However, they also note that modern purchase funnel models also take into consideration the post-purchase stage in the customer journey. Besides this, they also say that the influence of the Web (the Internet and social media) is also increasingly taken into consideration in the customer decision-making journey. Vázques et al. (2014) also mention the importance of understanding where in the customer journey the customer is located at. This knowledge is needed to provide the right interactions with customers at every touch point and can in turn improve customer relationship management.

Vázques et al. (2014) focus on explicit feedback (reviews) in their research. Although they do not talk about recommender systems, they do discuss the various stages in the customer journey and how firms are able to understand the customers' experience according to their actions at specific points in this journey.

(1) The first stage 'awareness' can be explained as the first time the customer comes in contact with the firm. This can be either because they are browsing or because they have a specific product in mind with a clear 'intention to buy'. Customers can end up at this specific firm through advertisements or word-of-mouth (real-life, social media). In turn, customers can process this word-of-mouth and end up forming their own opinions about a brand/product/experience.

(2) The second stage 'evaluation' entails that the customer is evaluating the firm or its products. The customer benchmarks this firm with other brands and can make a decision about where they eventually want to buy the product.

(3) The third stage 'purchase' includes the actual buying of the product. The customer makes the decision to buy the product and can voice why they have decided to buy the product from this company/brand.

(4) The final stage 'post-purchase' is the point at which the customers have used the product, formed their opinions, and spread word-of-mouth about the brand/product/experience.

When looking at the words that are underlined, it is clear that Vázques et al. (2014) have looked at the customer journey from the perspective of customers' opinions and reviews: explicit feedback.

This customer journey is important in trying to understand customers' opinions at certain points in time. In the first stage, the customer is influenced by other people's opinions; in the second stage the customer is influenced by other companies and the customer is able to form their opinion on the company and its competitors; in the third stage the customer buys the product

and can justify why they have decided to buy this specific product/brand from this company; and in the final stage, the customer can influence other people with their own word-of-mouth. This customer journey, based on explicit feedback, can be viewed as a loop as shown in Figure 3.

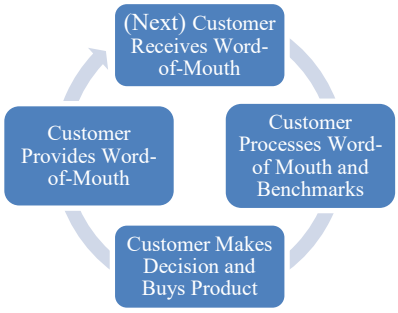

Figure 3: Customer Journey Explicit Feedback

Vázques et al. (2014) do not take AI into consideration in their research. This can be explained by the year of publication - 2014. However, this framework is still relevant both in general and for my research as understanding customer behaviour provides the company with a foundation to figure out how to incorporate recommender systems into their value creation strategy. Ultimately, providing these recommendations and personalising the customer's journey, will increase the customer's experience and therefore also further increase positive word-of-mouth. Devika, Jisha & Sajeev (2016) mention that the opinions of customers shape a company's development, therefore companies should use the feedback given by customers and use it to their advantage. The more feedback companies receive, the more data goes into the recommender system, in turn increasing its accuracy. This process of increased accuracy will be explained further on and is visualised in Figure 4.

In cases in which a company newly launches a recommender system (data sparsity) it is important for those companies to include a cross-system. This system includes information and data from other e-commerce web sites and social media platforms (Zhao et al., 2017).

4.3.2 Personalisation

According to Rustagi (2012) and Bauer et al. (2014) personalisation enables a company to attract customers and increase the likelihood of customer loyalty. Personalisation can be applied in many ways, providing: personalised recommendations, personalised pricing offers, personalised advertisements, etc. Personalisation proves as a filter for customers, since it provides relevant suggestions, which helps reduce information overload. This can be seen as simplifying and speeding up the decision-making process, and thus lowering the customer's effort (Rustagi, 2012; Yang et al., 2017; Jannach & Ludewig, 2017; Kaci, Patel & Pkacirince; 2014). In turn, this can improve the customer experience (Ruchika et al., 2017). Seshadri, Singh, House, Natan & Parikh (2017) mention that machine learned filters – a form of personalisation – simplify the user experience and improve the value delivered to customers. In turn, this can increase user engagement. Furthermore, it increases the likelihood of browsers turning into buyers, therefore increasing the conversion rate. It has been shown by psychology that if a product, which fits your personality and lifestyle is recommended to you; you will more likely end up buying said product (Marwade, Kumar, Mundada & Aghav, 2017).

