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# **Utilization of Chatbots in Customer Interface**

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## Abstract

Automation has become a worldwide trend in business. Businesses try to find competitive edge from more efficient processes, lower costs and better customer service. In this Bachelor's thesis, I focus on one instance of the trend: web-based chatbots in the customer interface. Based on a broad literature review, this thesis illustrates what are the prerequisites for the utilization of chatbots, how should they be implemented and finally, what pros and cons managers can expect from such investments.

Managers should first be aware of the technical restrictions and challenges chatbots as a medium exhibit. Then, through analysis on their customers, managers should assess the suitability of chatbots for their business. The design process should include both the customers as well as different departments in the company. This can also help with change resistance in the implementation phase. Finally, the chatbot should be constantly evaluated to ensure the benefits promised are delivered. Although chatbots can offer versatility and cost savings, poorly design may end up costing the firm both in the terms of unnecessary investment and reduced customer satisfaction.

Although no new concepts are introduced, this thesis is a good starting point for managers interested in utilizing chatbots. On the other hand, as the topic is currently relevant, this thesis can be useful for other industries as well.

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# 1 Introduction

Automatization and artificial intelligence (AI) have become major trends in business, and many companies are either utilizing them or talking about implementation in the future. Furthermore, the competition around AI is brutal: in 2017, over 20 billion dollars were spent on related mergers and acquisitions alone. (The Economist 7.12.2017).

Artificial intelligence is also of interest in the national level. The Finnish Ministry of Economic Affairs and Employment (2017) predicts that AI will transform the economy, both in terms of competition between companies and individuals in the form of evolving jobs. In recent years, economic superpowers like China and the U.S.A have also produced plans and reports on utilizing AI as a driver for their economies (Harvard Business Review 2016; The New York Times 2018.)

On a smaller scale, one practical instance of the aforementioned trends is the rise of interest in chatbots. In this paper, a chatbot is defined as an automated chat system. Moreover, *virtual assistant* and *conversational agent* are used as interchangeable terms for a chatbot.

Chatbots, however, are not a new invention. The first automated chat system, credited by the literature, was created by Joseph Weizenbaum during the years 1964-1966 in Massachusetts Institute of Technology. The chatbot was called ELIZA, and it was emulating a psychotherapist. (Saygin et al. 2000; Shawar & Atwell 2003).

Whether talking about virtual assistants capable of speech recognition and spoken communication, such as Apple's Siri, or purely text based chatbots, such as If's Emma, the communication usually seeks to be as close to natural human language as possible. Lee et al. (2009) propose that this kind of communication in human-computer interaction is desirable, because it resembles the flexibility and efficiency of natural communication between people.

## 1.1 Research objectives and research questions

Although chatbots have become increasingly popular in business and entertainment, there is currently not much written about their economic prospects in the literature. As such, the key focus of this paper will not be the technological aspects of chatbots, but rather the point of view of businesses contemplating whether a chatbot could be an asset in their processes, specifically in the customer service function.

The objective of this paper is to illustrate the key prerequisites of utilization of chatbots in business, the challenges of implementing such systems and possible beneficial outcomes. By combining

existing theories and frameworks developed in Information System Science and related fields, I seek to answer the following research questions:

**1. What are the prerequisites for the utilization of chatbots in customer service?**

**2. How should the implementation process be handled?**

**3. What are the pros and cons of using automated chat systems as a part of customer service in business?**

## **1.2 Scope of research**

Due to the length restrictions in Bachelor's Thesis, this paper will have a relatively tightly defined scope. I will focus on chatbots used in the customer interface. The chatbots in question may be used to answer questions from customers and help them navigate the web-page, assist in purchasing situations or as a general agent, guiding the customer to a human agent when necessary.

Another restriction to the scope is that the focus will be on web-based chatbots, rather than on ones e.g. communicating through phones. This constraint is due to the fact that web-based chatbots seem to be more versatile than the other variations. Moreover, as most companies nowadays have at least some form of website, these kind of chatbots are best available for different businesses to use.

## **1.3 Structure of research**

This paper is structured in a way that aims to build on the existing theoretical background and frameworks. Thus, the content chapters two and three are based on a literature review, combining earlier research to the particular case of chatbots.

Chapter 2 will go over the prerequisites that should be considered before beginning the (possible) implementation process. Although the list is far from exhaustive, I feel like the topics chosen are the most important ones. First, I will talk about how the customers, and their needs influence the utilization of chatbots. After that, the Media Synchronicity Theory (Dennis et al. 2008) is discussed,

and how it can help identify the challenges chatbots as a medium may present. Lastly, technological restrictions of chatbots are focused on.

Chapter 3 will discuss the utilization of chatbots after the initial analysis: the design, implementation process and evaluation. Each stage has their unique challenges in the context of chatbots, and managers should be aware of them beforehand.

After that, I will discuss the methodology used in this paper in Chapter 4. I will describe the process of information gathering and the limitations a literature review as a research method includes. Chapter 5 is dedicated to the results of my research. I will go over my research questions, and answer them based on the findings of the literature review. Pros and cons of chatbot utilization are also discussed in this chapter.

Finally, Chapter 6 concludes my thesis with discussion about the topic. I will take into account the implications of this paper for practise and future research, as well as the limitations of this thesis.

