



LUND UNIVERSITY
School of Economics and Management
Department of Informatics

Indices for Virtual Service Agent Design

Cross-Cultural Evaluation

Master thesis 15 HEC, course INFM10 in Information Systems
Presented in January 2016

Author: Peter Gerhat

Supervisors: Styliani Zafeiropoulou
Odd Steen

Examiners: Björn Johansson
Olgerta Tona

Indices for Virtual Service Agent Design: Cross-Cultural Evaluation

Author: Peter Gerhat

Publisher: Dept. of Informatics, Lund University School of Economics and Management.

Document: Master Thesis

Number of pages: 100

Keywords: Virtual service agent, Avatar, Affective computing, Cross-cultural comparison, Localization

Abstract:

While localization helps to create websites and mobile apps for specific target markets, not as much attention was devoted to the area of affective virtual service agents. The situation is changing due to advances in affective computing and artificial intelligence. Virtual service agents have the potential to change the way how people interact with information technology by transforming control method from physical gestures to natural language conversation. By having human-like characteristics, the agents can transform impersonal service experience to personal and make an emotional impression on the user or customer. Such message can take different forms and interpretations, depending on national culture and other context. Qualitative data from interviews with experts were used to identify differences in how they are viewed in Sweden and Japan. A survey was then used to quantify the differences using a sample of participants, who were asked to rate the likability and trustworthiness of agents with varying ethnicity, gender and age. The impact of visible visual attributes on their trustworthiness and likability is analysed on a familiar example with virtual service agents at an airport. It was found that each group favours their familiar communication style and recommendations on virtual service agent localization are given.

Contents

1	Introduction	1
1.1	Background	1
1.2	Motivation	2
1.3	Problem area	3
1.4	Research Question	4
1.5	Research Purpose	5
1.6	Delimitation	6
1.7	Structure of the thesis.....	6
2	Literature review.....	8
2.1	Cross-cultural Differences	8
2.2	Emotional Branding.....	9
2.3	Affective Engineering (Kansei Engineering).....	11
2.4	Avatars for Service Agents.....	13
2.5	Interface Localization	18
2.6	Theoretical Framework.....	20
3	Research Approach.....	21
3.1	Research Method	21
3.2	Research Model	21
3.3	Hypotheses.....	23
3.4	Design Space.....	23
3.5	Interviews.....	24
3.5.1	Interview Design.....	24
3.5.2	Interview Participant Selection.....	24
3.6	Questionnaires.....	25
3.6.1	Questionnaire Design.....	25
3.6.2	Questionnaire Participant Selection.....	26
3.6.3	Questionnaire Website Design.....	27
3.7	Research Quality and Ethics	27
4	Empirical Results.....	31
4.1	Interviews.....	31

4.1.1	Interviewee Views on Ethnicity.....	32
4.1.2	Interviewee Views on Gender.....	32
4.1.3	Interviewee Views on Age.....	33
4.1.4	Interviewee Views on Expression.....	34
4.2	Questionnaires.....	34
4.3	Overall research results.....	39
4.4	Sweden results	39
4.5	Japan results	40
4.6	Quantitative Findings.....	42
5	Discussion.....	43
5.1	Empirical Findings.....	43
5.2	Managerial Implications	44
5.3	Future Work	45
6	Conclusion.....	46
	Appendix A.....	47
	Appendix B.....	48
	Appendix C.....	59
	Appendix D.....	63
	Appendix E	67
	Appendix F.....	72
	Appendix G.....	76
	Appendix H.....	80
	Appendix I	84
	References.....	88

Abbreviations

Abbreviation	Original phrase
AE	Affective Engineering
AI	Artificial Intelligence
DA	Decision Aid
IS	Information Systems
ISR	Information Systems Research
JTMP	Japan Technology Management Program
PCA	Principal Component Analysis
PEEIM	Perceived Effectiveness of E-commerce Institutional Mechanisms
PLS	Partial Least Square
RA	Recommendation Agent
SEM	Structural Equation Modeling

Figures

Figure 2.1: The business world needs logic, while the consumer world is driven by emotion. (Gobé, 2007, p. 69)	10
Figure 2.2: The concepts underlying the emergence of affective engineering (Nagamachi, 2010b, p. 3)	12
Figure 2.3: Research model for trust on websites with static human images. (Cyr et al., 2009, p. 543)	18
Figure 2.4: Research model for effects of culture on perception of websites. (Cyr, 2013, p. 1360)	18
Figure 2.5: Kiosk for automated interviewing. (Nunamaker et al., 2011, p. 19).....	20
Figure 3.1: Relation of Model to Existing Theory.....	22
Figure 3.2: Proposed Research Model.....	22
Figure 4.1: Average Response for Each Country	36
Figure 4.2: PLS Structural Model.....	39
Figure 4.3: PLS Structural Model for Sweden.....	40
Figure 4.4: PLS Structural Model for Japan	41

Tables

Table 2.1: National Cultural Comparisons (Hofstede, 1980)	8
Table 3.1: Research Hypotheses	23
Table 3.2: Overview of Interviewees	24
Table 4.1: Interviewee Views on Ethnicity	32
Table 4.2: Interviewee Views on Gender	33
Table 4.3: Interviewee Views on Age	33
Table 4.4: Interviewee Views on Expression	34
Table 4.5: Variable Coding	34
Table 4.6: Participant Demographics	35
Table 4.7: Conditions	37
Table 4.8: Partial Least Squares Structural Model	37
Table 4.9: Component Matrix	38
Table 4.10: Correlation Matrix	38
Table 4.11: Quantitative Findings	42
Table 4.12: Highest Rated Service Agents	42

1 Introduction

Information systems field is where business, IT and design intersect to create user-centric products/services (Bernard, 2011). In this era of global competition in twenty first century, companies try to be as close as possible to their diverse customers, not to let any of their competitors to come in between them. To do so, organizations need to provide the best possible product/service from customer point of view to satisfy them. Ultimately, by the good product/service in customer's point of view, companies can keep their customers loyal and committed to the product/service that they provide. (Gobé, 2009)

1.1 Background

By facing growing demands from customers due to global competition, companies need to adapt their business strategy from price leadership to offering emotional and meaningful experiences to their customers (affective product/service) (Gobé, 2007, 2009). Therefore, they place more emphasis on user emotions starting from the 70s when designing their services/products to improve online and offline user experiences (Nagasawa, 2008; Schütte, Krus, & Eklund, 2008)

Virtual agents, the new generation of personal assistants and staffs available 24 hours a day, 7 days a week, are cost effective, clear and can represent personal services to the users. Today they are seen in different contexts (e.g. e-commerce, e-therapy, e-learning, virtual worlds, video games, collaborative online design, etc.). Whether we realize it or not, they, or some advanced voice technology already come pre-installed on all major desktop and mobile operating systems. From an Information Systems (IS) perspective, the agents are technological artifacts. They can take different forms, including an animated visual representation, which enhances their affective qualities (Al-Natour & Benbasat, 2009).

Gerhard, Moore, and Hobbs (2004) have described the visual representation as an avatar, which stands for "user embodiment in a collaborative virtual environment". They first emerged in the 1980s and since then they have been developed and incorporated into a number of both text and graphical virtual worlds (Schroeder, 2002). Avatars enable a user or agent to adopt a graphical form on a screen and contribute to the establishment of a sense of presence in a virtual environment (Svensson, 2003).

“Avatar” term in academic papers is used for visual aspect of virtual humans that are called also as virtual agents, advertising agents (Jin & Bolebruch, 2009), customer service agents, virtual interviewers (Nunamaker et al., 2011), online sale agents (Keeling, McGoldrick, & Beatty, 2010), recommendation agents (RA) (Qiu & Benbasat, 2009), decision aids (DA), advanced communication features (Y. Lee, Kozar, & Larsen, 2005) or many other terms based on their defined tasks but basically they are meant to assist their users.