Bauer et al. (2014) explain customer satisfaction and loyalty in personalised recommendations as a loop: (1) The application of a recommender system provides personalised recommendations to customers; (2) Customers reduce their time searching for the product they are looking for; (3) Customers will have a strong positive feeling towards the system if the recommendations are accurate; (4) Customers' loyalty will increase; (5) Higher loyalty due to accuracy will result in more use by customers; (6) More information about customers can be gathered; (7) In turn this will even further improve the accuracy of the system; (8) And so forth. They name this loop a 'positive reinforcement' and can be seen in Figure 4.

Figure 4: Reinforcement Loop Recommendations/Loyalty

So, personalised recommendations have to power to increase customer loyalty. However, for customers that show little brand/store loyalty, prices of products are of key importance in making a purchasing decision. Zhao et al. (2015) have researched the willingness-to-pay of customers in combination with personalised price promotions. If further research proves that this leads to significantly higher profits, it is likely that this can become a more common future addition to personalisation on e-commerce web sites. And in turn, this might attract and retain those customers that do not usually have brand/store loyalty.

But, there are more techniques related to recommendations, which are subject to research. Jannach et al. (2017) focus on the 'ranking' of products. When you search for an item on an e-commerce channel, you have the option to rank the results according to price, relevance, newest additions, etc. These researchers focus on adding past behaviour (implicit feedback) into their ranking. This includes information about past price ranges and past products/brands bought. This technique is able to make the likelihood of browsers turning into customers higher, since people are more likely to buy products/prices ranges/brands they have bought before. Especially for a retailer like Amazon.com, which sells a large amount of product from almost every imaginable product category, this can be very beneficial in terms of time reduction for customers. In addition, Amazon.com is likely to have a lot of past behaviour available, from both the customer and/or other customers.

As mentioned before, it is important to understand a customer's behaviour in order to best serve them. Even (2019) highlight 'behavioural analytics' as a tool to reveal the digital actions of customers. These actions can be presented along a timeline, called the user journey. Based on these actions along the user journey, companies can form a list of likes and dislikes customers have and with the use of that list optimise their product and delivery to the best of their ability. This optimisation should in turn lead to higher customer satisfaction, and thus improve the customer experience. In turn, this will provide the company with a higher revenue stream. Next to this, Even (2019) also discusses 'predictive analytics', which entails that firms have to use machine learning to model customer's

behaviour' before a purchase has been made. This will save the company both time and money. He emphasizes the importance of understanding customer behaviour along the whole customer journey in order to improve personalisation and therefore increase customer experience.

Interestingly, Marwade et al. (2017) combine two artificial intelligence applications, namely recommender systems and chat applications. They mention, those chat applications fall under the category of 'conversational' commerce, meaning that it combines the experience of shopping with messaging applications. By collecting this conversational data, it can be used to understand a customer's personality traits. By mining these traits and applying those to recommender systems, personalisation can be more accurate; and like mentioned previously, it can improve the likelihood of the customer buying those recommended products. The next sections will further discuss the adoption of conversational agents, or universally called 'chat bots'.

According to Freitas, Gastaud Maçada, Brinkhues & Zimmermann (2016), *customers* want fast and convenient services, and *businesses* want low-cost techniques to solve complex issues and higher revenues. As a small summary of the previous part, the ways recommendation systems can have an impact on both the customers and businesses (as mentioned by various researchers) are visualised in Appendix B (Appendices).

4.4 Customer Engagement

In the area of marketing, Bhandari et al. (2017) state that customers are usually not interested in products being forced onto them with the only intention of firms to sell. Customers want to be engaged by marketers and want to be part of an experience. Therefore, in this section I will focus on the importance of engaging the customer and how companies can achieve this.

In their research, Niu, Li & Yu (2017) have looked at the search behaviour of customers in a general search engine and of customers shopping at Walmart.com. One element which they investigated, was customer engagement. It appeared that shoppers at Walmart.com searched more often, looked longer through results, viewed more products and overall spent more time searching than those who searched for a product on Google. The Google search engine is often used to quickly access some information about a product. Thus, e-commerce sites are generally a lot more goal-based than general search engines are.