## **2 Prerequisites for implementation of chatbots**

No investment is without a certain degree of risk. Tjan (2001) argues that failure in internet investments comes from three distinct causes. Firstly, some companies do not take appropriate caution and instead invest in every new initiative available. On the other hand, betting it all on one opportunity is unpreferable simply from the perspective of risk management. Lastly, going blindly with the masses and following every new trend allocates funds excessively to sometimes even non-existent markets.

In this chapter I will go over the prerequisites for implementation of chatbots. The aim is to present important factors that should be considered before an implementation process is started. A thorough analysis may help avoid investments that lead to unfavourable outcomes for both the firm and its customers.

### **2.1 Suitability for customers**

Whether talking about a purchasing situation or an exchange of information, customers have become the focus of business. As competition has become global, businesses across different industries have turned to customer value and superior service delivery as sources for enhancing their performance (Woodruff 1997.) As such, knowledge of the customers is vital. Karmarkar (2004) argues that in today's service revolution the winning firms are the ones that have the best understanding and anticipation of customer needs, best service quality, and use the service channels preferred by the customers.

Of course, customers are as diverse as people, with differences in demographics and preferences alike. Nowadays, customers typically switch channels when interacting with a firm, and businesses' role is to maintain preferred channels, making the process viable. The customer preference in channels also changes overtime. (Nunes & Cespedes 2003). Knowledge of customer preferences can also improve the performance of new products (Joshi & Sharma 2004.)

When talking about chatbots, individual preferences in utilization of technology can be hypothesized to be a factor in customer satisfaction. However, in a Master's thesis conducted by Pirilä (2018), customer expectations were observed to be the key indicator of formation of AI-preference and customer satisfaction. High expectations correlated with high probability of AI-preference and satisfaction. On the other hand, Pirilä's (2018) study found no statistically relevant differences in AI-preferences between different demographic features, used as background variables, such as age and gender.

Moreover, Venkatesh et al. (2003) found in their study of existing technology acceptance models that age and gender are rather parts of moderating factors (others being experience and voluntariness of use), influencing the effect of direct determinants of technology acceptance and use behaviour. The direct determinants are performance expectancy, effort expectancy, social influence and facilitating conditions (ibid.)

There are also differences in B2B and B2C customers, at least in a sense that B2B customers' decisions are made up by a group of people. Kotteaku et al. (1994) used four variables to describe the different purchasing structures of firms: articulation, formalization, centralization and depth of analysis. Articulation refers to the existence of specific purchasing units or departments, and formalization to there being formal documents about roles, customs and policies. Centralization captures the extent of purchasing delegation or the lack of it, and hierarchical structure of the buying process. Finally, the depth of analysis describes the sophistication of records kept and tools used to support the purchasing process. The complexity of a product may influence the purchasing structure, especially the articulation, formalization and centralization levels (ibid.)

Some researchers have also argued that the distinction between B2B and B2C customers is outdated. Similar marketing techniques have proved to be effective in both contexts (Cova & Salle 2007.) Furthermore, similar constructs, such as customer satisfaction, have been observed to drive customer value and loyalty (Lam et al. 2004.) Finally, the needs of individual participants in B2B purchasing structures have been found to be as relevant as the needs of the actual firm. (Tellefsen 2001).

In this context, chatbots can't be seen as a sole customer service channel, but as a component of the exchange between the firm and the customers. Since expectancies are big part of the acceptance of new technologies, firms utilizing chatbots should therefore also try to influence the expectations of their customer segment with positive communication about the chatbot. On top of that, educating the customers about the chatbot can help make the new technology more acceptable.

The purchasing process is also an important factor when analysing suitability for customers. As much as customer segments vary between different industries and individual businesses, the purchasing process is contingent of the product (including services) in question. By accurately identifying their customer segment and processes, management can deduce if a chatbot is worth the investment. Moreover, knowledge of the customer base and the purchasing process will help in the design process of the virtual agent, discussed more in Chapter 3.

Choudhury and Karahanna (2008) identify four steps in the consumers' purchasing process: requirements determination, vendor selection, purchase and after-sales service. In the first stage, customers consider the need they have and decide on the exact product that should be purchased to fulfil the need. After that, consumers seek information on the available alternative sellers and



compare the products' that are available for them. The third step, as the name suggests, consists of the purchasing transaction, and finally, the last stage involves the after-sales services the object of the purchase may require.

On top of that, Choudhury and Karahanna (2008) suggest that the first step is especially crucial when a product is complex. Zhang and Reichgelt (2006) found in their study of the U.S. banking industry that product complexity is a key component in the choice of transaction governance structure (TGS). They defined a TGS as a structure that intermediates the transfer of products between separate parties, based on the works of Oliver E. Williamson in 1979 and 1981. Zhang and Reichgelt concluded that TGSs that are market-oriented, such as web platforms, are more commonly used when the complexity of a product is low. On the contrary, TGSs with high hierarchy, such as a face-to-face setting with a professional, are more viable when dealing with products exhibiting high level of complexity.

Depending on the characteristics of a particular purchasing process, chatbots can achieve different goals. If the product is complex, a chatbot's role could mainly be that of an educator, targeting the first steps in the purchasing process. On the other hand, when talking about simpler products, chatbots may be used more freely between the different steps of the purchasing process, depending on the objectives set to it by the firm.