Interface design has advanced to support end-user decision making through technological artifacts that are highly interactive, media-rich interfaces (Hess, Fuller, & Campbell, 2009). Interfaces now regularly employ sound, pictures, video, and animation. More recent enhancements include socializing or personalizing the interface (Hassanein & Head, 2007; K.-M. Lee & Nass 2005) in many cases through the incorporation of recommendation agents (RAs) or decision aids that provide assistance and advice to online consumers (Wang & Benbasat, 2005).

While the sophistication of interface of RAs continues to grow, many questions remain about how social, multimedia interface characteristics influence user perceptions and behaviors associated with these technological artifacts. For consistency of the text in this research the term avatar will be used for the visual representation of the virtual service agents.

Affective agents are one of the recent IS developments meant to act as additional companies' contact persons with customers. Despite being virtual, they are sometimes enhanced with human-like attributes to make the interaction more natural and appealing to the user. Those can be interpreted differently across cultures and this study aims to evaluate those differences. (Childs, Agouridas, Barnes, & Henson, 2006; Lager, 2012; Puzakova, Kwak, & Rocereto, 2013)

1.2 Motivation

The approach to new product development differs in Sweden and Japan, in Japan a complex approach called affective engineering is used with emphasis on user's emotions (Nagamachi, 2010a). Improvements in avatar design enhance emotional appeal for the user (Cyr et al., 2009). From an information systems research perspective, understanding the adoption behavior of avatars by individuals is interesting, important and also a current strategic trend in academia (Al-Natour & Benbasat, 2009).

Firstly, studying the factors influencing the perception of virtual service agents helps to reveal the customers' preferred business-customer relationship, so that organizations would have knowledge about their customers' preferences to be able to provide affective avatars and generally affective service to them.

Secondly, face-to-face communication has decreased substantially nowadays and people have become more isolated in the society (Boneva, 2001; Cumming, Butler, & Kraut, 2002; Kraut, Patterson, Lundmark, Kiesler, & others, 1998). By studying the factors influencing the perception of avatars and recommending features to make them more affective/emotional, it is possible to some extent reconnect the detached connections in organizational level (the business-customer relationship).

This study offers features to enhance the conversational and relationship-oriented attributes (interactions) required for communications in business-customer relationships. Finally, a comparison between Swedish and Japanese preferences is made to evaluate cross-cultural preferences for design and localization of virtual service agents and contribute knowledge to organizations that want to compete effectively in today's globalized market environment.

Use of avatars can be cost-effective for airports (the organisation) and time-effective for the passengers (the customers) considering the time they should wait on the long queues for information or even check in while they can serve themselves by the help of an automated service agent and save their time.

The interactive information kiosks were for instance chosen by decision makers at Munich International Airport to replace their outdated methods of handling customer claims and put the airport a step towards having virtual information desks. However, the academic community has been coping with the problem for a much longer time. Several different disciplines were represented in this project (e.g. psychology, human-computer interaction, social science, graphic design, business, marketing and many more). The cooperation among them was hard to achieve and that fact has reduced the speed of the project and added complexity.

Since social components of human-like agents (humanoid avatars) are important components in their adoption and use by individuals (Benbasat et al., 2010), this study focuses on how the design of the anthropomorphic interface of airport agents can enhance the agent's trustworthiness and likability to facilitate their adoption by individuals. This can be achieved by tailoring them to target socio-demographics by putting to use design attributes, such as ethnicity, gender, age and facial expressions.

1.3 Problem area

Alvesson and Sandberg (2011) pointed out gap-spotting as a prevalent way and problematization as a methodology of generating interesting research questions. Moreover, they state that a researcher needs to investigate challenging assumptions to make his/her research worth reading to others. The investigated problem was spotted as a gap in existing literature, as a similar cross-cultural study between Sweden and Japan has not been conducted yet.

Through literature review it was revealed that the field that combines psychology with artificial intelligence as a current and growing strategic trend in academia (Al-Natour & Benbasat, 2009). To make affective agent considering the avatar observer's national cultural background has been rarely investigated, and is worth to be put under more investigation. In this study the avatar characteristics that should be well-perceived by observers at airports are covered, the factors influencing individuals' perceptions of the avatars and the role of national culture in this perception. Besides the user preferences, there are also some cultural taboos (e.g. about gender in the Middle East), which would come as completely normal elsewhere in the world.

Although the use of high volume technological artifacts (e.g. avatars, images, animations and videos) has been debated among usability experts, some of whom feel that these high volume artifacts unnecessarily clutter up the system, slow it down, and disrupt its functionality, the same artifacts have been found to attract viewer's attention significantly (Riegelsberger, 2002) and therefore an affective gap to fill by organizations to grasp their customers.

1.4 Research Question

The research question of this study is disaggregated into two parts, which are formulated accordingly. Through reviewing the former surveys, the most important characteristics in design of avatar that should be well perceived in airports were found (RQ1). Eventually the main research question was formulated based on the former researches to evaluate how national culture influences this perception (RQ2).

RQ1. Which virtual agent characteristics should be well perceived by individuals in airports?

RQ2. How does the national culture affect individual's perception of airport virtual agent's characteristics?

1.5 Research Purpose

There were a number of researches that had focused on hedonistic elements of technological artifact as they can contribute to the user experience (Benbasat et al., 2010; Childers, 2001; Cyr, Head, & Ivanov, 2006; Cyr et al., 2009; Hassanein & Head, 2007; Hassenzahl, 2002; H. Van der Heijden, 2003; H. Van der Heijden, 2004). Garrett (2003) argues that visual design of the technological artifact has potentials to contribute to emotional appeal for users. In marketing studies a relationship was uncovered between aesthetic beauty and trust of observer to technological artifacts (Karvonen, 2000). Research has also begun to explore the impact of social cues and “warmth” of technological artifacts that impart a feeling of social presence related to the user experience of the artifact (Gefen, Karahanna, & Straub, 2003; Hassanein & Head, 2007; Yoo & Alavi, 2001) and its likability. Hence, today’s Information Systems Research (ISR) is aimed to create new theoretical perspectives that move beyond the Technology Acceptance Model (TAM) into the realm of emotive reactions.

Specific to the current investigation, avatars are examined for how they can induce hedonic reactions of agent appeal (likeability and trust) for the users across different cultures.

This research has the following goals:

- 1 From a theoretical perspective a model is created and tested, which connects avatar characteristics with their perception by individuals (likability and trustworthiness).
- 2 From reviewing the literature and interviewing experts the factors influencing avatars’ characteristics’ perception were studied (likability and trustworthiness) from observer’s point of view; worthwhile investigation for airport agents - gender, age, facial expression and ethnicity.
- 3 By distributing the questionnaires in different countries the aim was to evaluate how national culture may affect individual’s perception of avatar characteristics.

Sample groups of the research are chosen as below and based on reviewing former researches and the literature (European Kansei Group, 2015; Nishimura, Nevgi, & Tella, 2008):

- 1 Sweden – Belongs to European Economic Area and has Western culture, known for being technologically advanced and as an early adopter of innovations, it is also European leading adopter of Affective Engineering (European Kansei Group, 2015)
- 2 Japan – Belongs to East Asian countries with Eastern culture, known for being an early adopter of innovations and one of world’s largest economies. It is also known for being leader in robotics and establisher of Affective Engineering.

Japan in east Asia and Sweden in Europe are the leaders in affective engineering (European Kansei Group, 2015) and have been investigated and are frequently compared by researchers doing cross-cultural studies both for their similarities (e.g. technology driven) and dissimilarities (e.g. eastern and western culture).

In summary, the overall target of this research is to evaluate the role of national culture influencing perception of avatars as affective specifically by passengers at airports.

1.6 Delimitation

The use of multiple methodologies to gain deeper and more reliable perspectives on the subject area has been supported by various researchers to do research both on the intelligence and social aspects of the agents (Boudreau, Gefen, & Straub, 2001; Kaplan & Duchon, 1988; Palvia, Leary, Mao, Pinjani, & Salam, 2004). It was chosen to investigate the latter. Also, the focus is on the near future and not on predicting the long-term evolution of this field.

Questionnaires belong to the common core of instruments used in IS research as a social science and they were adopted in this research. A laboratory with devices for controlling blood pressure, heart rate and eye tracking to evaluate participant's unconscious responses is less common, but it sensors were used for example by Nunamaker et al. (2011). Such laboratories are available to senior researchers but for this research such tools to gain more reliable results were not available.