Another important thing Niu et al. (2017) note is that customers at Walmart.com who are not registered have a much lower purchase rate than those that are registered users. This implies that customer engagement is a very important aspect that needs to be taken into consideration by marketers. Customer engagement can be improved with the use of various artificial intelligence techniques.

Reviews can be an indication of customer engagement. In research conducted by Dimitrov, Zamal, Piper & Ruths (2015), reviews posted on books on Amazon.com are compared with reviews posted on Goodreads, an online book community web site. The paper is introduced by saying that user-contributed product reviews prove to be valuable for various stakeholders. These include visitors who are able to shape their own opinions based on reviews. Besides this, customers get offered recommendations formed with past behaviour and reviews. Another stakeholder is the company offering the products, since positive reviews are able to increase (if negative decrease) sales. Dimitrov et al. (2015) found that the reviews found on Amazon.com are more focused on 'purchasing'. This means that most of those reviews consisted of characteristics and terms which could be seen as a way of selling the books. This implies that the background of posting a review (Amazon.com to explain value-for-money, Goodreads to explain whether worth-reading or not) influences the type of review. In their paper it was also explained that the reviews posted on Amazon.com have typically extreme rating values, so most of the reviews were either one star or five star reviews. This will also have an effect on the recommendations which are provided to customers.

Relationships between customers and firms are important both offline and online. However, there are some differences between the relationships in offline and online environments. According to Steinhoff, Arli, Weaven & Kozlenkova (2018) relationships in the offline world are often of the human-to-human kind. Whereas relationships in the online world are often of the human-to-technology kind. Since an omni-channel approach is often used in managing customer relationships, usually a relationship consists of both online and offline interactions. Moriuchi (2019) states that repeated interactions are critical in order to maintain active engagement. These interactions have to take place along the customer journey in order to optimize customer engagement. Moriuchi also states that some studies have agreed that customer engagement can have a positive influence on customer loyalty. "Customer engagement is an iterative process commencing with customer satisfaction and culminating in customer loyalty (Moriuchi, 2019, p. 3)." Especially in the online retail environment, in which very little human interaction is available, it is important for companies to find others way to interact and thus engage with customers. This can be done via various artificial intelligence techniques like voice assistant or chat bots.

Steinhoff et al. (2018) say that customer experience in the online world is comprised of two facets: cognitive experience and affective experience. Most interesting for my research is the second facet: affective experience, which is comprised of customers' perceived ease of use, personalisation, connectedness and customers' perceived benefits. Furthermore, they state that ease of interaction can have a positive effect on customer loyalty. The affective experience seems to be the facet that has a possibility to be positively affected by the integration of artificial intelligence techniques aimed at personalisation and engagement. This, as long as the web site or mobile app remains easy to use and provides the customer with additional benefits like increased speed of use. In addition, communication can increase the level of trust customers have in firms. Trust is essential, especially in e-commerce, since people fear they will be scammed and are often reluctant to share personal data.

Artificial intelligence is part of the era of the Symbiotic Web. According to Steinhoff et al. (2018) "Humans and technology communicate symbiotically in a human-like fashion and in real-time" (p.375) on the web. Artificial intelligence is able to make otherwise very rigid transactions more personal. These researchers distinguish various sub-facets in customer relationships including: seamless relationships, omni-channel relationships, personalised relationships, and anthropomorphized relationships. Respectively, these relationships are to do with offering the customer: a flow during the purchase-journey; seamless integration between channels; personalised and exclusive experiences; and virtual agents acting similar to humans. I am mentioning these relationships in this section, since customer engagement is likely to increase once the customer relationships are set in place and

continuously improved. The previously mentioned recommender systems are able to provide the customers with a flow during the purchase-journey, seamless integration between channels, and personalised experiences. The following mentioned chat bots are especially able to provide the customer with virtual agents acting similar to humans and a personalised experience.

4.4.1 Conversational Commerce (Chat Bots)

As mentioned before, Marwade et al. (2017) categorise chat bots under 'conversational commerce'. In this section I will go into the impact of conversational commerce (chat bots) on the customer experience.

Leong, Goh & Kumar (2017) define a chat bot as "a computer program to simulate the conversations between human and machine (p.394). In their research they investigated the concept of a self-service interactive kiosk in medical health care. This kiosk is supposed to replace the role of service personnel in answering most commonly asked questions. This will give the service assistants more time to work on other important tasks. This research entailed a self-service kiosk in hospitals, however this information is also relevant in e-commerce in the form of online chat bots or in offline commerce in the form of self-service stores.