## **2.2 Choice of medium – Media Synchronicity Theory**

Many of the processes traditionally conducted through physical means have been switching to virtual channels in the recent years. However, not all processes are equal when it comes to the possibility of virtualization. (Overby 2008). Zeithaml et al. (2002) have observed, that the focus in e-commerce has changed to electronic service quality, as opposed to merely competing with low prices and web presence. In other words, the medium chosen for customer service should hold up to the standards demanded by the communication between customers and the company.

This section will present the refined Media Synchronicity Theory (MST) of Dennis et al. (2008), based on the proposal of the theory by Dennis and Valacich earlier in 1999. The theory was developed after some of the existing theories (such as Media Richness Theory, Daft et al. 1987) did not succeed empirically, when tested with newer media such as communication via computers.

Dennis et al. define *media synchronicity* as the capabilities of a given media that enable the communicators to reach synchronicity. Synchronicity, on the other hand, refers to the individuals' shared focus on a task while working at the same time to complete that task. In MST, five capabilities are identified as affecting the synchronicity supported by a medium: transmission velocity, parallelism, symbol sets, rehearsability and reprocessability. Of these five capabilities, transmission

velocity's and symbol sets' higher degree correlate positively with the level of media synchronicity. On the contrary, higher levels of parallelism, rehearsability and reprocessability have a negative correlation with media synchronicity.

Transmission velocity refers to the speed at which the information can be sent to other participants. Parallelism describes the width of the medium: how many simultaneous messages can be sent via the media. Symbol sets are the symbols, which are supported by a medium. For example, in a face-to-face communication, we can use gestures, such as nods and handshakes, verbal communication and visual aids, such as pictures, to convey our meaning. Rehearsability is the extent to which a sender can craft their message, before the information is transmitted. Finally, reprocessability is the ability of the receiving participant to process the information multiple times if needed, during or after the communication process. (Dennis et al. 2008).

Figure 1. illustrates the overall communication process, as seen by MST. Dennis et al. argue, that communication as a process is comprised of two kinds of fundamental processes, conveyance and convergence. The ratio of these processes may vary depending on the task, and both may contain some quantities of information transmitting and processing. Conveyance is the process of information transmission required by the task, and the cognitive effort of making sense of the new ideas received. Convergence processes' goal is to reach an agreement between the participants about the individual interpretations and meanings formed from the information transmitted.

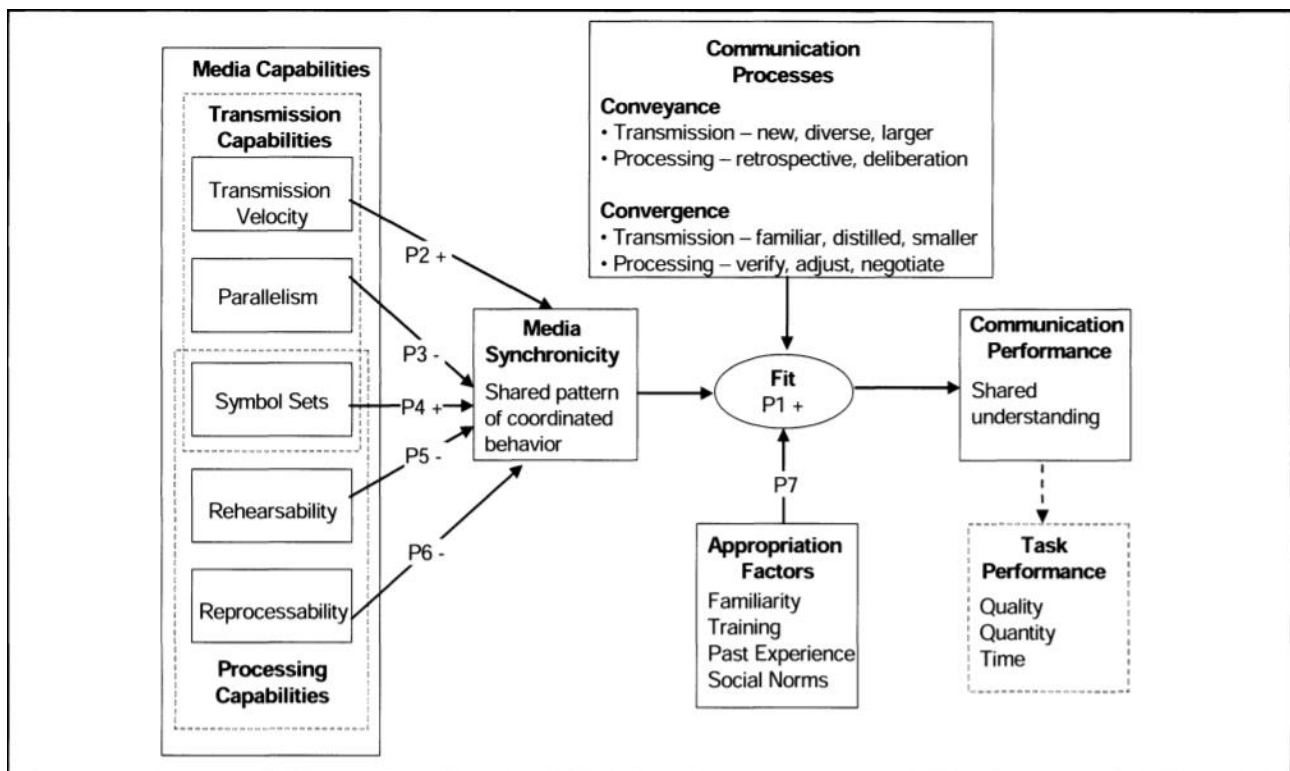


Figure 1. Media Synchronicity Theory, (Dennis et al. 2008.)