1.7 Structure of the thesis

The rest of the thesis is organized as follows:

Chapter 2 – *Literature review* discusses the existing knowledge carried out by other researchers regarding service agent design, affective engineering and cross-cultural comparison. In this chapter the theories that research is building on are specified, defined and motivations for selection of theories are given based on the main research question.

Chapter 3 – *Research Approach* includes research model and hypotheses, which describe how the proposed model and hypotheses were developed based on reviewing the literature and relevant studies of virtual service agent design. The hypotheses and selected factors within the proposed model are discussed in-depth in this chapter. In this chapter *Research quality and ethics* explains the common academic code for all research publications and how it was employed in this research.

Chapter 4 – *Empirical results* demonstrates the empirical data collected by the questionnaires and interviews. It entails the findings and analysis about the user perceptions and the influential factors affecting this perception of the non-verbal demographical cues of the agents. The supported relationships found by testing hypotheses within the proposed model are highlighted and their contribution to achieving the research purpose explained.

Chapter 5 – *Discussion* contains a reflection on the findings generated in the study and compares them to the relevant information obtained from other literature and research and lays out possible future research directions. Highlights the findings of this study.

Chapter 6 – *Conclusion* summarizing thoughts about the research are presented in this chapter with concluding remarks.

2 Literature review

This chapter introduces the literature that was used throughout this research. The introduction belongs to the theory of cultural values, important for reasoning the findings. Then the focus shifts to the area of virtual service agents and their visual representations and finally the theoretical models will be introduced.

2.1 Cross-cultural Differences

Salinas (2002) states that “[We] seldom consider the use value, or cultural consequence, that the images we produce have”. In a visual context, images are complex cultural artifacts ... and pictures can suggest a wide range of affective responses” (Scott, 1994) having emotional consequences such as trust and appeal to their observers. Hassanein et al. (2009) examined Canadian and Chinese responses to socially rich human images. Their images resulted in perceived trust for Canadian but not for Chinese users and supported Scott (1994) claim in an online environment. This was especially so when the images were not appropriately localized for the culture (Hassanein et al., 2009).

Hofstede (1980) proposed the national cultural values theory, which describes the effects of a society’s culture on the values of its members and how these values relate to behaviour and perception, using indicators that evolved over time. The theory has been adopted in several fields as a paradigm for research, particularly in cross-cultural psychology, international management, cross-cultural communication and recently for technological artifacts. The investigation was extensive (almost 20 years) and it defined four qualified dimensions and quantified them in different countries to be able to compare them. Although the theory went through some updates, the actual measurements have taken place decades ago in a world less interconnected and facing very different social problems than today.

Table 2.1 shows that Japan and Sweden share similarities and differences according to their national cultural values, two are in the contrasting spectrum. Power Distance index shows that power is distributed equally in both societies, while they traditionally have a different conception of gender according to a large gap between their Masculinity indexes. (Hofstede, 1980)

Table 2.1: National Cultural Comparisons (Hofstede, 1980)

Country Dimension Index	Japan	Sweden
Power Distance	Med (54)	Med (54)
Uncertainty Avoidance	Very High (92)	Low (29)
Masculinity	Very High (95)	Very Low (5)
Individualism	Low (46)	High (71)

Even though Hofstede's model is generally accepted as the most comprehensive framework of national cultures heavily cited in business and information systems literature, its validity and its limitations have been extensively criticized. Ailon (2008) deconstructs Hofstede's book *Culture's Consequences* by mirroring it against its own assumptions and logic, while finding inconsistencies at the level of both theory and methodology and cautions against an uncritical reading of Hofstede's cultural dimensions. For a further elaboration of Hofstede's cultural dimensions and definition of the indexes refer to Hofstede (1980), (Dawar, Parker, & Price, 1996), or (Simon, 2001).

2.2 Emotional Branding

Some of the main adopters of virtual service agents and virtual avatars into their scope of study are design and marketing, as the importance of consumer's emotion and feelings about the product/service (trust, satisfaction, reliability and etc.) affects positively the sales trend of the company.

Gobé (2001) was one of the prominent researchers who pushed for a more emotional approach to branding to create the sub discipline Emotional Branding. The aim of emotional branding is defined to humanize brands (in other words, putting the emotions and feelings of consumers into the design of the product/service) and increase of the interaction between consumers and the brands. He also pointed out to the opportunities that emotional branding brings to marketing. It is rather a managerial framework. (Gobé, 2009)

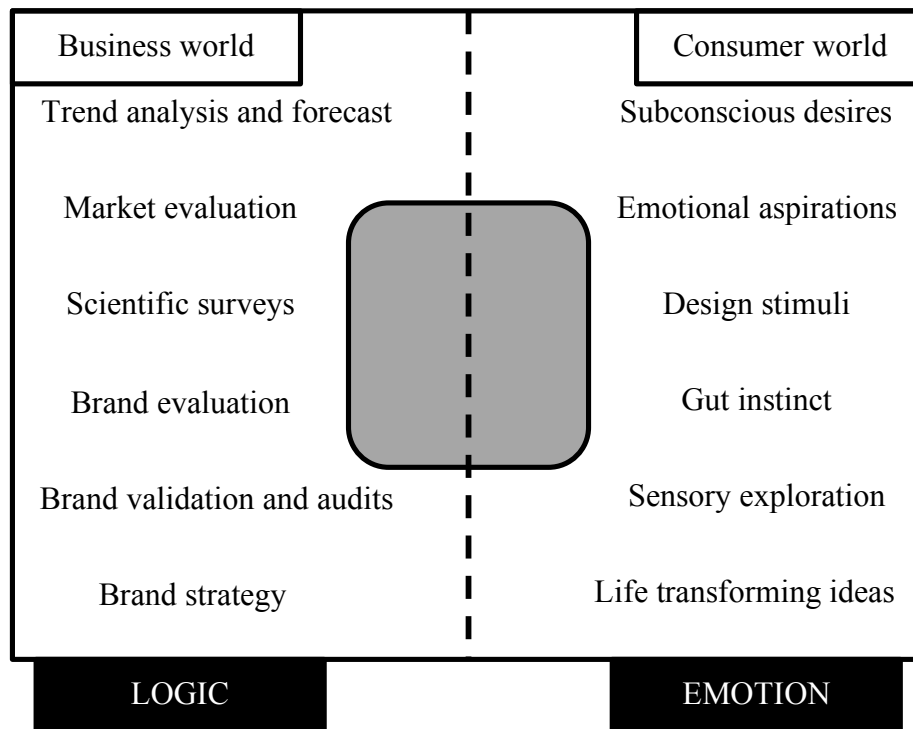


Figure 2.1: The business world needs logic, while the consumer world is driven by emotion. (Gobé, 2007, p. 69)

In the Figure 2.1, the differences between the business and the consumer worlds has been demonstrated by Gobé (2007). By doing so, he raised the need for connecting the two worlds in the market to simulate it.

Today the online retailing (E-commerce) has become a global competitive factor, and how to retain the customer to become committed to the product/service, the brand and make repeated purchases (repurchase) becomes a more important concern for online vendors than ever before. (Gobé, 2009; Johnson, Hult, & McGowan, 2008)

MIS Quarterly published a paper written by Fang et al. (2014) that studied the correlations between Trust, Satisfaction (consumers' emotions) and online repurchase intention by introducing a key moderator, perceived effectiveness of e-commerce institutional mechanisms (PEEIM). Drawing on the theory of organizational trust, and based on a survey of 362 returning online customers, the authors find that PEEIM negatively moderates the relationship between trust in an online vendor and online customer repurchase intention, as it decreases the importance of trust to promoting repurchase behavior. In theory, trust and satisfaction on a retailer's website were proved to lead to higher sales. These are just some of the emotions that emotional branding tries to harness.

The recent necessity for the affective approach in global companies was pointed out to prove that if they want to survive in today's competitive market, they have to be creative and they should put the information of their consumers' feelings and emotions about the products/services into their creativeness (Gobé, 2001; Nagamachi, 2010a).