Most current chat bots perform quite basic functions, they are programmed to react to specific scenarios and when they do not understand a question they ask the user to re-formulate the question (Lommatzsch, 2018). Lommatzsch (2018) presents a framework of a chat bot providing answers to specific questions taking into consideration previous behaviour of the customer. This includes chat bots having a proactive nature and guiding the customer in asking the right questions; namely the ones that the chat bot is able to answer. He also compares chat bots to human service personnel, stating that chat bots will always be kind and friendly, can be applied to any situation and will always have a constant level of quality. This leads to customers having the feeling of chatting to a human service provider.

Just like it was mentioned that personalised filters are able to reduce information overload for customers, chat bots can be used for the same reason. Customers do not want to spend their time searching for information or answers to questions on a web site. Chat bots are able to answer questions quickly and concisely; they are able to do the search work for you. (Lommatzsch, 2018)

Besides this, chat bots are able to learn from their own mistakes. Customers can be asked to provide feedback about the chat bot service they have experienced. They can give a rating based on information accuracy, speed, etc. Chat bots are able to provide customers with a 'digital' interaction they would otherwise not be having in online commerce (Lommatzsch, 2018). So, conversational agents are able to provide customers with a service that might increase customer interaction and engagement which is usually present in brick-and-mortar stores, but lacking in e-commerce.

As a small summary of the previous part, the ways chat bots can have an impact on both the customer and the company (as mentioned by various researchers) are visualized in Appendix C (Appendices).

5. CASE STUDY – AMAZON.COM

In this section, I will provide the reader with an analysis of Amazon.com's artificial intelligence endeavours. These AI endeavours are sectioned according to the previously discussed constructs. But first I will shortly discuss the background and history of Amazon.com.

5.1 History and Online/Offline Retailing

Starting out as a bookselling company, Amazon.com was founded in 1995 in Seattle by CEO/founder Jeff Bezos (Telegraph UK, 2015). The following years Amazon started upscaling their product categories to include CDs, DVDs, clothing, and electronics, among many more. Besides selling products, Amazon also first started selling services in the early 2000s including Amazon Web Services, Amazon Prime, and Amazon Alexa. (CNN, 2019)

Amazon Books, Amazon's first brick-and-mortar store was launched in 2015 in Seattle, the place where it all began for Amazon.com (The Guardian, 2015). Followed by the opening of its first Amazon Go store in 2016 (Forbes, 2016); a physical store without a checkout line (Amazon GO, 2019).

Their growth allowed Amazon to acquire various companies over the years. One of those companies, Whole Foods (brick-and-mortar stores), was acquired in 2017 (Business Insider, 2017). Amazon thus operates in both online and offline retailing.

Amazon is one of the most innovative companies when it comes to artificial intelligence. However, when Amazon first started to realise it needed to start innovating in this area, they did not have any experts in-house and had difficulties attaining them, since they had no reputation in artificial intelligence yet. Therefore, Amazon bought small tech-companies in order to be able to innovate in artificial intelligence. Going even further, Amazon started their own cloud computing service in 2006, offering artificial intelligence solutions to other companies: Amazon Web Services. (Levy, 2018; Amazon Web Services, 2019)

5.2 Artificial Intelligence - Amazon.Com

5.2.1 Customer Experience

According to Meyer and Schwager (2007) brands have to form the customer experience by making sure that the brand's value proposition is embedded in every feature of the product or service. In their mission statement, Amazon says "we serve consumers through our online and physical stores and focus on selection, price, and *convenience*. (…) We also provide *easy-to-use functionality*, *fast* and *reliable* fulfilment, and *timely* customer service (Amazon Annual Report, 2018). Besides investing in artificial intelligence in order to not fall behind their competition (Walmart, Google, Microsoft), Amazon's value proposition of providing customers with a convenient, fast service is a reason as to why Amazon.com is now one of the most innovative companies when it comes to technological advancements (Levy, 2018; Chatterjee, 2018).

5.2.2 Omni-Channel

So, Amazon serves their customers through both online and offline stores with a focus on convenience and speed in delivering products to their customers. Interestingly, Amazon is a company which started out as an online retailer, and only recently has started to venture into the world of offline retailing. While many offline retailers have found themselves in a tight spot, because of the rise of e-commerce, Amazon seems to understand that the rise of technological advances does not have to be a threat to offline retailing. Instead, it can be used to one's advantage.