A medium supporting high level of media synchronicity is beneficial in communication processes with emphasis on the convergence. On the other hand, media with low level of media synchronicity are better in communication requiring conveyance processes. Ultimately, the task performance is dependent on the communication performance: tasks should be paired with an adequate medium or a group of media to achieve the goal of the task (Dennis et al. 2008).

The MST has interesting implications in the case of chatbots. Firstly, a chatbot would be able to change its inherent media synchronicity based on the task at hand. Take for an example a case of simple information request from a customer. While human agents would be tied to one or few communication processes at most, a chatbot can practically ignore the parallelism constraint, since its interactions are a set of unique interactions. Moreover, the rehearsability capability can be ignored on the bot's side, since its communication is based on automated and already honed messages, so that the customer can take the time they require to process information, while the bot is ready to jump back in the communication process when necessary. Reprocessability is also dependent on the situation: the customer can access same information by a similar inquiry, but this is not needed when the communication process is heavy on the convergence side.

## 2.3 Technological restrictions

When designing customer service channels with a chatbot, a firm can't only take into consideration the boundaries set by the customer strategy and operational capabilities, but the technological restrictions too. This chapter aims to give the reader an image of the ALICE chatbot, how it has influenced the technological solutions used in chatbots, and what restrictions there are when contemplating about implementing a chatbot to the business.

One famous iteration of chatbots and a milestone in the field is Artificial Linguistic Internet Computer Entity, or ALICE for short (Shawar & Atwell 2003; Burden 2009; Wallace 2009.) ALICE uses AIML, Artificial Intelligence Markup Language, a version of XML language. ALICE is based on pairs of stimulus and response, or *patterns* and *templates*, forming *categories* that are stored in a tree structure. An object called *graphmaster* utilizes the storage structure for pattern recognition and matching algorithms. The process is overseen by a human agent, a *botmaster*, who can help ALICE learn more pattern-template pairs using automated targeting. (Wallace 2009).

ALICE is an instance of a general chatbot technology, that can be used as a base for more specific ones. The first condition of chatbot creation is a capable natural grammar unit. However, most of the

programs in the past have been rather poor in this aspect. One suitable way to tackle this problem is the creation of learning machines. (Saygin et al. 2000).

The problem can arise when the chatbot should be able to communicate in multiple languages. One approach is to use a corpus (an existing collection of natural language, comprised of real conversations between humans) with machine learning to teach an existing chatbot new languages (Shawar & Atwell 2003.) In their study, concentrated on teaching an ALICE-based chatbot Afrikaans, Shawar and Atwell (ibid.) found that the problem can be the composition of the corpus used: as the corpus was comprised of conversations in a narrow scope, the chatbot created could not communicate about other subjects. According to Shawar and Atwell, research should thus concentrate on how higher levels of linguistic knowledge can be incorporated on these kinds of machine learning techniques, so that the corpus based approach could be utilized more generally.

ALICE has been used as the starting point in other studies too. Ghose and Barua (2013) used forms of ALICE to test three distinct iterations in the context of a chatbot answering frequently asked questions of university students (the topics chosen were information about admission, courses and faculties.) Their three variations were a baseline chatbot, comprised of just the basic files of AIML consisting of 23920 knowledge-based entries, a domain augmented bot with 350 additional categories added that referred to the frequently asked questions, and a modified version of the domain augmented bot. The final bot had the 350 additional categories included, while Ghose and Barua restricted the base files to 4298, and manually modified them to better match the domain. Ghose and Barua found that the simple addition of domain specific knowledge is viable when designing a goal-oriented chatbot from a general conversational knowledge.

Another technological restriction can be seen arising from the study of Ghose and Barua (ibid.) In a business environment, the chatbot used should have knowledge of the specific domain it is used in, such as information about the firm, its products and the website it is on. However, this kind of required domain knowledge can easily become huge in quantity, depending on the size of the firm and its offerings. Manually creating such a number of categories may be unviable both from the viewpoints of resources and time committed.

Of course, the technological restrictions related to chatbots are contingent on the knowledge and professionals a firm has. If the needed human capital is absent, firms wanting to implement a chatbot can turn to outsourcing. There are already a plethora of companies offering chatbots tailored to customer needs, such as Assist, Avaamo and GetJenny. By outsourcing the technological construction of a virtual agent, firms can concentrate on their core functions and specifying the desirable characteristics for a chatbot suitable for their business.

### **3 Utilization of automated chat systems**

After analysing the prerequisites discussed in Chapter 2, a firm needs to assess if a chatbot would be beneficial for its operations. If the answer is yes, the firm begins the implementation process. However, the process may be costly, and the success rate might be relatively low (Legris et al. 2003.)

This chapter will highlight the important factors after the initial analysis of the fitness of a chatbot for a firm. First, information system design is discussed. Then, I focus on the implementation process, and what can be expected in such project. Finally, the importance of evaluation is discussed regarding automated chat systems.

#### **3.1 Design**

The design process of a chatbot is contingent on the prerequisites discussed in the previous chapter. Depending on the customers and the products, firms can design different functions for the chatbot. The virtual agent could only be giving customers information about the products and the firm, or it could also help navigate the web-site, giving recommendations depending on the questions the customer has asked. A chatbot could very well be a component of the marketing and sales function of a company too, actively promoting new purchases. Inherently, these design choices are contingent on the strategy and objectives set by the firm for the chatbot. Thus, this chapter will only present general good practises in the design process and introduce some useful functionalities, rather than compare the individual design choices mentioned above.