2.3 Affective Engineering (Kansei Engineering)

As explained before in the introduction chapter of this paper, affective engineering is concerned with development of products/services that are valuable and good from consumer point of view (Nagamachi, 2010a). Nagamachi is the introducer of affective engineering in 1970s in Japan. He states that the affective engineering is something comprehensive and in his book, he describes it as an approach, a theory, a system and a technology. In the current investigation, the affective engineering theory is used to investigate how to meet people's national cultural preferences, as different organizations try to adapt closer to the needs of their customers. The framework is very detailed and complex, yet used by large international corporations.

As mentioned before, since it is not straightforward to understand and measure the feelings and emotions of people, affective engineering is concerned with impressions that consumers have about the product/service. Nagamachi (2010a) also mentions that the University of Michigan has a program called the Japan Technology Management Program (JTMP). The JTMP assists American industry in learning from Japanese approaches to the management of technology (Nagamachi, 2010a). Affective engineering theory suggest an approach to understand the qualitative and sophisticated term *emotion* (Nagamachi, 2010a). This encouraged the researchers to look at the differences between Eastern and Western approaches, the things they learned from each other and the things that they should learn or adapt to, to survive in today's global competitive market.

However, after the success of this approach in Japanese companies and later in other East Asian countries' companies (Taiwan, China and Korea) the Japanese expression Kansei has been translated to Affective Engineering (AE) in English language and has been adopted to European and North American companies. The reason this theory is mentioned is because it is so widespread in Japan, that it affects the development of local e-services.

The affective engineering began within product development (in engineering and mechanical disciplines) but later it has been adapted to other academic disciplines (e.g. IT, marketing, design). As this research has been investigating the current adaptations of the affective engineering in Information Systems field (design of websites (Cyr et al., 2009), interview kiosk (Benbasat et al., 2010), emotional Business Intelligence (Helfenstein, Kaikova, Khriyenko, & Terziyan, 2014), etc.), these new adaptations can be traced to (Nagamachi, 2010a): Innovations of Affective Engineering, the original reference is used to minimize the possible distortions and miswriting of other researchers in definition of the affective engineering.

If companies aim to please their customers, they should develop their products/services based on customer needs, wants and desires. This cannot be possible unless companies get into deep layer of customer needs and desires using a refined approach like the one that was first introduced by Japan in 70s. (Nagamachi, 2010a)

In fact, the philosophy behind the affective engineering theory states the Japanese cultural point of view. In Japanese culture, a product/service does not necessarily have to have the best quality, the lowest price or the most functionalities. An emotional product/service (according to the affective engineering theory) has a good combination of these attributes that is sensible for the customer. (Nagamachi, 2010b)

Figure 2.2 displays the high level affective engineering flow and the relation it comprises between consumer's emotion (consumer's desire from the product/service) and the product/service's perfection from consumer point of view. Product/service's activity in its lifecycle - from the beginning to its Japanese perfection. It is a set of approaches to quantify user emotions and manage the product development lifecycle.

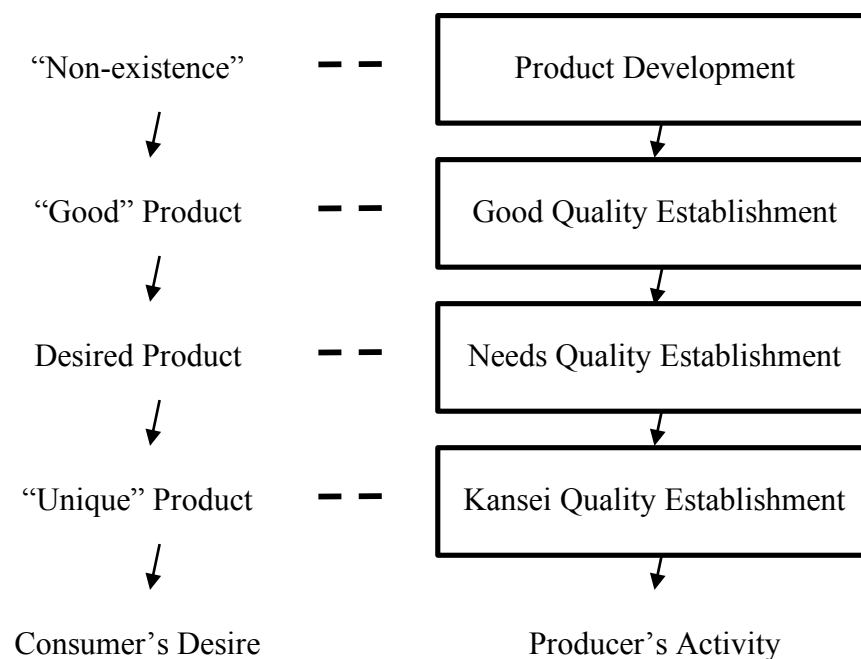


Figure 2.2: The concepts underlying the emergence of affective engineering (Nagamachi, 2010b, p. 3)

When information about consumer's emotions is properly collected and analyzed, it can then be translated into a technical design. Information Technology (IT) contributes to affective engineering by collecting data and analyzing it. In other words, IT is a requirement to actualize affective engineering. (Nagamachi, 2010b)

In developing a product/service by using affective engineering technology, the following procedure is necessary:

1. Break down the design into separate elements.
2. Interpret the information of customer's emotion for each element.
3. Finding the elements which have greater influence in the overall perfection of the product/service in customer's point of view and focus more on them.
4. Design the overall product/service based on the interpretations in previous steps.

The affective engineering has been a comprehensive field in academia. It has different complicated rules in different disciplines. This chapter brightens the relevance of the theory to the goals of the research. Readers with keener interest in affective engineering theory should refer to (Nagamachi, 2010a, 2010b).

2.4 Avatars for Service Agents

Avatars in literature are defined as “general graphic representations that are personified by means of computer technology” (Holzwarth, Janiszewski, & Neumann, 2006), due to their expressiveness and ability to trigger users' emotions. Today they are used in different contexts both professional activities (e.g. e-commerce, e-learning, e-therapy, etc.) and entertainment applications and games. It is foretold in academic papers that they are becoming more common to be seen anywhere on the Internet (e.g. as humanoid representations of service agents, recommendation agents (Qiu & Benbasat, 2009), advertising agents (Jin & Bolebruch, 2009), customer service agents, virtual interviewers (Nunamaker et al., 2011), etc.).

Although avatars in virtual worlds (VWs) continue to face challenges with communication, interaction, and technology limitations (Davis, Murphy, Owens, Khazanchi, & Zigurs, 2009), yet there are negligible benefits in their usage and improving their popularity among the users and public (Al-Natour & Benbasat, 2009; Davis et al., 2009). Therefore ISR stream on avatar topic is specifically aimed at presenting effective recommendations that can lead to avatar design improvements.

In 2009 Journal of the Association for Information Systems published an article written by Davis et al. (2009) titled “Avatars, people and the virtual worlds (VWs)”. The paper concentrates on virtual team collaboration, which means that the authors investigate their study mostly for gaming purposes. The group level avatars have complicated requirements for presentation quality, as for the group level the interactions and communications between avatars in VW is required. The research investigated avatars on individual level and interpreted their facial attributes according to the observer's national culture to provide affective avatar design recommendations to international organizations for their future use of avatars.

Recently researchers Diego-Mas and Alcaide-Marzal (2015) proposed a system based on a combination of Artificial Intelligence (AI) approaches, whose training is based on perceptual human responses to a set of generated faces (a kind of image recognition). The authors of this paper propose system that can learn what kinds of computer-generated faces receive the highest trust, or other appraisals. They have collected perceptual human responses of a sample to a set of generated faces to train the proposed system. It is likely that such system will be able to learn through appraisal clicks, which will allow it adapt to specific user needs.