Amazon GO: Liu et al. (2018) state that e-commerce distorts offline retailing, and therefore offline retailing needs to be reinvented by applying digital and technological transformations. Amazon GO, a physical store without a checkout line (an autonomous store), was first launched in 2016. Amazon calls it: "The world's most advanced shopping

technology, so you never have to wait in line" (Amazon GO, 2019). Using technologies like computer vision, sensor fusion, and deep learning, Amazon GO can be seen as the modern way of shopping. (Amazon GO, 2019)

Amazon Lockers: In a similar fashion, preceding the Amazon GO stores, Amazon launched Lockers in 2011. These Lockers are "secure, self-service kiosk where you can pick up your Amazon packages when it's convenient for you" (Amazon Locker, 2019). The convenience of this Locker is shown through its mentioned benefits: "Open early and late; Deliveries and returns; No waiting lines; No additional fees (Amazon Locker, 2019).

5.2.3 Customer Personalisation

Recommender System: Amazon "examines the items you've purchased, items you've told us you own, items you've rated, and items you've told us you like. Based on those interests, we make recommendations" (Amazon Help, 2019). Besides a customer's own past behaviour, Amazon will also make use of other customers' past behaviour who have similar interests. These recommendations, made possible by artificial intelligence and machine learning, do not only generate a huge amount of Amazon's revenues, it also provides customers with an easier shopping experience. Especially for a retailer like Amazon, which sells product from almost any category, it is of key importance to have algorithms in place that reduce information overload for customers.

5.2.4 Customer Engagement

Amazon Echo/Alexa and Amazon Dash Wand: As mentioned before, customer engagement is a topic which is increasingly being discussed in 'customer experience' research. Customers reach out to firms creating multiple extra touch points along the customer journey and vice versa (Lemon et al., 2016). Amazon can be seen enhancing this customer engagement with their smart speaker 'Echo'. Echo can be connected to Alexa, Amazon's virtual assistant (Amazon Echo, 2019). Alexa enables customers to use their voice to ask Alexa to perform certain tasks including: Saying what the weather's like; Putting on a certain movie; And even placing an order (Wired, 2017; Reinartz, 2019). Amazon is constantly innovating and enhancing their artificial intelligence technologies, making them more advanced and relevant for their customers. One of Amazon's most recent AI advances in their Alexa voice assistant system is the recognition of emotions. Their new emotion classification system is supposed to make Alexa more engaging with its customers (Amazon Alexa Blogs, 2019). Amazon Echo/Alexa is a great example of Amazon's focus on creating convenience and enhancing customer engagement and can be seen as a form of conversational commerce. Conversational commerce, according to Piyush (2016) puts the conversations firms and customers have at the core of the customer journey.

Building on the functionality of Alexa, Amazon included the virtual assistant in their Dash Wand. This enables the user to scan the barcodes of products that they have at home and possibly run out of, making the process of reordering every-day products easier and faster. Most interesting about this development is the signal this sends out in terms of Amazon's future endeavours. (Price, 2017) Amazon is increasingly expanding its voice assistant's application; from Echo Auto (connecting Alexa with your car's speakers) to fridges with Alexa built in (re-ordering products automatically) (Amazon Echo Auto, 2019; LG, 2019). This expansion is a clear example of the ever-growing presence of the Internet of Things. According to Jones (2019), IoT refers to "networkability for household gadgets such as dishwashers, refrigerators, lights, door locks, (…). It brings the intelligence of the Internet to physical products, making them smart, interconnected, and able to communicate autonomously" (p.3).

6. DISCUSSION AND CONCLUSION

As mentioned before, I will use the frameworks of Klaus (2013) and Karimi et al. (2014) in order to highlight the effects recommender systems and chat bots can have on the customer experience and to map these artificial intelligence techniques across the customer journey. A table of the ways recommender systems and chat bots influence functionality and psychological factors (the customer experience) of customers can be found in the Appendix D (Appendices). This table includes the benefits and services AI techniques provide to customers and can be transformed into actions along the customer journey as can be seen in Figure 5 (larger figure can be found in Appendix E (Appendices)).