As mentioned in Chapter 2, customer knowledge can affect the performance of new products (Joshi & Sharma 2004) and thus customer data and expertise should be utilized in the design process. One way businesses can achieve this is by directly including the customers in the design process.

Yan et al. (2007) propose a three-phase process for the for a proper utilization of customer knowledge in product conceptualization: design knowledge acquisition, design knowledge representation and design knowledge evaluation. In the first stage, background information on the product is gathered, and customer segmentation is conducted for latter stages. After that, in the second step, a hierarchical view of the design knowledge (DKH) is constructed, based on the abstraction of the knowledge. Customers are then asked to rate specific design properties. In the final step, clustering algorithms (Kohonen Association) are used to identify the key differences in preferences between the customer segments identified in the beginning.

Figure 2 illustrates the proposed framework by Yan et al. (2007.) Although the framework was originally meant for physical products, I feel like it perfectly combines the preference identification

and its other objective in the design process, the integration of the four domains: marketing, product, customer and technology.

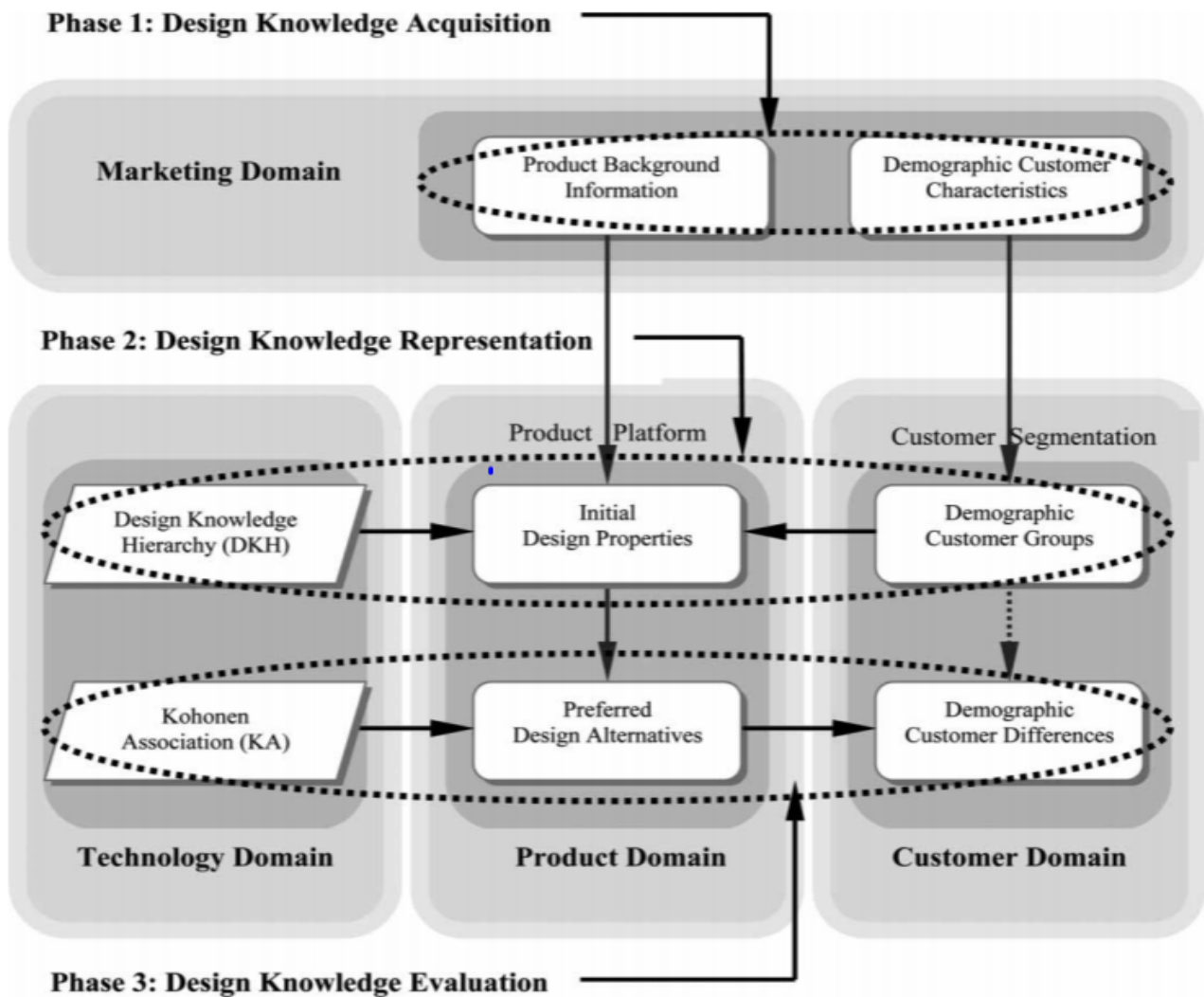


Figure 2. Four-domain framework for product conceptualization. (Yan et al. 2008).

The goal of integrating different departments in the firm’s processes and objectives is not new. Reich and Benbasat (2000) see that the establishment of an alignment between IT and business departments, and more specifically their objectives, has long been a major concern among IT managers.

