Impact of Chatbots on Online Customer Experience

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The internet presence has become crucial for the success of many companies in the digital era we live in today. Therefore, the company's online presence has to be outstanding in order to retain customers and remain compatible. With the increases of available consumer data to be analyzed, new insight can be gathered, thus creating value. Most of the gathered data is unused due to lack of knowledge and technological capabilities. Artificial Intelligence represents a solution to this problem since it can enable companies to tap into this unused data. The objective of this paper is to elaborate upon one type of A.I. technology currently used online, namely Natural Language Processing and Chatbots in particular, how those are integrated on websites and what effect those systems have on the perceived Online Customer Experience of the induvial. This was done by conducting a survey assessing Online Customer Experience from a new, holistic point of view while also measuring the intentions of people to use chatbots on websites. The results indicate that people using chatbots are having a better experience online than those who do not. The results suggest that companies with an online presence should consider using such technology in order to increase the experience of the customer and optimize the usage of resources in regard to the operations required to sustain a good website.

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1. INTRODUCTION

Systems using Artificial Intelligence have already an immense impact on the day to day live of many people, using it in many different forms ranging from the autocorrection for spelling on your smartphone, Siri or OK Google, up to snapchat/Instagram filters adjusting to the pictures/videos you take and many more. Some of those applications have been recognized as a competitive advantage which contributes to the success of companies, as e.g. the recommender tool on the website of amazon.com.

One branch of A.I. often used on websites is the so-called Natural Language processing (NLP), it is a technique for human-computer communication. In particular, this technology enables a computer to interpret a succession of natural (human) words, understand its context and respond in accordance to it. Without NLP, a computer could not distinguish between "hello" and "goodbye" and could not provide a meaningful response to any input based on human language. The field of applicability of such technology ranges from analyzing search queries for optimal search results, the conversion of speech to text and vice versa, the out filtering of spam emails or chatbots for resolving customer issues.

However, there is a lack of information about how the implementation of this tool effects the experience of the customer online. This paper is designated towards providing a guideline for understanding NLP's, their field of applicability and the effect of one particular kind of NLP, Chatbots, on Online Customer Experience (OCE).

1.1 Online Customer Experience

Research about how people interact with companies and what effects those interactions have on the individual's perception of experience with the brand has been studied extensively. Experiential Marketing, the approach of believing that the interaction of a customer and a company is perceived as a subjective experience rather than a rational evaluation (Schmitt, 1999), has been introduced as a way of understanding how customers evaluate products. The research concerning customer experience was extended and synthetized into the online context, creating theories and frameworks acknowledged by the scientific communities and used by online marketeers. OCE was assessed through different angles, ranging from cognitive and affective explanations for perceived experience to behavioral angles explaining the adaptation of information systems.

1.1.1 The Need for Outstanding Online Presence

The online environment has become a common interaction platform between customers and companies, generating significant amounts of revenue, data and market insights with increasing tendencies proposed for the future (Statista, 2019). Online presence has become a necessity for many companies, some even solely relying on it.

Due to the increase in available information and alternatives, the consumer has become selective about what to consume while browsing online, filtering out all unnecessary information. Therefore, a company's online presence and how it is perceived by visitors has become essential for commercial success. The developments in digital capabilities have shown that the aggregated data produced by society is exceeding the current processing capabilities of online marketing practices (Marr, 2017), resulting in missed opportunity in regard to effective data usage.

1.2 Artificial Intelligence and its Impacts

A.I. applications are a stream of technologies emerging into practical maturity, they possess a disruptive nature which can change the way how business is practiced. In general terms, A.I. is described as "the ability of a computer or computer-controlled robot to perform tasks commonly associated with intelligent beings" (Copeland, 2019). As a practical illustration about what to expect from A.I. based systems, one can think about a mental task performed by a human, if such task requires a human one second to complete, it is very likely that this task can be performed by an A.I. today or in the near future (Ng, 2016). The advantage of A.I. lays in handling enormous amounts of data, you can think about it as "analytics on steroids" (Davenport & Rajeev, 2018). Such capacities were not realizable with the prior software; therefore, implementing such technologies represent an opportunity to increase effective data usage, thus, creating competitive advantage.

Nevertheless, since A.I. is a relatively new technology to be used on a bigger scale, it is not certain that it will be accepted throughout the entire society, it has to provide a surplus in comfort and usefulness from the perspective of the end-user in order to be fully regarded as an integrated technology which is going to be used in the entire market.

1.3 Research Gap

Due to the lack of expertise, new talent and basic understanding about the fundamental insides of A.I. (Ransbotham, Kiron, Gerbert, & Reeves, 2017) many companies cannot answer the question about what to expect from the implementation of A.I. based systems into their common business practices, and as the increasing importance of A.I. will affect many businesses in the next years, the current models of OCE should also be adjusted to this technological innovation and adapt themselves to those new capabilities. This paper tries to bridge the gap of understanding how the components of OCE are affected by the use of A.I. applications, Chatbots in particular, on websites. Based on this, the research question is formulated as follows:

What effect do chatbots on websites have on the online customer experience?

Resulting from this, the sub questions are:

sQ.1.: What are the components of OCE?

sQ.2.: Why are NLP systems, chatbots in particular, implemented in the first place?

sQ.3.: How does the architecture of the website affect OCE?

The sub research questions represent a helpful way to extend the research in such a way that the main research question can be answered in an appropriately. A clear definition of OCE and its components is important to have as a baseline for the research design. The reason of chatbot implementation is used in order to understand the purpose of a chatbot and what it does in the overall context of the website, also influencing OCE. The effect of the website design on OCE is needed in order to understand what characteristics a website should possess to be considered enjoyable and therefore influencing the OCE construct as well.

In the following, the second chapter will critically review the literature assessed in order to conceptualize OCE as a construct with its components, define the objectives of a website, presenting the functionality of NLP applications and how the adaption of such technologies into society is defined, resulting in a conclusion of the main implications. The third section will lay down the methodology used in order to investigate given research question, it contains the synthetizing of constructs identified in the literature, the hypothesis tested upon, a model describing the proposed relation between aforementioned constructs as well as techniques for data aggregation and tests used for statistical interpretation. The findings will be presented in the next section, elaborating on the implications those findings have on the overall context. The fifth section will conclude aforementioned findings and lastly, a discussion will be held, followed by the references and the appendix.

2. LITERATURE REVIEW

2.1 Online Customer Experience

This section reviews Customer Experience and how it can be translated into the online context, defining key concepts and theories.

2.1.1 Customer Experience-Experiential Marketing

Schmitt (1999) proposed a new approach, contrasting the traditional view of marketing, which was based around the assumptions that: 1.) Customers are focusing on the functional aspects of a product or service, meaning that they "weigh functional features in terms of their importance, trade off features by comparing them, and select the product with the highest overall utility" (Schmitt, 1999). Such features were defined as "characteristics that supplement the product's basic function." (Kottler, 1994) which were, according to Porter (1985), a main source of competitive advantage. 2.) Product categories and competition is narrowly defined, meaning that e.g. "McDonald's competes against Burger King and Wendy's and not against Pizza Hut, Friendly's or Starbucks" (Schmitt, 1999). 3.) Customers are seen as rational decision makers and 4.) Assessment of companies and products is based on quantitative, analytical methods.

Schmitt (1999) pointed out that such a classification of marketing was not sufficient due to the disregards of branding, a concept which states that companies and their products are a "rich source of sensory, affective, and cognitive associations that result in memorable and rewarding brand experiences". The functionality of a product is seen as a given and customers evaluate products rather based on the subjective perception, how well it communicates an experience which corresponds with their lifestyles and how well it transmits this experience.

Schmitt (1999) proposed the experiential marketing approach, which is characterized by: 1.) "Experiences (that) provide sensory, emotional, cognitive, behavioral, and relational values that replace functional values"; 2.) A holistic perception of experience, that products and services are not assessed individually but rather have to be seen in a broader, socio-cultural context; 3.) Consumers are rational and emotional and 4.) Evaluation based on a much broader facet of available tools which do not have to be designed in a standard format.

He stated that marketing practices should be oriented based on sensory experience (Sense), affective experience (Feel), cognitive experience (Think), physical experience (Act) and experience defined by social identity (Relate).

2.1.2 *Cognitive Online Customer Experience*

A stream appearing in the literature concerning OCE is the cognitive approach of Hoffman & Novak (1996a), it describes a model based on prior research of Csikszentmihalyi, Larson and Prescott (1977) conducted on "flow", a psychological state which is characterized by: 1.) "a seamless sequence of responses facilitated by machine interactivity, 2.) intrinsically enjoyable, 3.) accompanied by a loss of self-consciousness, and 4.) self-reinforcing". The flow construct was derived into the online context in which it was formulated as "a cognitive state experienced during online navigation that is determined by 1.) high levels of skill and control; 2.) high levels of challenge and arousal; and 3.) focused attention; and 4.) is enhanced by interactivity and telepresence" (Novak, Hoffman, & Yung, 2000). Further, based on previously established flow construct, Novak et al. extended their findings using models concerning human computer interaction (Trevino & Webster, (1992); Ghani & Deshpande, (1994)) in order to complete the model of online experience.