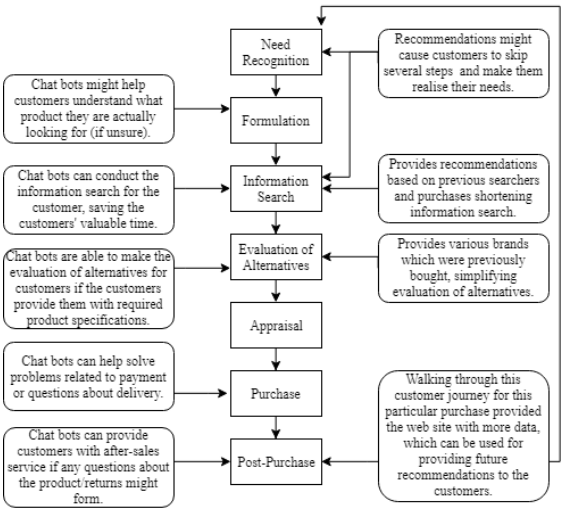

Figure 5: Use of Chat Bots (Left) and Recommender Systems (Right) along the Customer Journey

By mapping these techniques and their functions along the customer journey, it is possible to improve the customer's experience at those certain touch points. However, in order to do so, it is of key importance to understand customers' behaviour and needs. Customer experience can be influenced by functionality factors and psychological factors, and by figuring out how AI techniques have an effect on those, it is possible to increase understanding of customer behaviour. Recommender systems provide the ability of personalisation for customers, whereas chat bots provide the ability to enhance customer engagement.

As mentioned before, the definition used for the customer journey (including customer experience) is as follows:

"The customer experience consists of the subjective responses customers form when interacting with a company. These interactions take place over a period of time at various touchpoints and across various channels; from the pre-purchase stage up to and including the post-purchase stage. Together all of these interactions and experiences form the customer journey."

Together, these two frameworks provide a holistic view on both the customer experience and the customer journey. If interactions at individual touch points can be improved with the use of AI, the customers' subjective response will be positively affected. All of those improved interactions combined from pre-purchase, to purchase, to post-purchase together from the improved customer journey.

As previously mentioned in this thesis, the outline shown in Figure 6 can be used to summarise the outcomes of my research. The AI techniques and their benefits on customer experience have been provided in appendix D (Appendices). The outcomes of those AI techniques are customer personalisation and customer engagement. Together these two outcomes provide for an improved customer experience along the customer journey, as pictured in Figure 5.

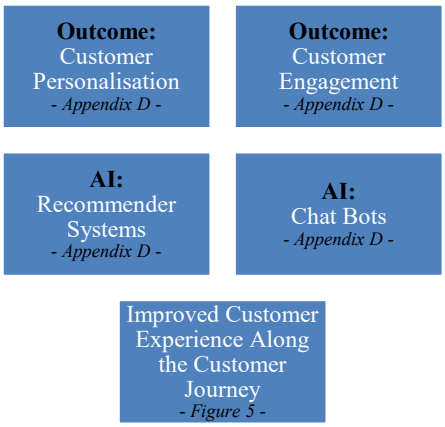

Figure 6: Visualization Sections 4.3-4.4 & 6

7. IMPLICATIONS FOR RESEARCH & PRACTICE

In this thesis I have addressed the effects artificial intelligence can have on the customer experience along the customer journey. I have presented this through an overarching framework based on a combination of existing literature. This framework and thesis research contributes and adds to the current available literature, since the provided framework can be used in order to better understand the effects AI can have on the customer experience (this research has been limited to recommender systems and chat bots). With the rising importance of providing the customer with a memorable experience, there is a need for literature which highlights the effects technological advances can have on this experience. This thesis provides a foundation and starting point for those researchers that are interested in discovering the effects AI techniques can have on the customer experience along the customer journey in the omni-channel environment. In the chapter "Limitations & Recommendations for Future Research", I have provided the reader with research that can be conducted in extension to this thesis.

This work has several implications for practice: (1) Businesses can use the proposed framework presented in Appendix D (Appendices) as a guide to figure out how artificial intelligence can have an effect on the customer experience; (2) The framework presented in Figure 5 can be used by businesses to better understand how these customer experiences shape the customer journey; (3) In this thesis I have highlighted the importance of understanding customer behaviour in order to be able to enhance the customer experience; (4) In this thesis I have also provided an analysis of Amazon.com and their AI applications. This analysis has been based on the topics covered in this thesis. Companies can learn from Amazon.com's AI endeavours and apply their own business to my proposed framework; (4) And, although I have focused on the customer experience aspect of marketing, businesses (within different industries) can learn from this and apply this to other areas of their business as well.