When designing a chatbot, managers should include both the customers and different departments of the firm in the process. Firstly, this will enable the firm to better match the functionalities of the chatbot to the preferences of their customer segments. Secondly, including the different departments

can help align their different objectives and needs, for example between marketing, customer-service and IT functions. Finally, the inclusion of customers and different departments can help counter change resistance, which could otherwise arise in the implementation process.

Regarding the functionalities of a chatbot, an important fact to consider is that electronic marketplaces are inherently different from physical ones, since the quantity of products on display may be huge. To customers, this is both a blessing and a curse: more products mean higher probability for a match with individual needs, but limitations on cognitive processing capacity can make the information gathering impossible. One solution in a web-based environment is the implementation of interactive decision aids, such as recommendation agents and comparison matrices that help the customer compare different products and their features. (Häubl & Trifts 2000).

Cenfetelli et al. (2008) found in their study that supporting-service functionality (SSF), alongside service quality, is as well a key component in the formation of online-customers' perception of usefulness and the satisfaction of using the website, thus leading to continuous use of the website. Cenfetelli et al. define SSF as "the extent to which a website uses IT to provide services that support a core product or service transaction, and to help customers reach their shopping goals."

Chatbots can easily support SSFs, so the design question is just what kind of additional services a firm is willing/choosing to provide. On top of that, chatbots can be classified as interactive decision aids, differing only in the extent that decision-support functionalities are added.

### **3.2 Implementation**

The implementation process is vital for a chatbot-investment to be beneficial. In this chapter I will go over the factors that may hinder the implementation process of a chatbot. First, resistance to change as a phenomenon is discussed. After that, the focus will be on how to combat the resistance in order to successfully implement the chatbot.

Resistance to change can come from many different sources. While change resistance is widely recognised as a real-life phenomenon, it is important to make the distinction that it is rather a consequence than a trait of people. The underlying reasons, causing people to exhibit resistance, include for example uncertainty, surprise, lack of trust, fear of failure and threats to job status or security. (Dent & Goldberg 1999).

Markus (1983) identified three distinct approaches when searching for the cause of change resistance during IS implementation: people-determined, system-determined and interaction theory. The first approach sees the resistance come from inside the beliefs and attitudes of people and groups, while

the second one argues that system characteristics, such as bad usability or ergonomics is the source of resistance. The final approach, interaction theory, describes that change resistance comes from the interaction of the system and the context that it is used in. The interaction theory has also a political variant, where the interaction of system features with power distribution inside an organization causes the change resistance.

The adoption of multichannel solutions can surely create resistance in the organization. Many organisations have been providing education programs for managers, and thus been able to get rid of prejudices and sticking to old habits (Nunes & Cespedes 2003.) Education may very well work with customers and chatbots as well, at least when using the first approach identified by Markus (1983.)

From another perspective, the human customer service agents can exhibit resistance to chatbots too. This may be due to fears of losing their jobs, or mental images of comparing themselves with the virtual agent. The objective of chatbot implementation is of course important: is the firm replacing the human agents with a robot or merely trying to ease their workload by introducing a complementary virtual agent. In the latter case the company should motivate the employees to just start embracing the chatbot, since the beliefs beneath the pre-adoption attitudes towards the system are based on uncertainty: beliefs can change post-adoption when they are based on a concrete experience (Karahanna et al. 1999.)

Overby (2008) argues that information technology has a key role in process virtualization. In the case of chatbots, human agents are changed from the way of a virtual one, and so the implementation process of chatbots can be seen as a virtualization process as well. However, if the second approach of Markus (1983) is used, the emerging resistance would be inherent to the chatbot. I would argue that the design phase and the actual implementation are parts of the same process and so, in this scenario, change resistance would be merely a consequence of bad design choices. Thus, the firm should return to the drawing board and use even more resources to accurately identify the customer and department preferences, as discussed in the earlier section.

Final approach to finding the source of resistance defined by Markus (1983) is the political interaction theory. Power dynamics is natural for hierarchical organisations, and disruptions may be possible for example between the IT department and managers, or the different departments brought together in the design process. In these situations, managers could try to facilitate negotiations between different parties (Dent & Goldberg 1999.) Through quality communication, managers can clearly share their visions and give participants a chance to give their input on the subject (Lewis 2006.) This type of quality communication can also help in the creation of mutual understanding and shared domain knowledge, which may lead to better alignment of business and IT objectives (Reich & Benbasat 2000.)



### 3.3 Evaluation

After the implementation process has been successfully started, the next logical step is to start evaluating the chatbot and its effects on the measurable performance of the firm. This kind of quantitative measuring is usually done with figures based on accounting data, such as return on investment (ROI) or return on assets (ROA).

However, Tan et al. (1999) argue that in an ideal world, performance measurement should rather be based on metrics of financial data, such as internal rate of return (IRR). The reasoning behind this is that since IRR is based on the markets' valuation of the firm, it is more accurate metric of the intrinsic value of the business. Still, figures based on accounting data are widely in use because of the impossibility of forecasting future revenues of a firm, thus making IRR inaccurate.

Figure 3. represents the model of customer relationship management (CRM) success factors constructed by Kim and Kim (2008.) As the focus is on chatbots in the customer interface, the most relevant perspectives for measurement are the process and customers factors.