As mentioned, in the paper about avatars, people and the virtual worlds (Davis et al., 2009) the behavioral areas in design of avatars in group level has been investigated. Although individual and group level avatars have significant differences, as Davis et al. (2009) highlighted, there are similarities shared between them. Davis et al. (2009) were particularly interested in those behavioral areas that have the greatest likelihood to be impacted by technology as well as those that impact the outcomes of the design. Specifically, they were interested in behaviors related to the four areas of coordination, trust, role clarity, and shared understanding between team members. This research investigates individual avatars on behaviors related to trust, profession and appearance. They are linked to its target, which is professional use of avatars as employees by organizations.

Moreover, the communication style of an avatar-customer relationship should be considered in detail during the avatar design process. Generally communications are categorized in three groups, Task-oriented, Self-oriented and Interaction-oriented (Sheth, 1976). The second group (Self-oriented) has been obsolete for its inappropriateness and negative academic evaluations even in the real communications (Berscheid, 1994; M. C. Campbell & Kirmani, 2000; Sujan, Bettman, & Sujan, 1986), so it has nothing to do with this group in VWs. Not only avatar interaction attribute can avoid this undesirable situation (self-oriented) (Keeling et al., 2010) but also the third group (interaction-oriented) covers almost all of the attributes in the first group (task-oriented) for the design of avatars. So this research focuses on the interaction attribute of the avatar-customer communication.

The avatar characteristics that are considered important in academic psychology and avatar design are:

- 1 **Trust** - Despite the fact that today there are many vendors selling things online, the information systems and marketing research often overlap. (Jarvenpaa, Knoll, & Leidner, 1998) state that “trust is based on the expectation that others will behave as expected.” In fact Trust is a critical success factor in achieving successful outcomes and it reduces uncertainty in communication with avatars (Jarvenpaa & Leidner, 1999; Zigurs, 2003) therefore it is a valid focus point when evaluating avatar design.

The interaction that is offered on individual level is an opportunity for people to view others and understand a person through his/her non-verbal behaviors (the body language). Incongruence between what a person says with his/her non-verbal behavior, creates difficulty to trust to him/her (Davis et al., 2009).

Avatar-to-observer communication (which is in individual level category) is the ideal method of communication because it is helpful in establishing trust through both verbal and non-verbal cues, as well as verbal interaction (Jarvenpaa et al., 1998; Maznevski & Chudoba, 2000; Strauss & J., 1994). However, since individuals usually do not think about the non-verbal cues they are displaying, non-verbal cues are still hard to control in this type of communication (Davis et al., 2009). In addition, the cultural and personal differences in interpreting both verbal and non-verbal cues make it harder to control.

- 2 **Professionalism** (interaction style and content for the task) - Avatars should have this capability to convey their professional confidence to the observer. They can make their presence known by various non-verbal cues, such as when they sit in meetings, their body language, voice inflections, style of clothing and facial gesture. A service provider; regardless of the service it provides, should look professional in that service it provides.

The task-oriented avatar, as explained previously, is goal oriented, purposeful and aims to complete the task, showing expertise and competence (Williams & Spiro, 1985) and so promoting trust (Crosby, Evans, & Cowles, 1990) to the observer (customer). Recent investigation aims to find out the interpretation and preference of facial attributes and gestures of avatars in different cultures to maximize their efficiency for organizational use in the age of globalized market, specifically at airports.

- 3 **Appearance** - Technological artifacts (avatars in this case) are perceived as social actors, and users (observers in this case) can attribute personality and behavioral traits to them. Such perceptions interact with the observer's own characteristics and personality to evaluate the similarity between the observer and the avatar. Such perceptions of similarity are important because individuals tend to more positively evaluate others (avatars), to whom they are more similar. (Al-Natour, Benbasat, & Cenfetelli, 2006)

Individuals unconsciously attribute human-like characteristics (e.g., gender, ethnicity) to technology and media representations, and apply social rules and expectations when they interact with technologies (Nass, Moon, Fogg, Reeves, & Dryer, 1995).

Besides both Yee and Bailenson (2007) and Banakou, Chorianopoulos, and Anagnostou (2009) have shown that the tendency of people to get close to others and their self-confidence when establishing relationships online are affected by the attractiveness of the avatars in VWs. This suggests, that the interaction with avatars has a lot in common with human-to-human interaction.

Al-Natour et al. (2006) investigate two types of perceived similarity between the observer and the avatar (automated online assistant) as one type of technological artifacts: perceived personality similarity and perceived behavioral similarity. The authors then investigate how design characteristics drive an observer's perceptions of these similarities and, importantly, the bases for those design characteristics. The results of this research demonstrate that IT design characteristics can be used to manifest desired personalities and behaviors in an avatar. Moreover, these manifestations of personality and behavior interact with the observer's own personality and behaviors to create matching perceptions of personality and behavioral similarity between the observer and the avatar.

Al-Natour et al. (2006) emphasizes the need to consider avatars as social actors and describes several specific ways in which technology design can manifest social attributes. In doing so, the authors show that it is possible to match the social attributes of an avatar with those of the human observer.

Dominance is a behavior that is self-confident, leading, self-assertive, and charge-taking. Conversely, submissiveness is a behavior that is self-doubting, weak, passive, following, and obedient (Wiggins, 1979). In particular, dominance is behaviorally marked by: 1) giving orders, 2) making decisions and talking others into following them, and 3) assuming responsibility, which is appropriate for special positions, whilst, submissiveness is behaviorally marked by: 1) being easily led, 2) letting others make decisions, and 3) avoiding responsibility, which are suitable for some other professions (Kiesler, 1983). The opportunity that individual avatar design provides, is the ability to control these critical behaviors and attributes.

These researches, and what is covered in the literature review, studied the importance of appropriate appearance of technological artifacts (avatars in recent investigation). It is expected that cross-cultural differences influence the perceived appropriateness of the avatar appearance across different cultures.

The human-like non-verbal demographic cues that avatars may have in virtual environments, are divided into two types: behavioral and non-behavioral.

Behavioral Cues – A person's non-verbal behavior is any movement or position of the person's face and/or the body. In order to understand any non-verbal behavior, it must be first understood how that behavior became part of the person's repertoire (origin), the circumstances of its use (usage), and the rules that explain how the behavior contains or conveys information (coding). (Ekman & Friesen, 1969)

More recent investigation by (Hall, Carney, & LeBeau, 2005) showed that perceived and actual behaviors were positively correlated.

- **Facial expressions** – Use of virtual agents and avatars is increasing to express emotions in online communications, since it has been demonstrated that they increase the sense of social presence and trust in their observers (Koda, Ishida, Rehm, & André, 2009). In early ages of avatars it was assumed that avatar expressions are interpreted universally among all cultures but (Koda & Ishida, 2006) investigated on an evaluation of avatar expressions interpretation among different cultures. Their results confirmed that cultural differences do exist in interpreting avatar face and body expressions. Since then, the avatar face and body expressions are used to provide purposeful non-verbal cues for individual and organizational goals.

Non-behavioral Cues – Demographic cues, such as gender, age and ethnicity, are non-verbal and non-behavioral cues that are hard to be controlled by the individual due to their inherent nature (Meuse, 1987). By studying the impacts of these cues, the uncontrollable cues in design of avatars can be controlled. In fact, there are strong evidences that the observable demographic characteristics of ethnicity and gender are the most important ones when evaluating another person (H. Lee, Battle, Raina, & Ng, 2006; Qiu & Benbasat, 2010; Taylor, Fiske, Etcoff, & Ruderman, 1978). Also, more studies are needed to investigate the impacts of the other non-behavioral cue of age that can be implemented in RAs.

- **Ethnicity** – Hart et al. (2000) showed that ethnicity stimuli has a key role when participants assess the faces of people from other ethnicities. More recent investigation by Benbasat et al. (2010) confirmed the credibility and validity of this theory on virtual RAs. In reviewing the former researches, no significant investigation was found successful in rejecting the ethnicity theory. Thus, it is expected for anthropomorphic RAs that match the user's ethnicity to be evaluated more likeable and trustable by their observers.
- **Gender** – Another important demographic characteristic that is associated with positive “in-group” perceptions (Benbasat et al., 2010). In previous studies, gender similarity was positively linked to a buyer-seller relationship quality by Smith (1998). Benbasat et al. (2010) studied the effect of gender similarity in the evaluation of RAs with an anthropomorphic interface in terms of social presence. Benbasat et al. (2010) presented a neurological explanation as to why different anthropomorphic RAs that match the user's ethnicity and gender are more likely to be adopted and used differently across genders (Rosen & Jerdee, 1974). Their neurological evidences support the gender and ethnic theories.
- **Age** – As explained previously, several researches suggested that the person's age (Schwab, 1978) and generally demographic cues systematically influence observer ratings (specific to this investigation the aim of this research was to understand the impact of age on perceived expertise (performance appraisal) of the avatar and therefore avatar's trustworthiness).