8. LIMITATIONS & RECOMMENDATIONS FOR FUTURE RESEARCH

When looking at topics of future research, it is important to look at the limitations of this thesis research. The research of this thesis has been conducted in ten weeks. If the length of research would have been longer, a lot more facets of customer experience or AI techniques could have been discussed. In addition, empirical evidence is now lacking. Therefore in future research, empirical evidence could be gathered in order support my findings.

In this thesis I have focused my attention on two applications of artificial intelligence: recommender systems and chat bots. I have analysed the impact of these two AI applications on the customer experience and came to conclude that the two most important outcomes of those applications are customer personalisation (through recommender systems) and customer engagement (through chat bots). Future research could analyse more outcomes of these two particular AI techniques in order to even better learn how these can enhance the customer experience at even more detailed touchpoints along the journey.

As can be seen in Appendix D (Appendices), some boxes remain empty. These boxes could have been filled by other AI techniques aiming to improve the customer experience (e.g. augmented reality clothes fitting could fill the gap of product presence). Future research could go into multiple AI techniques which have not been covered in this thesis and apply them to my proposed framework in order to extent and complete this step-by-step.

Reinartz, Wiegand & Imschloss (2019) propose a framework of new sources of value creation in the age of digitization. These sources include: automation, individualisation, ambient embeddedness, interaction, and transparency and control. The two AI techniques covered in this thesis are part of automation, individualisation and interaction as can be seen in Table 3. The framework they propose could be used in future research, since it discusses value creation, and this has the potential to improve the customer experience. In future research, the two AI techniques covered in this thesis could be researched from the perspective of *convenience* and *relevance* with the use of this framework. Other AI techniques could also be covered for the remaining sources of value creation. This could provide as a tool to extent and further complete my proposed framework.

Table 3: Value Creation Sources

Sources	Examples
Automation + Interaction *Value Creation through Convenience*	Communications → Real-time information and responses (chat bots)
Automation + Individualisation *Value Creation through Relevance*	Personalisation → Ease and efficiency in decision-making (recommender systems)

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11. APPENDICES

Appendix A: Overview of the 40 Analysed Literature Sources and the Topics Discussed

Authors Literature Review:	Topics:
Ahmeda et al. (2015)	Recommender Systems; Data Mining; E-Commerce
Bauer & Nanopoulous (2014)	Recommender Systems; Customer Satisfaction
Bhandari et al. (2017)	Customer Journey
Braun & Carriga (2017)	Customer Journey; Customer Experience; Big Data Analytics (Privacy)
Chamatkar & Butey (2015)	Data Mining
Devika et al. (2016)	Recommender Systems; Machine Learning
Dimitrov et al. (2015)	Reviews; Amazon.com; Customer Engagement
Djurica & Figl (2017)	Reviews
Even (2019)	Customer Journey; Customer Behaviour; Big Data Analytics
Freitas et al. (2016)	Digitisation; E-Commerce
Grewal et al. (2018)	Omni-Channel; E-Commerce
Hilken et al. (2018)	Omni-Channel
Jannach & Ludewig (2017)	Recommender Systems; Customer Personalisation
Kaci et al. (2014)	Recommender Systems
Karimi et al. (2014)	Decision-Making Process
Klaus (2013)	Customer Experience (Online); Amazon.com
Leong et al. (2017)	Chat Bots; Machine Learning
Liu (2018)	Omni-Channel; Autonomous Stores; Amazon.com
Liu et al. (2017)	Virtual Reality
Lommatzch (2018)	Chat Bots
Mangiaracina et al. (2009)	Customer Journey; E-Commerce
Marwarde et al. (2017)	Chat Bots; Recommender Systems; Customer Personalisation; Conversational Commerce
Moriuchi (2019)	Chat Bots; Customer Engagement; Customer Satisfaction
Niu et al. (2017)	Machine Learning; Predictive Analysis; E-Commerce; Customer Engagement
Piyush et al. (2016)	Conversational Commerce
Reinartz et al. (2019)	Omni-Channel; Customer Journey
Rogojanu et al. (2018)	Machine Learning; Omni-Channel; AI
Ruchika et al. (2017)	Recommender Systems; Machine Learning; Customer Experience
Rustagi (2012)	Customer Personalisation
Seshadri et al. (2017)	Recommender Systems; Machine Learning
Steinhoff et al. (2018)	Omni-Channel; AI; Chat Bots; Customer Personalisation; Customer Relationships
Takahashi (2019)	Customer Behaviour
Taylor (2017)	Customer Journey
Vakulenko et al. (2019)	Omni-Channel; Customer Journey
Vázques et al. (2014)	Customer Journey; Reviews
Wagner et al. (2018)	Omni-Channel
Wetzlinger et al. (2017)	Omni-Channel; Customer Personalisation
Yang et al. (2017)	Recommender Systems; E-Commerce
Zhao et al. (2015)	Recommender Systems; Customer Personalisation; Amazon.com
Zhao et al. (2017)	Recommender Systems; Machine Learning