The main findings imply an interaction between the skill level of the individual, which is depicted as "the capacity for action during the online navigation process and control taps the consumer's ability for action" (Ajzen 1988), and the level of challenge, "the opportunity for action on the web experienced during the browsing" (Novak et al., 2000). The cognitive state of flow during browsing online is achieved if the levels of both variables correspond to each other (high skill/high challenge or low skill/low challenge), in case of a mismatch (low skill/ high challenge or high skill/low challenges) the state of flow cannot be achieved, instead anxiety or boredom is experienced by the consumer (Novak et al., 2000). Besides the cognitive state of flow, other directions were also taken into consideration, e.g. the research conducted by Szymanski & Hise (2000) points at the satisfaction experienced during online browsing not only from a cognitive standpoint, which he stated as level of convenience and site design , but it also includes more practical factors as financial security, product offerings and product information.

Further, a distinction of flow was conducted by Novak, Hoffman, & Duhachek (2003) differentiating between two different types of web usage, namely goal directed and experiential behavior. Goal directed behavior online is a behavioral pattern characterized by extrinsic motivation, instrumental orientation, situational involvement, utilitarian value, directed search and goal directed choice which are cognitively evaluated. Such type of behavior is perceived as work from the individual and usually refers to planned purchases online.
According to Novak et.al. (2003), experiential behavior online can be described as an intrinsically motivated, ritualized, enduring, hedonistic, nondirected, navigational process which is perceived affectively by an individual, such behavior is done for fun purposes and states that online customers are rather impulsive then it comes to purchasing decisions. The findings imply that in both types of behavior flow can be achieved, but it is more likely to appear in goal-directed behavior patterns.

In latter papers, Hoffman, Novak and Anderson (2009) elaborated the construct of flow further, clarifying the problem of definition and measurement due to different conceptualizations of flow throughout the research landscape. It appears that flow is an intuitive concept since everybody has been in such a state, but how to measure that still remains a challenge, resulting in "hindering the systematic progression of empirical research of flow" (Hoffman et al., 2009). They presented two types of measurement techniques concerning flow, the unidimensional and the multidimensional. The unidimensional concept of flow is derived from simple, direct reporting of the research participants or as a combination of the skill/challenge interaction perceived by the individual. Such a method is easy to measure, since it represents a rather intuitive approach of flow. The main drawback of such a conceptualization lays in definitional problems, many different dimensions were associated with flow, therefore, comparability is potentially risked.
The Multidimensional type of flow is rather a set of constructs which, if combined, result in flow, this approach does not model flow as a separate construct, but it derives from combining more reliable constructs.

2.1.3 Affective Online Customer Experience

Rose, Hair, & Clark (2011) presented a model of OCE based on prior research of Novak et al. (2000) and her findings on the cognitive implications of online consumers but extended those by adding an affective component into the model. The framework conceptualized uses traditional models of Customer Experience (CE), defined as a "psychological construct, which is a holistic, subjective response resulting from customer contact

with the retailer and which may involve different levels of customer involvement" (Rose, Clark, Samouel, & Hair, 2012) derived from the customer experience literature (Gentile, Di Milano, Spiller, & Noci, (2007); Verhoef et al., (2009)) and synthetizes those findings in the online environment. The findings are aligning with other concepts of traditional CE, which propose sensory, emotional, cognitive, behavioral and relational components (Schmitt, 1999). Based on this, OCE is defined as "incoming sensory data from a range of stimuli on the website in form of text/vision/video/audio" (Rose et al., 2012) which is interpreted by the individual. Similar findings were found in current studies, including the cognitive and affective state of the OCE, but complementing social and sensory appeal as individual components of OCE (Bleier, Harmeling, & Palmatier, 2019).

2.2 Artificial Intelligence in a Digitalized World

2.2.1 Big Data

We increasingly live in the informational era, Information is seen as the key resources for value aggregation. The technological development in Information technology enabled organizations to store, communicate and compute more information than ever before (Hilbert & Lopez, 2011). Due to this growth in processing power and storing capacities of IT, the amount of stored and aggregated data is increasing drastically, with predictions about the total amount of produced data reaching up to 163 zettabytes by 2025 (Patrizio, 2018). In this regard, we talk about the concept of big data, which is defined as "data sets that are too large or complex to be dealt with by traditional data processing software" (Wikipedia, 2019). It is conceived through the 5V's (high Volume; high Velocity; much Variety; low Veracity and high Value) (Wang & He, 2016) and while looking into the characteristics of such data, it appears that 80 % of the data points held by companies are not following predefined classifications (Rizkallah, 2017). They possess nonnumeric, multifaceted and ambiguous attributes (Balducci & Marinova, 2018), thus being labeled Unstructured Data (UD). This UD is oftentimes commercially unused in the business environment due to lacking capabilities in processing know how throughout the marketing landscape (Balducci & Marinova, 2018). But UD inherently possesses many customer insights, which could be utilized to create value online (Cyrillo, 2017).

2.2.2 Megatrend Artificial Intelligence

The current field of applicability of A.I. based tools ranges from enhancing business processes, increasing data analysis capabilities to customer or employee engagement (Ransbotham, Gerbert, Reeves, Kiron, & Spira, 2018). A survey held by the MIT Sloan revealed that about 72% business leaders expect large impacts from AI in the next five years with 80 % of IT and business decisions makers reporting already made investments and 30% mentioning a ramp up in the following years (*TeraData, n.d.*). In a report of TeraData, the most noted reason for adapting A.I. was to improve the customer experience, therefore, many applications using A.I. are designed to make the customer journey more appealing and valuable or they create a better communication line for the customer company interaction. The biggest potential recognized for A.I. applications lays in the automation of repetitive processes.

2.2.3 Natural Language Processing

Natural Language Processing is a branch of A.I. research which deals with the human computer communication and how this communication line can be optimized. NLP enables computers to use input data in form of text or speech, analyze and understand the underlying context of it and respond accordingly with a text/speech output. For such undertaking, the systems using NLP are relying on a variety of processes in order to function, interpretation of human language is assessed based on statistical methods and machine learning systems. Further, rule-based approaches as known from basic coding practices combined with algorithmic approaches (FriendlyData, 2019) are used.

2.2.3.1 Techniques used in NLP

Machine learning approaches can be broken down into two streams, the supervised and unsupervised learning. The supervised learning algorithms are creating models based on the input data gathered previously and the outputs generated, creating models predicting responses for new input. For those algorithms to do so, they use classification models such as support vector machines, discriminant analysis or naïve Bayes (Kowsari et al., 2019). To elaborate on each of those techniques would exceed the scope of this research, but basically, the underlying classification approaches are used in order to give discrete responses on given input, e.g. while searching through a website using the integrated search bar, giving the best fitting outputs on what was typed in. Further, regression techniques such as (non)linear model, regularization, stepwise regression or adaptive neuro-fuzzy learning are used in order to predict continuous responses, as found in e.g. prediction on changes in the weather. Supervised machine learning can only be done if you have data which can be categorized, if this is not possible due to uncertainty in the data properties, unsupervised techniques are used. Unsupervised machine learning is used in order to find hidden patterns in data in order to cluster it into groups which then can be assessed based on algorithms such as K-means, K-medoids, fuzzy c-means, hierarchical clustering, Gaussian mixture models or hidden Markov models.

The process of how NLP assesses language begins in a categorization of given input data, this means that the linguistic structures inherent in human language are broken down into for the computer understandable pieces, one can compare this process to tasks done in primary school in which you break down sentences into their individual pieces and label them (noun, predicate, verb, adjective etc.). After the categorization, an analytics-based approach is used in order to model the components into a collection of discovered topics in the input data from which then the context of the text/speech can be pulled. Based on the found context, sentimental analysis is applied in order to understand the subjective opinion inherent in the input data, creating a either a positive, negative or neutral rating of the individual's sentiment in regard to the discussed topics. NLP tools use the gained understanding of the input data then to create an output which can be converted into the same linguistic structure found in the input data, meaning that the computer generates speech/text, replying to the input. The gained insights from this interaction are stored and integrated in the machine learning algorithms in order to make future assessments better.

2.2.3.2 Applications for NLP

This technology is used in a variety of fields, e.g. business, sports and health. Business use cases evolve often around sales and marketing, in which NLP systems are used in order to extract knowledge from input of customers, in e.g. the form of a text received via e-mail or the comments found on social media. This textual data is then analyzed and interpreted in order to understand the current position of the company or the opinions concerning a product, which then can be translated into e.g. the identification of keywords, new marketing campaigns or chatbots which are programmed to answer frequently asked questions. Such usage would fall into the category of branding, sentimental analysis, publishing and market intelligence (Bogdanov, n.d.). In Human Resources, NLP can be used in e.g. conflict resolution, as such systems enable HR managers to analyze the communication between two people and identify the key issues, or recruitment, where NLP can be used in order to

analyze resumes, selecting the most fitting ones into the organization. But also, in financial areas it is applied for analyzing news, financial reports etc. on a daily basis in order to react on the ever-changing conditions of the markets.