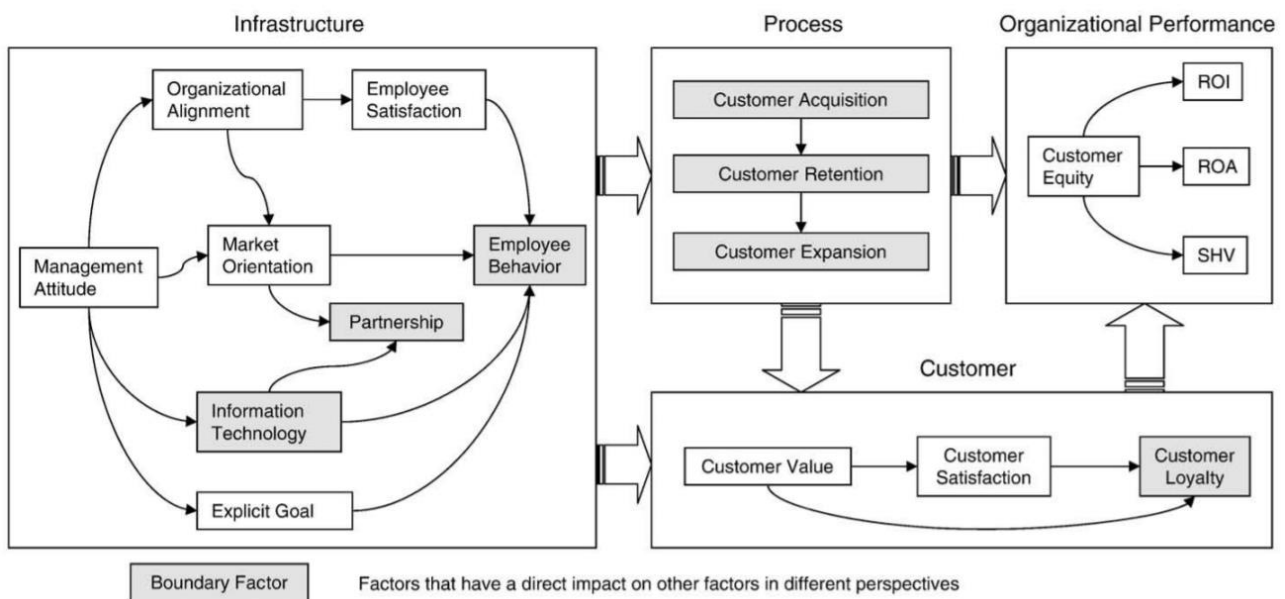


Figure 3. Inter-relation of CRM success factors between different perspectives. (Kim & Kim 2008).

The process factors include customer acquisition, retention and expansion. Customer acquisition has metrics such as leads per channel, number of acquisitions and sales success rate, whereas retention has indicators including percentage of complaints resolved on first call and retention rate. Customer expansion could be measured by core customer ratios and value per order. On the other hand, the customer factors consist of customer loyalty, satisfaction and value. They can be measured with RFM (recency, frequency, monetary value, referring to purchase behaviour of a

customer), satisfied customer ratio and number of customer complaints, respectively. (Kim & Kim, 2008).

The choice of metrics should be based on the objectives set for the chatbot. For example, if the chatbot is intended to inform the customers and help navigate the web-page, satisfied customer ratio and number of customer complaints would be the most relevant metrics. In the case of a chatbot intended to help promote the products and improve sales, indicators like number of acquisitions, sales success rate and value per order would be better suited. A chatbot could be also utilized as a platform for collecting the relevant data for these indicators from the customers.

The performance indicators of a chatbot should also be investigated in the context of the whole customer service function. This way managers can deduce whether the chatbot brings added value to customer service, or if the function would be better off without it. By combining the indicators of the whole function managers can also better get a picture on how the particular function bring value at the level of the whole company, indicated by ROI, ROA and shareholder value (SHV) in the framework of Kim and Kim (2008.)

## 4 Methodology

This thesis is based on a broad literature review conducted via Scopus and Aalto Finna. Scopus is an abstract and citation database consisting of peer-reviewed literature (Elsevier, 2018). Aalto Finna is an online portal containing the materials of the Learning Centre of Aalto University.

Although the scientific literature discussing chatbots is quite thin as of now, Scopus turned out to be a valuable tool for my research. The objective of this paper was to integrate existing frameworks and theories in ISS and related fields, and Scopus enabled me to firstly find the relevant articles and sources. Secondly, it allowed me to review the interactions the articles and theories have formed in the course of literature.

The Scopus database's feature of providing citation impact factors allowed me to form a strong theoretical foundation from reputable sources. This way I was able to rate the peer-reviewed sources, and ultimately choose the articles and theories that seem to be the most respected among the scholars.

However, literature review as a research method has its own limitations. Primarily, the inherent nature of literature review, as a sole method, excludes the possibility of testing the concepts empirically in the context of chatbots. Although inferences were drawn from existing theories and frameworks, quantitative analysis would have been beneficial for the scientific contribution of this paper. Secondly, no new concepts were introduced, rather guidelines for managers seeking to understand the most important factors affecting a process like implementing a chatbot.

My methodology also evolved during the writing process. I was initially in talks with a company currently utilizing a chatbot, but incompatible schedules forced me to abandon the case. The objective of this case research would have been to measure financial key measures of chatbots in the customer interface. The case could have been beneficial in three ways.