Appendix B: Impact Recommender Systems on the Customer and the Company (as Mentioned by Various Researchers)

Effects of Big Data Analytics and -Mining		
Even (2019)	Company	Higher Customer Satisfaction; Higher Revenue; Higher Conversion; Map Customers' Wants/Needs; Saved Money/Time
Effects of Personalisation (Recommendations and Filtering)		
Rustagi (2012)	Customer	Noise Filtered Out → Reduced Information Overload
	Company	Higher Customer Acquirement; Higher Customer Engagement; Higher Customer Retainment; Higher Customer Satisfaction; Higher Conversion Rate
Marwade et al. (2017)	Company	Higher Conversion Rate
Zhao et al. (2015)	Company	Higher Profits
Jannach and Ludewig (2017)	Customer	Items Found Easier/Quicker
Seshadri et al. (2017)	Customer	User Experience Simplified; Maximised Value Delivered
	Company	Higher User Engagement
Ruchika et al. (2017)	Customer	Introduce User to Items of Interest; Better User Experience
Yang et al. (2017)	Customer	Simplified Decision-Making Process; Reduced Information Overload; Better Customer Experience
	Company	Better Customer Relationship; Higher Customer Loyalty
Bauer and Nanopoulos (2014)	Customer	Lower Search Time; Higher Trust In Recommendations (If Satisfied)
	Company	Higher Customer Loyalty; Higher Conversion Rate; Increased Cross-Selling

Appendix C: Impact Chat Bots on the Customer and the Company (as Mentioned by Various Researchers)

Effects of Chat Bots		
Leong et al. (2017)	Company	Service personnel does not have to answer most commonly asked questions anymore → They will have more time to work on other important tasks
Lommatzsch (2018)	Customer	Friendly/Kind Interactions with Constant Level of Quality; Reduced Information Overload; Quick/Concise Answers; Increased Customer Interaction
	Company	Increased Customer Engagement
Marwade et al. (2017)	Customer	More Accurate Personalised Recommendations
	Company	Information Gathered Increases Customer Understanding

Appendix D: Influence Artificial Intelligence on Functionality and Psychological Factors (the Customer Experience)

	Recommender Systems:	**Conversational Agents:**
Functionality		
Usability *Ease/Speed of Use*	Reduces information overload; simplifies/speeds up decision-making process; lowers customers' efforts	Reduced information overload; Speeds up information search process
Product Presence *Ability of Product Assessment*		
Communication *Reduces Perceived Risks*		Provides communication; Is able to use past behaviour in conversation, and thus give off a sense of trust
Social Presence *Reviews*	Integrates reviews/ratings and behaviour of other customers	
Interactivity *Dynamic Dialogue*	Uses past behaviour to propose relevant content; providing personalisation	Provide communication with personalized interaction; Possibility to provide feedback to the system
Psychological Factors		
Context Familiarity *Ability to Create Customer Experience Similar to Offline Store*		Provides customers with ability to ask questions you would otherwise ask store workers
Trust *Personal Contact*	Integrates reviews/ratings and behaviour of other customers, which can ease the customer through others' (positive) service experience	Provide communication with an otherwise non-communication channel
Value for Money *Best Price*	Provide personalised price promotions, giving customer feeling of receiving an exclusive offer	
Outcome	**Customer Personalisation**	**Customer Engagement**

Appendix E: Use of Chat Bots (Left) and Recommender Systems (Right) along the Customer Journey