Clayes and Anderson (2007) and Cowell and Stanney (2005) found that agent's facial features affect its perceived likability. This research skips such details to focus on bigger picture.

2.5 Interface Localization

Cyr et al. (2009) in a series of studies suggested that the existence of human pictures in websites enhance the social presence and trust for the users. The results of this paper show that very subtle visual characteristics can have major impact on success of websites across cultures.

Recently several investigations gained the result that adapting user interfaces to the cultural background of the user enhances satisfaction associated with their use (Benbasat et al., 2010), which can also be seen in higher trust and likability due to familiarity (Cyr et al., 2009).

Cyr and Head (2013); (2009) focused their research on website as a technological artifact and their target was to understand the perception of trust across different cultures by using human images in the website. Their model (Figure 2.3, Figure 2.4) is generalizable and can be adopted to other technological artifacts (e.g. service agents). However, websites are nowadays well understood phenomenon and people today are able to interact with other cultures daily through web and social networks. These researches study large samples of users across cultures and their findings are based on the cultural values theory.

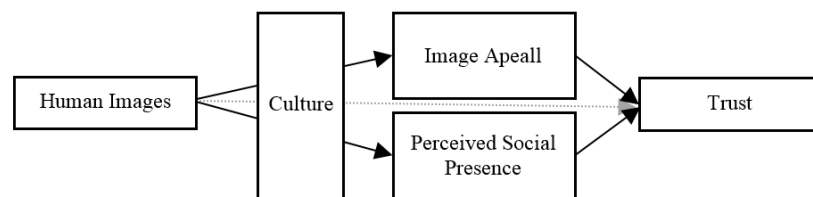


Figure 2.3: Research model for trust on websites with static human images. (Cyr et al., 2009, p. 543)

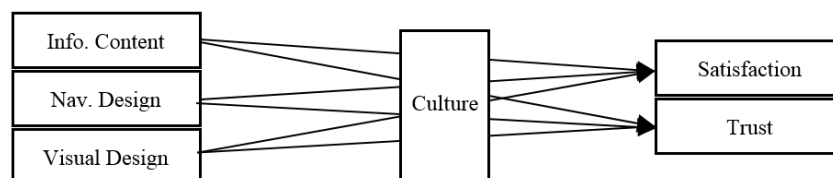


Figure 2.4: Research model for effects of culture on perception of websites. (Cyr, 2013, p. 1360)

Since social components of human-like RAs (humanoid avatars) are important components in their adoption and use by the public users (Benbasat et al., 2010), this study focuses on how the design of the anthropomorphic interface of RAs in terms of socio demographics, namely facial expressions, ethnicity, gender and age, can enhance the avatar's likeability and trust-worthiness in different cultures and therefore to facilitate their adoption.

Baron and Segerstad (2010) did a quantitative survey between Sweden, Japan and USA about the use of mobile phones. They introduced new concepts of personal space, self-expression and frequency of use. Rather than analyzing the use of device itself, they compared the behaviors across the countries and they found that while it is okay to use mobile phone in public in Sweden for calling, in Japan such behavior would be considered rude to others and texting in public is preferred. The results of this paper may affect also the usage of virtual service agents in public spaces, since Japanese tend to respect the public space.

Nunamaker et al. (2011) put effort to understand the impact of gender, facial and body expressions on perception of power, trustworthiness, expertise and likeability of virtual agents. The research model in **Error! Reference source not found.5** has been adopted by researchers in varying forms.

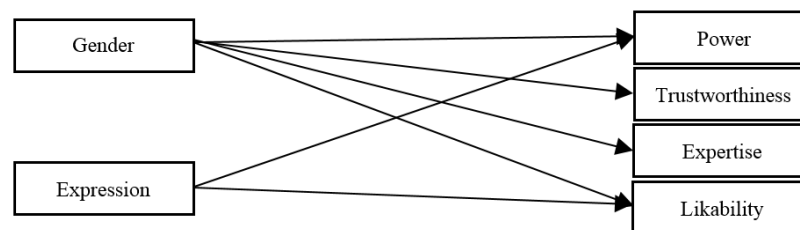


Figure 2.5: Research model for effects of gender and expression on perception of human service agents. (Nunamaker et al., 2011, p. 34)

Nunamaker et al. (2011) proposed an embodied interviewing kiosk Figure 2.6 and tested the research model in Figure 2.5 for the embodiment's avatar, displays on its screen, both behavioral (facial expressions) and non-behavioral (gender) cues. In addition, the authors studied the perceived expertise affecting by the same variables of expressions and gender. They have got convincing findings about perception of gender.

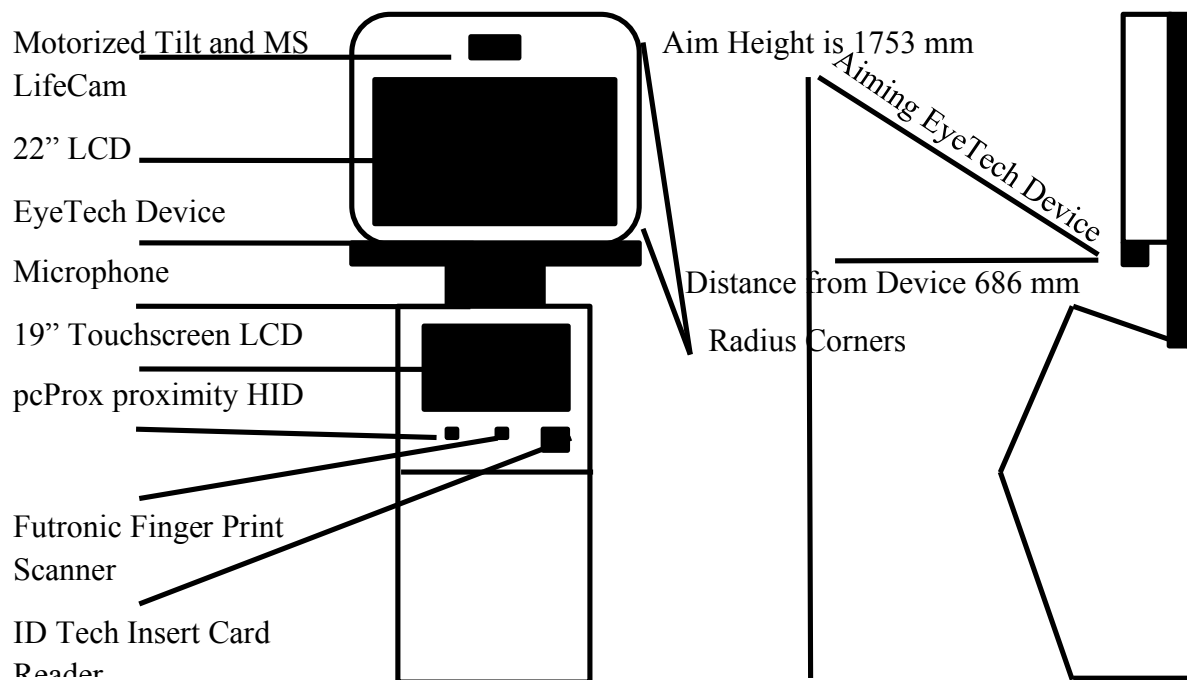


Figure 2.6: Kiosk for automated interviewing. (Nunamaker et al., 2011, p. 19)

What Nunamaker et al. (2011) aimed for was an evaluation of an interviewing kiosk for use at border control, airports, or as a welcoming kiosk for tourists. The applications of this research can go beyond just kiosks. It is an internet of things device with sensors that allow more natural interaction.