In sports NLP systems can be used to optimize broadcasting and strengthen the tie between fans and the sports club through e.g. chatbots which can give them detailed information about their favorite clubs.

In health it can be used as a detector of disease, as it enables staff to analyze medical records of patients and their speech during examination, combining those insights with findings in medical research, in order to derive to new insights concerning the health of the patient and possible recognition of disease and its treatment.

Besides such innovative ways of using NLP, it is also found throughout everyday life as an incremental support for standard operations, ranging from translation tools, autocorrection in text messaging applications, identification of spam mail, summation of texts etc.

2.2.3.3 Possible Impact of NLP on OCE

The impact of NLP systems is far reaching, it affects many businesses with increasing tendencies for the upcoming future. The impact on Online Customer Experience is that the strategic design of customer involvement and its execution will become more customer centric (Institute for Business Value, 2018). The gathered insights will lead to new reveals in what customers want and expect. Further, the interaction will get more personalized, as NLP enable companies to communicate on a personal level, thus, the perceived customer orientation will increase. Lastly, NLP will affect the automation of the processes such as automated marketing promotions and direct message.

2.3 Models of Information System Acceptance

The satisfaction of customers online can be assessed by the usage of overarching, behavioral models explaining Information System (IS) usage and its adaptation, those are: The Technology Acceptance Model (TAM) (David, 1989); the Transaction Cost Analysis (TCA)(Williamson, 1975) and Service Quality (SERVQUAL) (Xie, M., H. Wang, T. N. Goh.., 1998)

2.3.1 Technology Acceptance Model

TAM depicts an explanation of why people are willing to adapt new IS based on the "perceived ease of use (PEOU) and perceived usefulness (PU)" (Devaraj, Fan, & Kohli, 2002) of IS, Gefen, Karahanna,& Straub (2003) pointed out that beside PEOU and PU, the familiarity of the consumer with the website influences the degree to which IS is accepted with reducing importance over time. Huang (2008) also used TAM as the backing theory for researching e-consumerism, which then was extended by using the Use and Gratification theory (UG), a psychological concept basing the usage of a certain medium on the motivation one experiences while using this new medium, creating an intrinsic need for gratification (Huang, 2008).

2.3.2 Transaction Cost Analysis

TCA is a model deriving from the study field of corporate governance and economic performance, stating that "institutional structure matters and (that) certain institutional structures affect governance better than others" (Shelanski, Klein, 1995). For the online environment this means that involved parties will "given the circumstance (….) in a transaction relationship (…) seek their self-interest" (Devaraj et al., 2002), creating opportunistic behavior, which then creates uncertainty resulting in unfavorable effects on the customer/vendor relationship as e.g. information could be purposefully disclosed from the vendor and consumer's doubt the effectiveness of the website (Devaraj et al., 2002).

2.3.3 Service Quality

SERVQUAL "measures the difference between expected service and perceived service to assess the service "gap""(Devaraj et al., 2002). The main findings imply that the smaller the gap between both variables, the more likely people are to use a service.

2.4 Website Interface Quality and its Objectives

Wolfinbarger & Gilly (2003) pointed out that the online customer experience was mainly focused on the interaction between the consumer and the website, therefore they conducted focus group research in order to weigh the individual component of a website based on the perceived quality. For this weighting, they included factors found in the research concerning website interface quality (Loiacono et al., (2002); Yoo, Donthu, (2001); Chen, Wells, (1999); Liu, Arnett, (2000)) and combined them with other factors influencing the consumer-website relationship (Szymanski,& Hise, (2000); Novak et al., (2000); Francis, & White, (2002)). The findings of this research imply that the quality of a website is deriving from the reliability of a website, meaning that the transactions between customers and the website are going as described from the website provider. Further, the design and customer service were identified, focusing on the convenience of information available on the website and how accessible this information is. Lastly, perceived security and privacy issues also affect the quality of a website.

Such an overviewing approach concerning factors influencing e-commerce behavior was also conducted prior by Keeney (1999), who came up with a model of what the objectives in an online purchasing environment are and how they contribute to the satisfaction of a customer. He described the experience from a customer as the individual assessment of a diversity of components found on a website, the perceived value of the website is derived from the sum of all weighted components. He came to the conclusion that by changing the weighting of the components, different types of potential customer will get interested in the website, e.g. could some people prefer a website where a book is sold for 20€ with a delivery in 3 days while others would prefer a website where they have to pay for the same book 30€, but would receive it the next day (Keeney, 1999).

A similar approach of identifying the factors influencing a good online experience was done by Constantinides (2004), he used a literature review in order to derive to an importance ranking for the components of a website, the findings imply that the web experience is based on a mixture of functional attributes such as the usability or the interactivity of a website, psychological issues such as trust and content factors such as aesthetics and the traditional marketing mix as conceptualized by Kottler (1994). Usability as well as trust are the predominant factors influencing the experience on a website. Usability describes how convenient a website is, how well the informational architecture is and how easy the navigation through a website is, whereas trust refers to the confident handling of customer data in e.g. financial transactions (Constantinides, 2004).

2.5 Summary of Key Findings

2.5.1 Experiential Marketing and its Implications for OCE

Experiential marketing can be seen as the underlying theory about how companies have to design the interaction between them and the customers, focusing on a holistic approach in which the experience is emphasized. The experience should be anchored around attributes which provoke either sensorial, affective, cognitive, physical or socio-cultural engagement with the customer.
When deriving those findings in the online context, it appears

that the theories reviewed are related to one of the aforementioned types of experience.

Sensorial experience in the online context can be related to the structure of a website, its perceived quality and usefulness of the content provided. Physical experience can be translated in the online context to the possibilities one has to interact with the website. Such approaches were found in the literature of Wolfinbarger (2003), Keeney (1999) and Constatinides (2004), which had researched the formal objectives of what a website should provide in order to be regarded as a positive, enjoyable, experience for the user.

Affective experience can be synthesized in the online context as sensory data (text/vision/video/audio) interpreted by the individual as discussed by Rose (2011).

Cognitive experience can be synthesized in the online context as the interplay of individual skill and perceived challenge found on the website, which, if corresponding, results in a state of flow, as discussed by Novak et al., (2000).

The socio-cultural experience describes a situation in which the customer can relate to a product due to the social identity with which they can associate. Such association corresponds with the behavioral models of TAM, TCA, SERVQUAL and U&G, as they describe the behavior of societies and how they react upon technological innovation, which can be seen as a new social construct which is currently establishing itself in a technical way, therefore, it will be experienced as a new, socio-cultural shift in society. TAM depicts a model which explains why certain technologies are accepted or not based on the dimensions of PEoU and PU. If a technology added value and is easy to use, it is likely to be adopted.

As we deal with a new technology, we also deal with uncertainty, and the TCA helps to understand that this uncertainty has be minimized in order to be reliable. Reliability can further be explained by assessing the gap between expected and perceived service, if such gap is getting reduced, the technology will be perceived as having high quality, increasing the chances of it being integrated.

Types of Experiential Marketing (Schmitt, 1999)	**Literature in online context**	**Variables**
Sensorial Experience and Physical Experience	(Wolfinbarger & Gilly, 2003); (Constantinides, 2004); (Keeney, 1999)	Reliability; Customer Service; Personalization; Security; Usability; Aesthetics
Affective Experience	(Rose, Hair, & Clark, 2011); Rose, Clark, Samouel, & Hair, 2012); (Gentile, Di Milano, Spiller, & Noci, 2007); (Verhoef et al., 2009)	Ease of Use; Customization; Connectedness; Aesthetics; Perceived Benefits
Cognitive Experience	(Csikszentmihalyi, Larson, & Prescott, 1977); (Novak, Hoffman, & Yung, 2000) (Hoffman& Novak, 2009); (Man, Novak, Hoffman, & Duhachek, 2003); (Ajzen, 1988)	Skill; Challenge; Telepresence; Interactivity
Socio-Cultural Experience	(David, 1989; Devaraj, Fan, & Kohli, 2002); (Gefen et al. 2003), Huang, 2008); (Williamson, 1975); (Shelanski and Klein, 1995); (Xie, M., H. Wang, T. N. Goh., 1998)	Ease of Use; Perceived Usefulness; familiarity; Uncertainty; Asset Specifity; Responsiveness; Empathy; Assurance; Gratification

Table.1 Experiential Marketing and its derivatives in the online context.

2.5.2 Global Trend A.I.: What is it? Why do we need it?

In the informational era it is crucial for companies to know how to use aggregated data properly, more and more data is available but often a big portion of it is rather seen as waste, thus being unused. But indeed, much of this "waste" data has value, the companies just lack know how about the extraction of the value out of it.

A.I. possesses the capabilities to diminish this waste data and serve value to the companies using it. Many companies already understood the value A.I. can bring to the company, but often they lack understanding for the implementation of it.