The immediate benefit would have been to the business, in the form of information gathering and analysis, and then presenting the findings to managers of the firm. This would have given the chatbot legitimacy or in the case of negative findings, helped the firm in decision making whether to continue the chatbot or alter it. Secondly, quantitative data and analysis could have empirically supported the construct highlighted in this paper or guided the constructs into more appropriate forms in the case of chatbots. Finally, quantitative analysis regarding chatbots is quite thin at the moment, and the findings could have promoted new avenues of research questions in other studies.

## 5 Results

After gathering the data and reviewing the literature surrounding chatbots and information systems sciences, I feel like I have found answers to all my research questions. In this chapter I will go over the questions, and report the results found in the literature review.

### **1. What are the prerequisites for the utilization of chatbots in customer service?**

Firms thinking about utilizing chatbots should first look at their customer segments. They should identify the preferences of their customer segment, and analyse the suitability of a chatbot for their customers. Also of importance is the purchasing structure. What kind of products does the firm offer? Products with higher levels of complexity have different kinds of purchasing structures, and customers can have different preferences on the transaction governance structures depending on the level of complexity.

On the other hand, firms need to understand the characteristics of chatbots as a medium. The media chosen must be able to support the kind of communication with customers that the interaction demands. Luckily, chatbots are quite versatile when it comes to media synchronicity, and thus are good for different kinds of communication processes.

Finally, businesses need to take into account the technological restrictions of chatbots. Simple chatbots, that are based on categories and simple match algorithms, can have bad language skills. Moreover, manual retraining to domain specific knowledge can be resource and time consuming. On the other hand, there is a large quantity of firms offering customizable chatbots as a service, so outsourcing is also possible.

### **2. How should the implementation process be handled?**

The implementation process starts with the design of the chatbot. Firms should include both the customers as well as different departments into the process. This way the functions on the chatbot can better match the need of the customers and the firm too. The design should include some sort of supporting-service functionality.

Change resistance may be encountered in the process of implementation. Managers can combat this based on the perceived fundamental sources of the resistance. The mutual design process can help

reduce the change resistance, as well as quality communication, education of participants and negotiations.

The evaluation of a chatbot should be conducted through quantitative performance indicators. The most suitable metrics are dependent on the objective and design of the chatbot. The chatbot should also be evaluated in the context of the whole customer service function, so that the impact on overall performance can be measured. Chatbots could be designed to gather the data, that the chosen performance indicators require.

### **3. What are the pros and cons of using automated chat systems as a part of customer service in business?**

Pros of using chatbots:

- they are versatile in terms of communication capabilities and types of customer service tasks they can be programmed to do
- through automation the unit costs of customer service are lower, and human agents are freed to do more rewarding/demanding tasks
- offers the customers an around-the-day channel for communicating with a firm

Cons of using chatbots:

- inadequate chatbots lead to decrease in customer satisfaction and perceived usefulness, thus costing the firm
- since the technology is not quite mature yet, investment carries higher level of uncertainty
- some of the customers may prefer actual human agents, and chatbots can be inadequate platform for more complex products and purchasing processes

## **6 Discussions and conclusions**

The focus of my research was on web-based chatbots that are utilized as a component of the customer service function. I was able to construct a starting point for future study and practical instances.

On a more general basis, chatbots have become a global trend, and already they are used in many ways, such as components of teaching, personal virtual assistants and aids in social work. In the future, as the technology becomes more advanced, even more kinds of opportunities may become available.

Chatbots also hold promise in the individually tailored marketing, as a part of combinations that companies can use to target and interact with their customers around the clock, in those channels that are most effective. Customers will be able to be in touch with their favourite brands whenever, wherever and through whatever channels they choose to do so.

Of course, these kinds of technological trends should be taken with a grain of salt. Chatbots won't be a miracle cure for customer relations issues and neither will they be suitable for everyone. Still, best innovations will be sought after, and best practises will likely lead to competitive and monetary advantages.

### **6.1 Implications for future research**

My study has a few implications for future research. Firstly, the multiparty approach discussed in the design chapter would greatly benefit from more empirical testing. The performance indicators, their comparability and accuracy could also use quantitative testing, as to see whether they are practical, or if some other metrics would better capture the effects on customer service function and overall business performance.

Moreover, the field of chatbots needs more quantitative and qualitative research from an economic perspective. I hope that this paper can illustrate some of the benefits chatbots have, so that in the future there will be more literature surrounding the topic.

### **6.2 Implications for practise**

As with any investments, managers need to first identify the key elements of their business and the suitability of the proposed investment. My paper gives managers a practical starting point when evaluating chatbot investments. The most important factors can be quickly summarized from Results, and can guide possible implementers towards more specific or relevant sources.

The Prerequisites are useful even for firms that do not plan on implementing chatbots, since it is possible that they will deal with other companies in the future that have incorporated some sort of automated chat systems in their own functions.

### **6.3 Limitations**

As discussed in the Methodology chapter, due to the nature of a literature review, no new concepts were introduced in this thesis. More study is also required to empirically validate that the concepts discussed in this study are relevant in the field of chatbots. Since there was much inference of existing theories about general phenomena in information system sciences, empirical validation is needed to guarantee that chatbots behave similarly as a subset of information systems.

Another limitation is that some of the studies discussed in this paper were either conducted with localised samples, such as that of Ghose and Barua in 2013 (university students) or with a specific industry, such as that of Zhang and Reichgelt in 2006 (financial industry.) More study is necessary to identify whether the phenomena observed are constant across samples and industries.

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