2.6 Theoretical Framework

Most of the prior research was done in localization of website design (Cyr et al., 2006). In recent years a new field of virtual agent design is becoming prominent. In the past decade the quality of the avatar research models has improved and the quality of virtual avatars has been augmented from cartoon-like characters to photorealistic human representations with artificial intelligence that can naturally interact with humans (Nunamaker et al., 2011). Potential was found in the field, since there are research gaps that are harder to find in more established domains, like the web.

From the reviewed body of literature the closest attention was paid to virtual agent interface localization, since Nunamaker et al. (2011) and Benbasat et al. (2010) presented a clear framework for measuring mainly visual characteristics of recent virtual agents. While intelligence certainly plays an important role in evaluating service agents, it is rather complex task to obtain a fully intelligent agent. Therefore, these theories were chosen as the most relevant for constructing the theoretical framework for this research.

3 Research Approach

This is the chapter that describes the chosen research approach in detail. Focus is given to the individual methodologies, as well as research strategy. In the end of this chapter it is explained, how the quality and ethics is ensured. The quality considerations are important for many reasons to make the results generalizable and further replicable.

3.1 Research Method

The method used is experiment, based on various cross-cultural studies made in the human-computer interaction and mainly interface localization field. One characteristic of such experiments is that they divide the participants into several same-sized groups corresponding to the studied cultures and the overall experimental design (Cyr et al., 2009; Nunamaker et al., 2011).

The mixed method approach was used due to richness of data that it allows to collect and analyse. For mixed method approaches is characteristic to combine quantitative and qualitative insights (Bhattacharjee, 2012). Qualitative method was used to find answer to the RQ1, since it allows to reveal subtle details of the problem and emphasizes quality of understanding (Recker, 2013). In the end, quantitative method was used to answer the main research question, RQ2. Quantitative research is used, because it is leaning towards positivist way of looking at reality and it allows findings to be more objective and generalizable (Orlikowski & Baroudi, 1991; Recker, 2013). In addition to these primary data, secondary data were collected as comments and dialogue transcripts to facilitate better interpretation of the results. (Bhattacharjee, 2012)

3.2 Research Model

Due to existence of previous research the approach was based on existing model constructs and avatar designs. The existing constructs Ethnicity (ethnic/cultural background), Gender and Expression found in academic literature were linked to each other, because their perceptions vary across cultures, which was also confirmed by the interviewees. A new construct Age, since avatar age is visible to the users and its effect is further emphasized by national culture. Trustworthiness is important when something valuable is at stake, for example in banking transactions, while likability is important in making an affective emotional impression. The resulting diagram is shown in Figure 3.1.

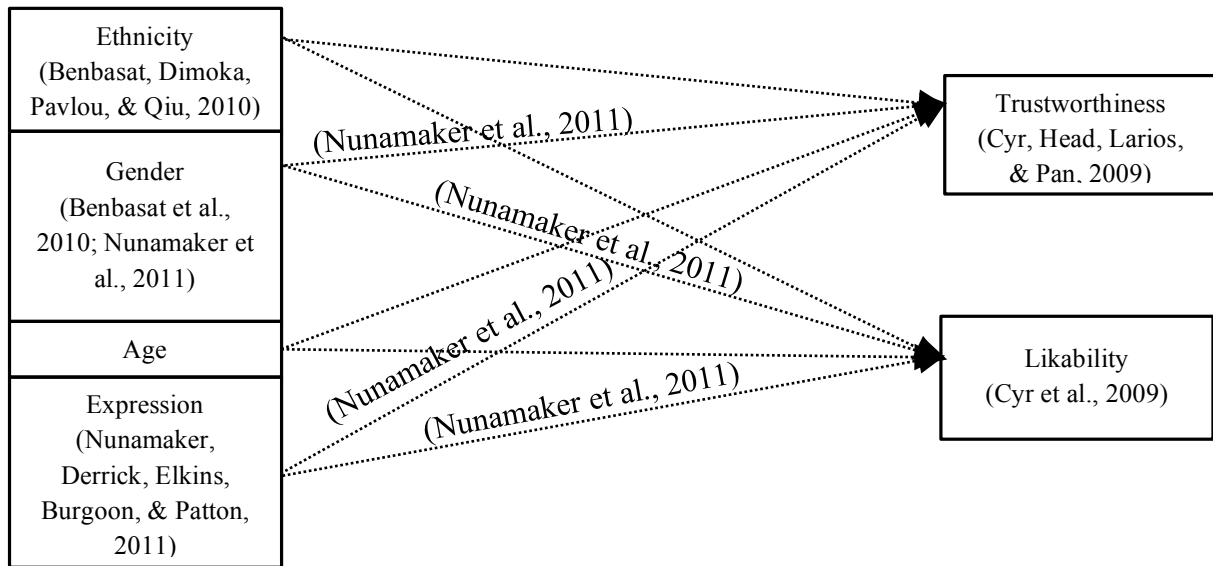


Figure 3.1: Relation of Model to Existing Theory

The constructs were taken and put to test across the Japanese and Swedish culture into the first test. At this point a short interview was conducted with a usability expert from each country. After analysing their responses the model in Figure 3.2 was finalized by adding the Culture construct to differentiate between the two groups.

The goal was to compare Sweden and Japan, which have noticeably different cultures. It was needed to contact a usability expert in each country to conduct an initial interview to support the model and questionnaire design by answering general questions in order to find areas of potential significance for research. They were also the contact persons in distributing the questionnaires in their home country.

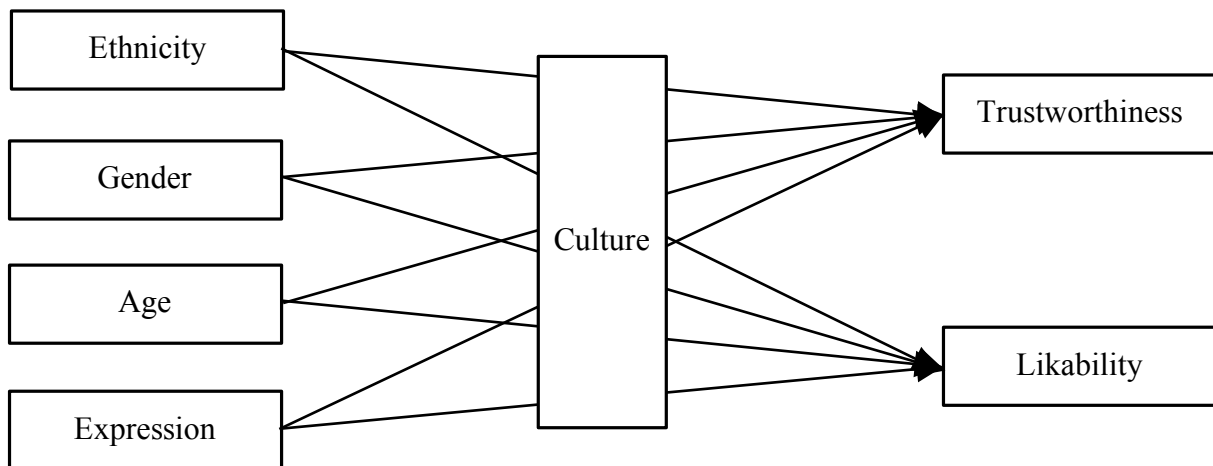


Figure 3.2: Proposed Research Model

3.3 Hypotheses

The hypotheses are based on the 3 research models that were already accepted by the academic community (Cyr et al., 2009; Nunamaker et al., 2011; Qiu & Benbasat, 2009). They were used to capture the influence of avatar's most visible design characteristics on the way how it is perceived by the users in terms of likability, trustworthiness and social presence. Since the purpose was not to evaluate agent's intelligence, the Social Presence construct was dropped from the model. Instead the Culture construct was added, since most of the research on virtual agents is done in US and an up-to-date comparison between European and Asian countries was not found. The list of hypotheses are as follows in Table 3.1.