The mostly stated are in which A.I.'s are incorporated is for repetitive tasks which involve customer experience, therefore, e.g. NLP system are being integrated by many companies in order to increase the value of customer company communication. This technology is still at the beginning of its development and what it can or cannot do will change in future.

3. METHODOLOGY

As previously stated, the objective of this research is to understand the impact of Chatbots implemented on websites on the OCE construct. Literature was reviewed critically in order to identify the constructs and component of the individual articles and when comparing those papers with the framework of traditional experiential marketing, one can recognize that the research concerning OCE can be assigned to one of the five types of traditional experience stated by Schmitt (see table 1.).

The findings of the literature review suggest defining OCE as the interaction between the five types of experiential marketing. Each of those types has its own components which are derived from the literature. Further, those components will be measured using scales deriving from the literature as well.

Based on this allocation, a quantitative research model will be used in order to statistically analyze the impact of chatbots on each of the aforementioned dimensions of OCE. The independent variable in this case will be the intended future usage of Chatbots, it represents a dichotomous variable (Yes/No). The dependent variable will be OCE, which derives from the traditional types of experiential marketing. A univariate analysis of variances (ANOVA) will be used in order to check for significant differences in the means of the two independent groups deriving from this model (Group1 being "positive attitude towards chatbots" and Group2 being "negative attitude towards chatbots").

3.1 Operationalization and Data Collection Procedure

In order to conduct the statistics, we will rely on the model shown in figure1, it is represented by one independent and one dependent variable.

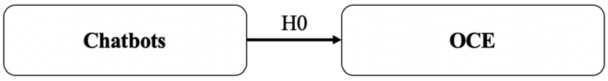

Figure 1. Model tested upon with H0= No significant difference in the means of both groups

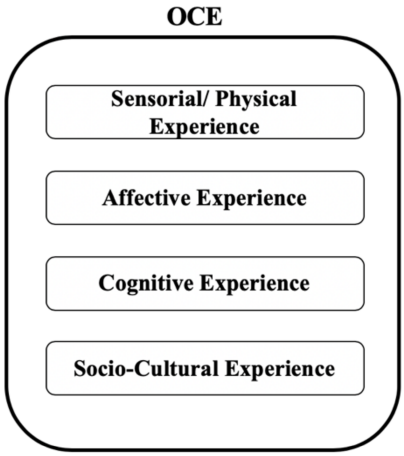

Figure 2. Components of OCE

The dependent variable is built upon the five types of experiential marketing and their derivatives in the online context. Sensorial and physical experience were combined into one construct since a physical experience is only figuratively speaking feasible in the online environment since the web is an intangible medium. Therefore, the sensorial/physical experience will be defined as "the sensation of input deriving from the website (Text, Video, Audio, Image) and how an individual can take actions upon those inputs". The affective experience will be defined as "the individual interpretation of the stimuli received from the website". The cognitive experience will be defined as "the interrelation of the personal skill level in handling a website and the challenge faced on the website". The socio-cultural experience will be defined as "the relation of an individual to a website based on social identity".

For the data collection, a survey method will be used in order to assess the attitude towards the construct variables inherent in the experiential experiences.

The sensorial/physical aspect of OCE will be measured through the constructs of Reliability, Customer Service, Personalization, Security, Usability and Aesthetics. Those constructs were retrieved from Wolfinbarger's (2003) survey for e-tail quality and are aligning with proposed factors from Constantinides (2004) and Keeney (1999).

The affective aspect of OCE will be measured through the constructs of Ease of Use, Customization, Connectedness, Aesthetics and Perceived Benefits (Rose et al., 2002). The scale for the affective experiential state is originating from the Havlena and Holbrook (1986) and Novak et al., (2000) the scale for Ease of Use is taken from Gefen (2003), whilst Customization, Connectedness and Aesthetics are created by Rose (2012), lastly, Perceived Benefits was taken from Teo (2002).

The cognitive aspect of OCE will be measured through the constructs Skill, Challenge, Arousal and Control. The scales used for assessing the cognitive experience are taken from the surveys conceptualized by Novak, Hoffman and Yung (2000).

The socio-cultural component is assessed through the constructs Ease of Use, Perceived Usefulness, Familiarity, Uncertainty, Asset Specifity, Responsiveness, Empathy, Assurance and Gratifications using the adopted scales of Devaraj (2002) and Huang (2008). Appendix 1. shows the details of the survey constructed.

Due to overlaps in the survey questions and construct components found in the articles, several constructs were combined into one overarching construct in order to minimize the length of the survey, since the answer rate drops dramatically the longer the survey gets, further, this will reduce the multicollinearity between the components. Reliability and Usability in the sensorial/physical experience, Ease of Use and Perceived Benefits in the affective experience and Ease of Use, Perceived Usefulness, Responsiveness and Familiarity in the sensorial experience were combined into one construct named Ease of Use, in order to not lose the covering of those construct components, all survey item were screened and redundant questions were cut out, this way the survey will still measure the intended constructs, but will do so without getting too long. The same is the case for the Aesthetics construct found in the sensorial/physical and affective experience, the survey items identified were combined and redundant question were cut out, resulting in one new construct name Aesthetics.

For the measurement assessment, a 7-point Likert scale (Strongly Disagree – Strongly agree) will be used in order to establish comparability across the constructs. The survey was created on google forms and the aggregated data will be analyzed using SPSS. In order to test the impact of Chatbots on OCE, a hypothetical situation is described at the beginning of the survey, it depicts a website which was commonly used by the respondent and added a chatbot feature on their website recently. The task of the respondents was to rate the web experience. The dichotomous item scale "Are you going to use chatbots in the future?" will be used in order to derive to two comparable groups. Based on this distinction, an analysis of variances will be done. This statistic will be used in order to see if the means of both groups (Group1 being "positive attitude towards chatbots" and Group2 being "negative attitude towards chatbots") have significant differences in regard to online customer experience based on the intention of using chatbots.

3.2 Sampling and Analytical Strategy

The sample used in the research consist mainly out of young people (17-24) who know how to use the internet, one can speak from the group of the digital natives. In order to gain respondents, the online survey was sent across the faculty as well as Facebook groups and other online platforms. Before performing the statistical test, the assumptions will be checked in order to see if the test is applicable or should be assessed with caution.

The analytical strategy used to assess the data will start with coding the variables, the survey question will be combined into the construct components found in the appendix. The dependent variable OCE consists out of four constructs, which are built from 14 components which are deriving from the survey which contains 52 items. For checking the reliability of the scales, a reliability assessment will be undertaken using Cronbach's α which has to be $\alpha > 0.7$ to be considered reliable. Normality of distribution, correlation, skewness, kurtosis and inter item correlation will be checked as well. The validity of the survey is given due to the question being taken from already conducted research, therefore, they been validated.

Further, the statistical assessment will start on the highest level in the model, meaning that a one-way ANOVA will be conducted

to see if there is a significant difference in the means of both groups concerning OCE. If this is the case, the separate construct components from OCE will be analyzed to see which of them are causing the effect.

4. FINDINGS

4.1 Assumption Testing

Table2. Descriptive Statistics

	N	Min	Max	Mean	Std. Dev.	Skewness	Kurtosis
OCE	31	1.81	4.65	3.5387	0.73296	-0.504	-0.479

We have a sample size of n=31 valid cases, the mean score for OCE is μ=3.5387 with a standard deviation of σ=0.73296, a skewness of -0.504 and kurtosis of -0.479. The skewness shows that we deal with an approximately symmetric distribution since the value lays between -0.5 and 0.5, the kurtosis shows an approximately normal level of sharpness of the central peak in comparison to the standard bell curve since the value lays between -2 and 2.

Table3. Reliability statistics

Cronbach's Alpha	Cronbach's α Based on Standardized Stem	N of Items
0.837	0.834	4

The reliability analysis of the 4 items found in the OCE construct shows that the α-level of OCE is at 0.837. This indicates that the measured variable is indeed reliable since α > 0.7.

Table4. Test of Normality

	Shapiro-Wilk		
	Statistic	df	Sig.
OCE	0.958	31	0.252

The Shapiro-Wilk test of normality shows a statistical value of 0.958 with df= 31 and p-value of 0.252. Due to the p-value being p>0.05, we do not reject the null hypothesis, meaning that we can assume the data of OCE being normally distributed.

Table5. Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
OCE	Based on Mean	0.70	1	29	0.793
	Based on Median	0.67	1	29	0.798

Levene's test shows a level of 0.070 based on the mean of OCE with df1=1 and df2=29 with a p-value of 0.793. The same test performed with the median instead of the mean, which can be helpful due to the median being more robust for outliers, shows similar results with a level of 0.067, while df1=1 and df2=29 while having a p-value of 0.798. Both p-values being p>0.05, we cannot reject the null hypothesis of Levene's test, this means that we can assume the homogeneity of variances.

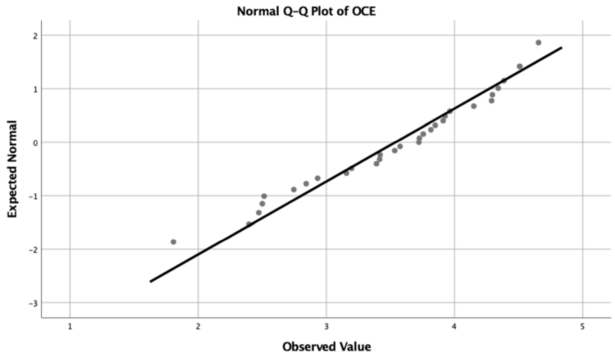

Figure 3. Q-Q Plot of OCE

The Q-Q shows that that we deal with a linear relationship between the level of OCE and the intention of using chatbots in the future.

Based on those outcomes, we can confirm the assumptions needed to perform a one-way ANOVA for this variable.

4.2 One-Way ANOVA for OCE

The above-mentioned statistics show evidence for assuming that the data collected is usable for a one-way ANOVA. Further, we can assume both tested groups to be independent from each other due to the design of the survey, the dependent variable for future intentions for chatbots usage was designed dichotomous, therefore, the results of both groups are not dependent on each other.

Table6. Descriptives of ANOVA

	N	Mean	Std. Dev.	Std. Error	Min	Max
Yes	20	3.9169	0.51146	0.11437	2.47	4.65
No	11	2.8510	0.55529	0.16743	1.81	3.85
Total	31	3.5387	0.73296	0.13164	1.81	4.65

The findings show that we deal with two groups, the groups with positive intentions towards chatbot usage (Yes in the statistic) has a sample size of n=20, with mean of μ=3.9169, a standard deviation of σ=0.51146. On the other hand, the group with negative intentions towards chatbot usage (No in the statistic) has a sample size of n=11, with a mean of μ=2.8510, a standard deviation of σ=0.55529. Only looking at the descriptives, we can see that the first group has a higher mean that the second one, this indicates that we might have a reason to say that the intention for future usage of chatbots has an impact on OCE

Table7. ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.063	1	8.063	29.035	0.000

The ANOVA shows for the statistical assessment of variances between the groups a F-value of 29.035 with a p-value of p<0.05, therefore, we can conclude that there is indeed a significant difference between both groups. This means that we have reason to assume that a positive future intention to use chatbots has a positive effect on the Online Customer Experience.

4.3 Multivariate Analysis of OCE Components

In order to see what facets of OCE have a significant difference in means in regard to both groups, a more detailed testing will be done, focusing on the four types of experience. For this, the relation between the four variables will be assessed. Further, the four types of experience will be treated as variables and an MANOVA will be done for comparing the means of both groups, respectively.

Table8. Inter-Item Correlation Matrix

	Sensorial/Physical Experience	Cognitive Experience	Affective Experience	Socio-Cultural Experience
Sensorial/Physical Experience	1	0.390	0.683	0.695
Cognitive Experience	0.390	1	0.377	0.395
Affective Experience	0.683	0.377	1	0.804
Socio-Cultural Experience	0.695	0.395	0.804	1

The inter item correlation shows that we, generally speaking, have a correlation of each Item to each other, for the model to be regarded as valid, the inter item correlation should be $0.2<X<0.8$. a lower score would suggest that the items do not have a kind of association to each other and a higher score would suggest that the item are intertwined and measure similar effects. The values of the inter item correlation show that we have an acceptable correlation between each variable, the only variable which shows a value $X>0.8$ is the correlation between affective and sociocultural experience with a value of 0.804. Since the value is close to fitting the assumption of correlation, it will be treated as such.

Table9. Multivariate Test

		Value	F	Sig.	Partial Eta Squared
Future Intention towards Chatbots	Pillai's Trace	0.593	9.470	0.000	0.593

For the multivariate analysis Pillai's Trace will be used, since it represents the most robust measure as some of the assumption are violated, which is the case for the inter-item correlation of affective and socio-cultural experience. Pillai's Trace has a F-score of 9.470, and a p-value of $p> 0.05$, resulting in rejecting the null hypothesis of not having significant differences in the means of both groups. Partial Eta Squared shows that the four variables are explaining 59.3% of the effect measured.

Table10. Test for Between-Subject Effects of the 4 Types of Experience

Based on the "Future Intention towards Chatbots" as the I.V.

	Type III Sum of Square	df	Mean Square	F	Sig	Partial Eta Squared
Sensorial/ Physical Experience	17.746	1	17.46	28.406	0.000	0.495
Cognitive Experience	3.529	1	3.529	12.930	0.001	0.308
Affective Experience	6.856	1	6.856	12.586	0.001	0.303
Socio-Cultural Experience	7.016	1	7.036	10.736	0.003	0.270

The between-subject effects show that that sensorial experience has a mean squared of 17.746 with a F-value of 28.406 and a p-value of $p<0.05$, explaining 49.5% of the effect measured. Cognitive experience shows a mean squared of 3.529 with a F-value of 12.930 and a p-value of $p<0.05$, explaining 30.8% of the effect measured. Affective experience has a mean squared of 6.856 with a F-value of 12.586 and a p-value of $p<0.05$, explaining 30.3% of the effects measured. Lastly, Socio-Cultural experience has a mean squared of 17.746 with a F-value of 10.736 and a p-value of $p<0.05$, explaining 27% of the effects measured. All p-value are $p<0.05$, resulting in the rejection of the null hypothesis, meaning that indeed in each of the four types experience the difference between group means for the intention of usage for chatbots is statistically significant.

5. RESULTS

The results of the tests comply with the suggestion made beforehand, people having a positive association with the future usage of chatbots had significantly higher scores than the group being rejective towards chatbot usage. Not only was the difference in the overall Online Customer Experience significant, but an analysis of the individual components showed that each component of OCE showed significant differences between both groups.

In the case of sensorial experience online, the experience one has when looking at the presented content and design of the website, the usage of chatbots increases the perceived value of the website in the assessment of the customer, creating a more visually appealing website.

In case of the affective experience, the experience one has when evaluating the stimuli received online, the usage of chatbots can increase the possible involvement of the customer on the website.

The cognitive experience, the psychological state of "flow" which one can experience, can be increased with the usage of chatbots due to either helping new customers to orientate better on the website or helping old customers in findings things more quickly.

Socio-cultural experience, the degree to which a tool provides a surplus in comfort in contrast to others, can be increased with the implementation of chatbots due to its perceived usefulness.

6. DISCUSSION

A.I. is arguably one of the biggest trends we can see nowadays, it has a far-reaching field of applicability throughout the entire world of cooperation's. It is not only used in niche markets or for small parts of the operations of a company, moreover, it represents a tool box which possesses the capabilities to be used

in a variety of ways, reaching from automating repetitive processes and increasing analytical assessment to discovering new business capabilities, as long as one understands how to integrate this technology properly. The trends show that it is very likely that many companies are willing to invest in a future based around this artificial intelligence, but many companies lack the know-how of what to expect of such implementation.

This step towards digitalizing the capabilities of companies fits well into the bigger picture we see nowadays; the internet has become a necessity for nearly all parts of our lives personally as well as professionally. This digital trend is the next big step in the informational era we live in, the usage of technology leads to an increase of information which potentially can create new ways of conducting business. This explains why the internet has become such an important medium than it come to company-customer interaction.

This paper focused on one type of A.I., Natural Language Processing, and chatbots in particular. The data used from chatbots is found in form of text or speech input created by the users of websites or devices such as computers or smartphones. Chatbots can interpret the things one says and writes in a meaningful way and use this input in order to derive to answers on that input. This results in a change of perception of the individual in regard to the usage of such technology, it becomes more and more seamless to interact with such technology, therefore, the question which this paper wants to address is how chatbots affect the experience of customers online.

It does so by combining a variety of theories reaching from overarching concepts, e.g. why certain technologies receive acceptance by society and how to understand Online Customer Experience from an individual, psychological standpoint, into one universal framework which covers all of those topics.

The literature concerning Customer Experience elaborated upon the concept of using the customer-company relation in order to create an experience for the customer since the evaluation of a company/product is not based solely on rational motives, but rather consists out of a subjective assessment of the individual.

Therefore, the psychological attributes inherent in such process were reviewed, resulting in a distinction between cognitive experience, which is characterized by the state of “flow”, which is an effortless, intrinsically enjoyable state of mind achieved if the skill of an individual is on a similar level as the challenge perceived, and affective experience, which take into account the evaluation of all received stimuli and their evaluation.

In order to get such stimuli and reactions in the first place, the used website has to offer the possibilities of being enjoyable to use. The factors influencing this are based around the user-friendliness and can be achieved if the website e.g. has a visually appealing aesthetic, shows efforts of securing your data and provides convenience.

Since this paper tried to understand the impact of a relatively new technology, it is important to understand why certain technologies are adopted into everyday use, this is conceptualized through providing a surplus in Ease of Use for the consumer in comparison to other technologies.

6.1 Recommendations

The main recommendation of this paper lays in a suggestion to companies relying on websites to take the usage of chatbots into consideration, they represent a practical way of automating the communication between customer and company. It does so while achieving high levels of satisfaction for the customer since their questions and comments will get answered faster than being done by hand, while being so sophisticated that it can handle an enormous spectrum of different topics and deliver an answer to many of them immediately. The company’s profit from it as well, the automation of communication makes it possible to focus time and effort into other matters, therefore, it has the potential to increase efficiency.

6.2 Relevance

The practical relevance of this paper lays in providing a guideline for understanding the current developments in A.I., recognizing the need of filling the lack knowledge found inside companies and how this will change the future practices in business throughout the entire market.

The academic relevance lays in an extensive literature assessment of OCE and its linking to possible impacts deriving from the usage of chatbots online. Moreover, this creates the possibility to build further research, extending the systems assessed beyond chatbots, covering a wider spectrum of possible use cases of A.I. technologies but other technologies as well. Further, the survey created lays a solid foundation for future researchers to be used as a baseline measure concerning the assessment of Websites.

6.3 Limitation

Even though effort were made to make this research correctly, it still possesses some limitations which should be mentioned.

6.3.1 Sampling

Due to the small number (n=33) of samples gathered during the research, the statistical assessment of the data should be considered with regard to that. The required number of participants in such type of research is usually significantly higher. Further, due to being spread around social media and across the university, it is likely that the samples are biased due to disregarding other demographics. The vast majority of respondents were between 17-24 years old and consisted mainly out of other students and friends and family of the researcher. If further research should be conducted, a randomized sample would deliver more precise description which could be validated for the general population.

6.3.2 Survey Design

Since the methodology for this research was based around a hypothetical situation from which OCE was assessed in regard to the intention to use Chatbots in the future, the findings should also be treated as such, a hypothetical outcome which suggests that there might be some circumstances in which the outcome of the research holds true or provides a certain direction to expect. This research should be seen as a pilot study for understanding the concept of OCE from a holistic standpoint while validating a survey which can be used in order to assess this concept.

The survey should be used in combination with a real website and real tasked which have to be performed on the website, once with and once without the help of chatbots, in order to see if there is evidence in increases of OCE due to the implementation of chatbots.

Since different website aims at different goals and have different target groups, a general conclusion to be made is not likely, if chatbots might have a significant impact or not depends on the nature of the website.

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8. APPENDIX.1

TABLE WITH THE SURVEY

Type of Experience according to Schmitt (1999)	Construct components	Reference	Survey questions	Scale used
Sensorial Experience/ Physical Experience	Security	(Wolfinbarger & Gilly, 2003)	I feel like my privacy is protected at this site. I feel that I can trust this website.	Likert Scale (1-7)
	Customer service	(Wolfinbarger & Gilly, 2003)	When you have a problem, the website shows a sincere interest in solving it. The company is ready and willing to respond to customer needs.	Likert Scale (1-7)
	Personalization	(Wolfinbarger & Gilly, 2003)	This website gives you personal attention. The level of personalization at this site is about right, not too much or too little	Likert Scale (1-7)
	Aesthetics[1] (Atmospheric experience)	(Wolfinbarger & Gilly, 2003); Rose, 2012;	The website's appearance is professional. The website is visually appealing. The website appears to use the best technology. The website has innovative features. It's really fun to use this website. The aesthetics of the websites promotes a perception of quality. The look and feel of the website is important during browsing online.	Likert Scale (1-7)
	Ease of Use [1]	(Wolfinbarger & Gilly, 2003); Gefen (2003); Teo (2002); Devaraj (2002); Rose 2012	The organization and layout of the website facilitate searching for products. It's easy to get around and find what you want at this site. The site doesn't waste my time. I can go to exactly what I want quickly. You can find what you want with a minimum number of clicks. The site always works correctly. I know what all my options are when I browse at this website. The layout of the site is clean and simple. The site is organized in a way that is intuitive, like your thinking. The website improves the quality of decision making.	Likert Scale (1-7)
Cognitive experience	Skill	Novak, Hoffman, and Yung (2000)	I am extremely skilled at using the Website. I consider myself knowledgeable about good search techniques on the Web. I know how to find what I am looking for on the Web.	Likert Scale (1-7)
	Challenge	Novak, Hoffman, and Yung (2000)	Using the Website challenges me. Using the Web provides a good test of my skills. I find that using the Website stretches my capabilities to my limits.	Likert Scale (1-7)
	Arousal	Novak, Hoffman, and Yung (2000)	Stimulated/relaxed Calm/excited (R) Frenzied/sluggish Unaroused/aroused (R)	Likert Scale (1-7)
	Control	Novak, Hoffman, and Yung (2000)	Controlling/controlled Influenced/influential (R) Dominant/submissive Guided/autonomous (R)	Likert Scale (1-7)
Affective experience	Aesthetics [1]	Rose 2012	The website's appearance is professional. The website is visually appealing. The website appears to use the best technology. The website has innovative features. It's really fun to use this website. The aesthetics of the websites promotes a perception of quality. The look and feel of the website is important during browsing online.	Likert Scale (1-7)
	Customization	Rose 2012	Websites should feel like they are talking to me personally as a customer. It is important to me that an Internet shopping website feels like my personal area when I use it.	Likert Scale (1-7)
	Connectedness	Rose 2012	When I use websites there is little waiting time between my actions and the response of it.	Likert Scale (1-7)
	Ease of Use [2]	(Wolfinbarger & Gilly, 2003); Gefen (2003); Teo (2002); Devaraj (2002); Rose 2012		Likert Scale (1-7)
Socio-cultural experience	Ease of Use [2]	(Wolfinbarger & Gilly, 2003); Gefen (2003); Teo (2002); Devaraj (2002); Rose 2012		Likert Scale (1-7)
	Uncertainty	Devaraj (2002)	It was easy for me to get relevant quantitative (price, taxes etc.) information. I believe that it was possible for me to evaluate the various alternatives.	Likert Scale (1-7)
	Asset Specifity	Devaraj (2002)	It was easy for me to get relevant information. I believe that it was possible for me to evaluate the various alternatives. The store's Web site provided adequate information. The online site provided sufficient information for what I was looking for.	Likert Scale (1-7)
	Empathy	Devaraj (2002)	I think the website can address the specific needs of each customer.	Likert Scale (1-7)
	Assurance	Devaraj (2002)	I felt confident about the online purchase decision. I feel safe in my transactions with the online store. The online store had answers to all my questions about the product.	Likert Scale (1-7)
	Gratification	Huang (2008)	I feel gratified using the website.	Likert Scale (1-7)

1,2: Due to overlapping of the construct components, Ease of Use and Aesthetics represent a combination of several variables measuring the same, therefore, all items in those components were combined and used multiple times in order to keep the survey as small as possible and avoid redundancy.

APPENDIX.2

Survey

Link to the survey:

https://docs.google.com/forms/d/e/1FAIpQLSc9akMnr8aaT6l5V1UBEGC_tk8UN2gS82wL96MUxg-KswhLOA/viewform?usp=sf_link

APPENDIX.3

Models of OCE

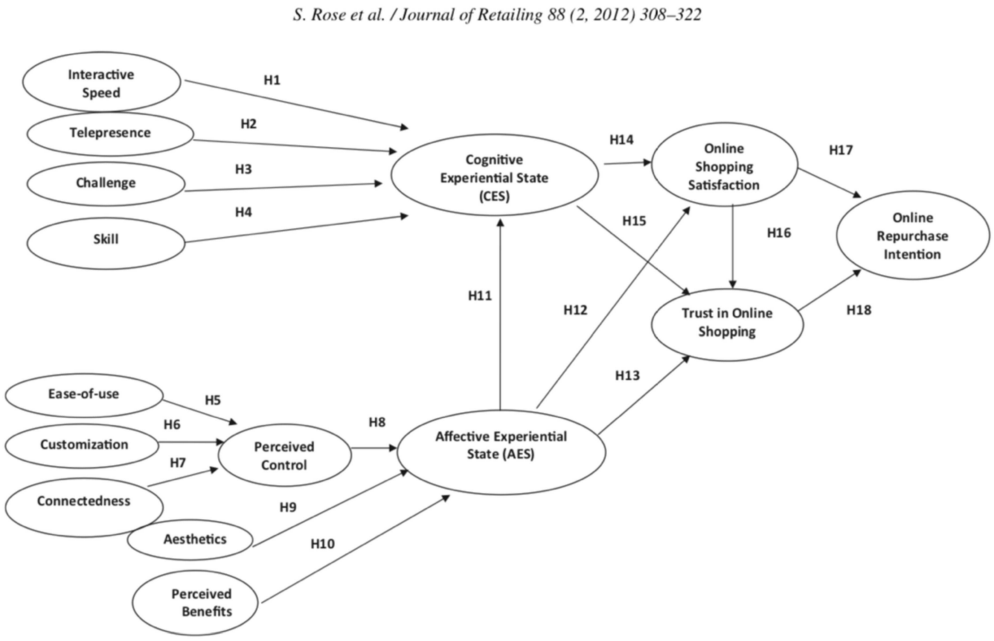

Fig. 1. Conceptual model of online customer experience.

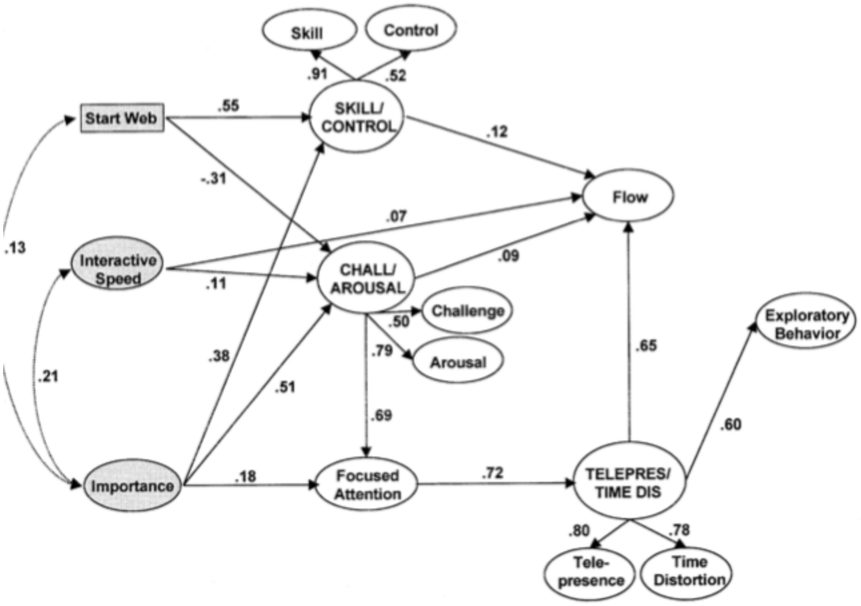

Figure 2. Model derived from Novak et al. (2000)

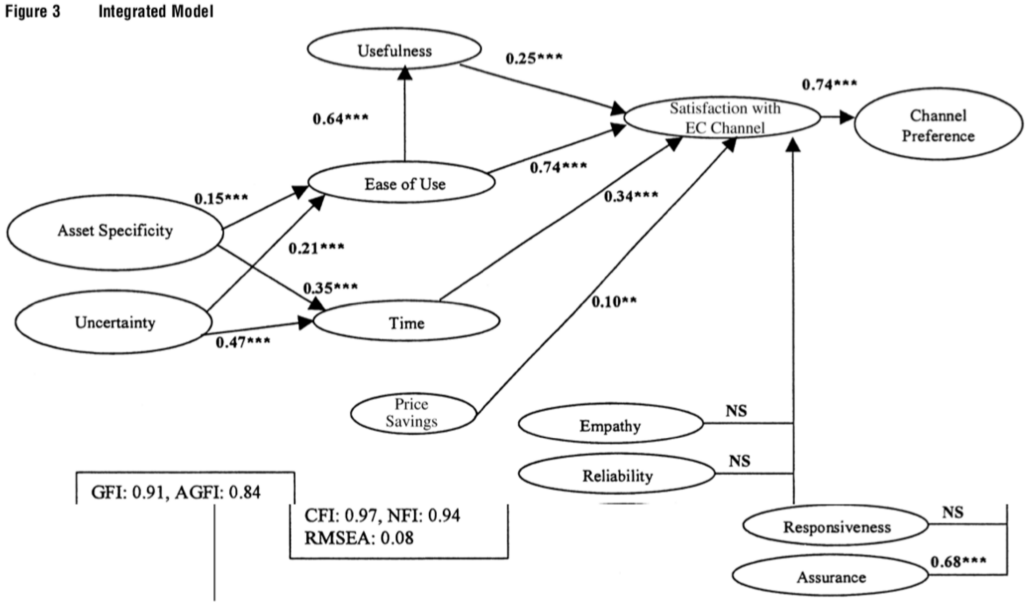

Figure 3. Model of TAM/TCA/SERVQUAL derived from Devaraj (2002)

Appendix.4

Reports

PLANNED AREAS FOR INVESTMENT

While adoption rates are already high, respondents from around the world say there is a lot of opportunity for future implementation. The top three areas that will drive business outcomes are customer experience, product innovation and operational excellence. Across the board, the APAC region rated all planned areas of investment higher.

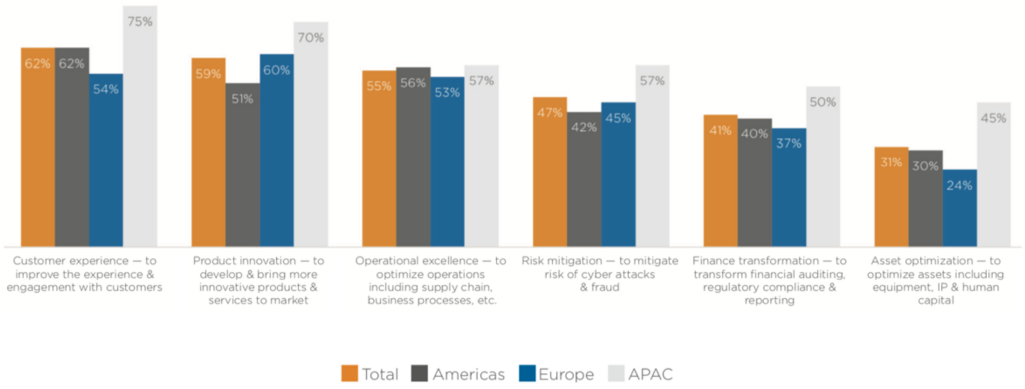

Figure.11 Planned Areas for Investment for A.I. Technology retrieved TeraData

KEY FINDINGS

With 80 percent of IT and business decision-makers reporting they are currently using AI and 30 percent saying they plan to ramp up spending on AI technologies over the next 36 months, this survey highlights enthusiasm for AI in enterprises today, a growing commitment to new investments, and optimism that AI will improve business practices and outcomes. While challenges will exist for enterprises as they shift to a new business strategy powered by AI, this report finds that they will accept those challenges, because the long-term benefits clearly outweigh near-term pains. These near-term pains include significant investment in IT infrastructure and processes, time commitment to training workforce on AI, and potential impact on employee morale. Nevertheless, C-level executives — namely CIOs and CTOs — maintain they they are committed to AI in their enterprise, because of the expected ROI over the next 10 years.

The key findings of this report depict the current state of AI adoption, its barriers to adoption and how businesses plan to strategize to extract ROI.

Enterprise Investments:

- 80 percent of respondents report that some form of AI is already in production in their organization, although 42 percent say that there is room for further implementation across the business.
- Companies expect a $1.23 ROI in the next three years for every dollar invested in AI today, $1.99 in the next five years and $2.87 in ROI over the next 10 years.
- 30 percent still believe that their organization isn't investing enough and will need to invest more in AI technologies over the next 36 months to keep up with competitors in their industry.

Challenges:

- 91 percent expect to see barriers to AI realization.
- Top barriers to AI are a lack of IT infrastructure (40 percent) and lack of access to talent and understanding (34 percent).
- Only 28 percent of respondents recognize that their organization has enough trained people internally to buy, build and deploy AI.

Strategies:

- Enterprises currently align AI strategy under traditional C-suite roles, with CIOs (47 percent) and CTOs (43 percent) leading in prevalence.
- However, 61 percent of respondents say they plan to hire Chief AI Officer in the future
- AI is not perceived to be a growing threat to workers by 2030, with only 21 percent of respondents projecting AI will replace humans for most enterprise tasks in their organization.

Figure.12 Key Findings of the report. Retrieved from TeraData

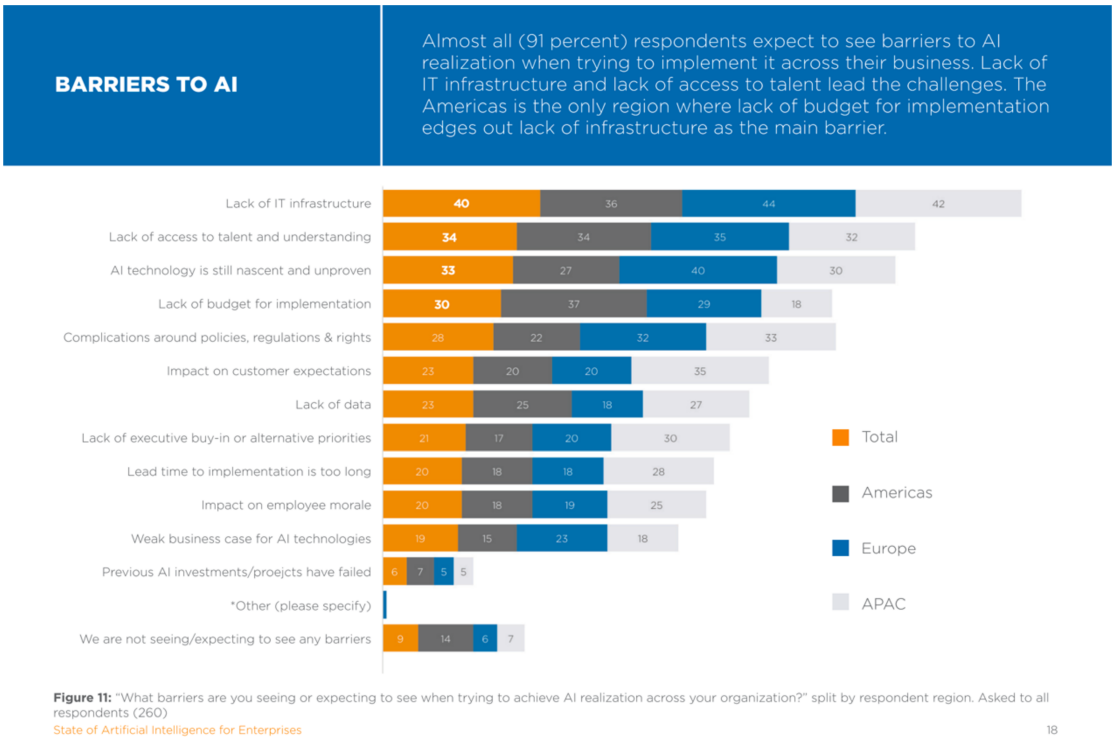

Figure.13 Key Findings of the report. Retrieved from TeraData

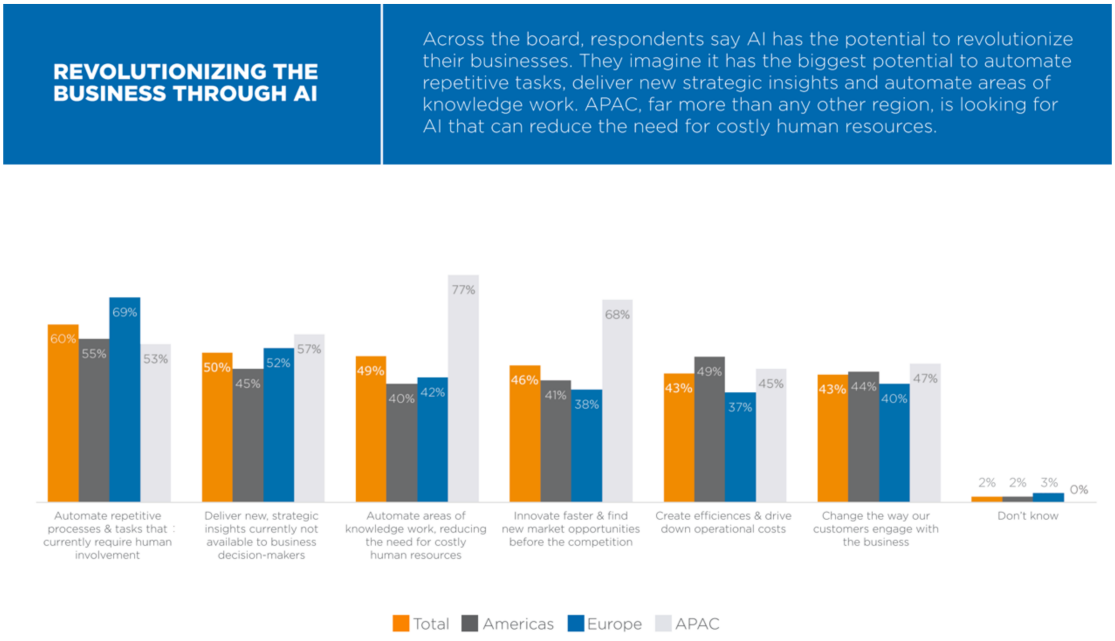

Figure.14 Key Findings of the report. Retrieved from TeraData

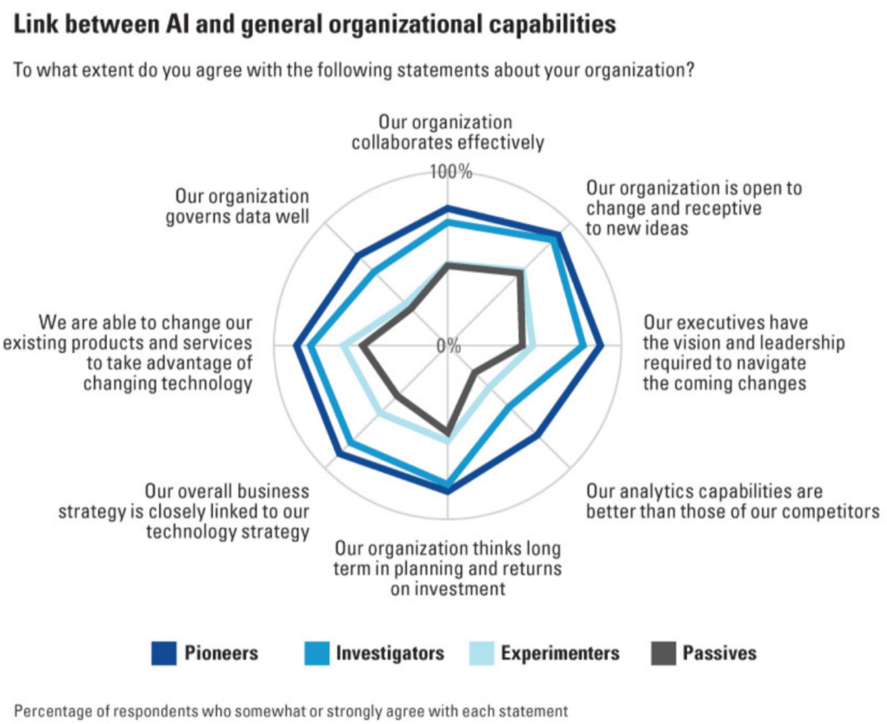

Figure.15 Key Findings of the report. Retrieved from report "Reshaping Business with Artificial Intelligence" by MIT Sloan Management Review and The Boston Consulting Group

Appendix.5

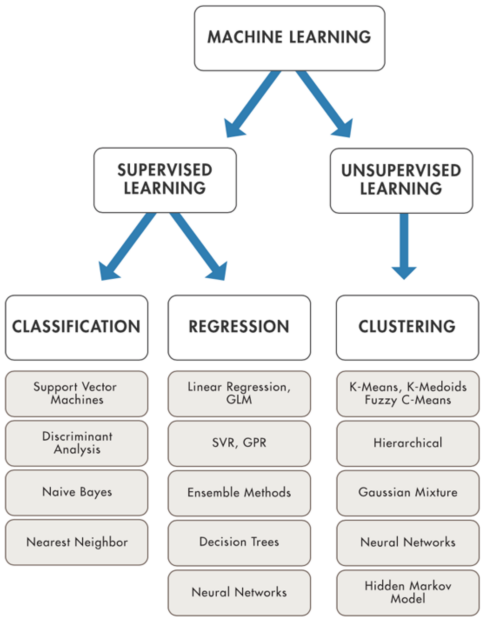

Figure 16. Methods of Machine Learning Techniques.

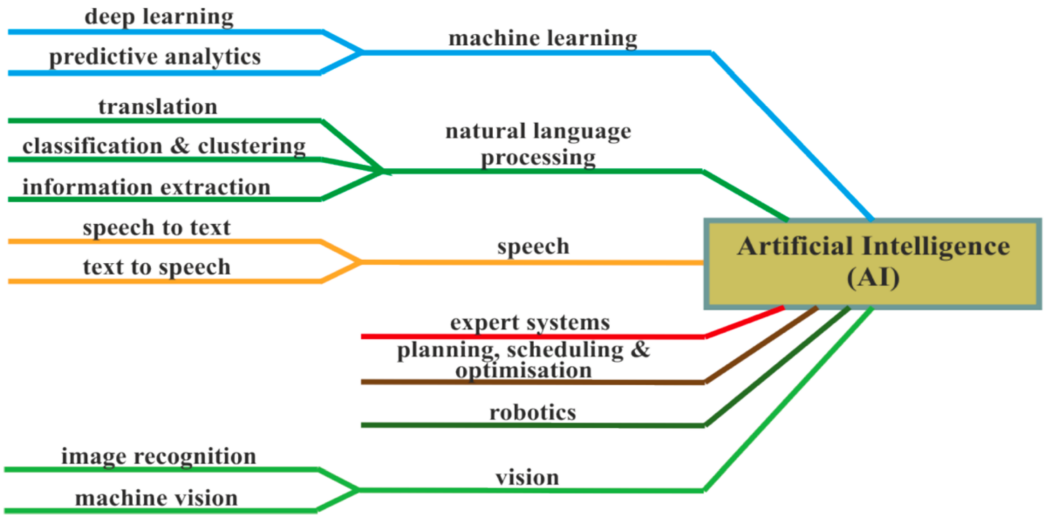

Figure 17. Branches of A.I. Retrieved from Oana (2017)