Table 3.1: Research Hypotheses

ID	Hypothesis	Source
H1	Avatar's Gender affects avatar's likability perception by the observer.	(Nunamaker et al., 2011)
H2	Avatar's Gender affects avatar's trustworthiness perception by the observer.	(Nunamaker et al., 2011)
H3	Avatar's Age affects avatar's likability perception by the observer.	Added
H4	Avatar's Age affects avatar's trustworthiness perception by the observer.	Added
H5	Avatar's Facial Expression affects avatar's likability perception by the observer.	(Nunamaker et al., 2011)
H6	Avatar's Facial Expression affects avatar's trustworthiness perception by the observer.	(Nunamaker et al., 2011)
H7	Avatar's Ethnicity affects avatar's likability perception by the observer.	Added
H8	Avatar's Ethnicity affects avatar's trustworthiness perception by the observer.	Added
H9	The avatar's observer's Culture affects avatar's characteristic perception by the observer.	Added

3.4 Design Space

When the research model was being built, the latest developments in the field were examined and the online tool Sitepal, created by Oddcast, Inc., was found to be the best tool for creating visual representations of the agents. It provides high quality designs with artificial intelligence on the back-end to simulate mutual interaction with the user (Qiu & Benbasat, 2009). Another reason for choosing the tool was the range of designs it provides, which covers all of the design space and a character was found to represent each of the experimental conditions defined by the model constructs, as shown in Appendix F (Table F.1).

During the selection the aim was to find visual representations that are easy for the participants to interpret and that meaningfully represent both countries in the survey. The possible distractions were minimized, so that the participants could focus on the researched design indices when entering their answers.

3.5 Interviews

3.5.1 Interview Design

The interviewees were notified one day in advance to arrange a time with the researchers and the expected duration and topic areas with links were included in the message to allow better scheduling. The interview itself began with a short introductory monologue and the rest was done in a semi-structured way and semi-casually, after which the interviewees were asked to provide their own inputs. The initial interviews from 15 to 30 minutes and each expert was asked a similar set of 6 questions prepared in advance. The interviews were conducted using Skype and a recording was made for each. The questions were structured according the literature, to focus on behavioural and non-behavioral attributes, as well as underlying e-services. The topics were not fixed and extra questions were added to the 6 to ensure dynamism and get the most of each interviewee based on his area of expertise. (Recker, 2013)

3.5.2 Interview Participant Selection

The documented interviewees were four design strategy experts in each of the researched countries. One was academic researcher with research focus on usability measurement. The three others were design strategists with extensive international background, one a foreigner residing in Japan to provide his unique perspective. Their selection was made to increase the dependability of the study. Two were selected from both Japan and Sweden to ensure accuracy. Skype interview was chosen due to the distances, the selection did not decrease the recording quality, but it did not allow non-behavioral queues to be transferred. (Recker, 2013)

Table 3.2: Overview of Interviewees

Name	Role	Method	Transcript	Country	Time
SI1	Design strategist	Skype interview	Appendix B	Sweden	30 min.
SI2	Design strategist	Skype interview	Appendix C	Sweden	15 min.
JI1	Professor	Skype interview	Appendix D	Japan	30 min.
JI2	Design strategist	Skype interview	Appendix E	Japan	15 min.

SI1 is a design strategist with focus on human-computer interaction, media and Swedish culture. Besides his regular job he is an UX entrepreneur and consultant. He is a member of large Swedish IoT professional community.

SI2 is a design strategist oriented on designing digital experiences at a well known design studio. He well understands the Swedish e-service ecosystem.

J11 is professor with extensive experience in ergonomics and human-computer interaction research. His particular focus is on affective engineering, one of Japan's prevalent UX design methods

J12 is a foreign owner of a digital consultancy in Tokyo. His work consists on advising companies how to design their digital artefacts and communication materials for customers outside Japan. He provides his own unique view on Japanese culture

3.6 Questionnaires

3.6.1 Questionnaire Design

The initial questionnaire was longer to measure the time participants needed to complete it and obtain their comments. Those were used to create the final optimized version.

Through feedback from participants from Sweden it was communicated that the survey was too long for them and participants from Japan had problem understanding differences between questions in English. In response the number of questions was reduced to 2 for each construct being measured. One was for subjective impression and the other to evaluate overall societal attitude, which means 4 in total:

T1 - I personally trust this service agent.

T2 - This service agent is generally trustworthy.

L1 - I personally like this service agent.

L2 - This service agent is generally likable.

Due to the cross-cultural context of the survey a question was added to detect where they stand in English proficiency. This was also due to complexities of providing a full translation into Swedish and Japanese. The Japanese users in particular responded that they had difficulties with using English to make comments or interact with the agent. On the other hand they understood the written text with no difficulty.

Also it was discovered in the initial feedback that participants came from different demographic backgrounds, so yet another question was added to measure how frequently they fly. This was targeted at different age groups, who may have less or more regular patterns of using the airport.

Yet, by conducting the survey in English the participants were given the same conditions in both countries due to linguistic differences between them and the fact that the service agent was programmed by its authors to answer questions mainly in English.

In total the survey contained 4 questions for each of the 16 service agents and in addition 6 demographic questions asked at beginning. The full survey including its original layout is included in the screenshots in Appendix C.

A standard used 7-point Likert scale was used to measure the results (Bhattacharjee, 2012). Each scale was mapped to one indicator measuring the research variables. That was the most optimal length, since the scale needs to be able to capture subtle differences in people's taste across cultures and yet it should not have more points than considered optimal in affective engineering, as it could confuse the survey participants and make the survey lengthy. Each end was labelled using a consistent label, with the leftmost end called "Fully Disagree" and rightmost end called "Fully Agree Such design was chosen because the variables needed to take on both positive and negative values. However, it was criticized for its results often being skewed to one side. (Nagamachi, 2010a)

3.6.2 Questionnaire Participant Selection

In the beginning pilot testing was done on a small test sample to estimate the duration of the survey and problems that participants were likely to encounter. (Recker, 2013)

The first group of participants were the researchers' contact people from both countries and their acquaintances. Those were the participants that could be trusted directly, since they were students like the authors of this research and they were their close acquaintances.

Since the survey still lacked participants, it was needed to look elsewhere too. Therefore, online services Prolific Academic (www.prolific.ac) and MicroWorkers (www.microworkers.com) were used, which specialize in online academic surveys and have a large participant pool to satisfy high even demands for participants. Each participant obtained through the services was rewarded \$1.94 as an appreciation for the time they spent filling in the questionnaires. The services have their own verification system and after receiving the responses those that meet the quality criteria of this research could be chosen and based on that the anonymous participants were given their reward. Those that did not meet the quality criteria or conditions were not approved:

- The participant's nationality had to be either Swedish or Japanese, or
- The participant had to be born either in Sweden or Japan

3.6.3 Questionnaire Website Design

In order to make the survey appealing to the participants and make them feel more familiar with the whole project an introduction page was made with information about the project, the motivation and video of existing service agent application at Munich International Airport. This gave the participants an idea of how the service should look like when the final artefact is deployed in their home country. This kind of role play increases the participant involvement by allowing him to imagine the check-in situation. (Schultze and Avital, 2011)

Once the users registered they were transferred to the survey, where they had to answer 4 questions about each agent. To make the situation familiar to them the already researched airport theme was chosen (Nunamaker et al., 2011). An image of a nearby airport was put as the background of the scene (displayed in Appendix C) with the service agent to make participants feel familiar with the context. The service agent already had pre-programmed responses and additional responses specific to the airport context were added to its configuration. Participants were asked to interact with the agent and the agent was able to respond to a limited extent using its built-in artificial intelligence engine. The engine and therefore the responses were same for all avatar designs in the survey, yet each avatar design had its specific voice.

To collect optional data from the participants interactive content was added to the webpage containing the survey. The service agents did not respond only to specific questions asked, but also to other activity, such talking while the participants were filling out the questionnaire to increase the feeling of social presence (Cyr et al., 2009). In addition the optional user comments about each agent were recorded, as well as all questions and answers between the agent and survey participant.

3.7 Research Quality and Ethics

To gain the possibility to add to the body of knowledge, a research must be qualified and credible. Research that is not deemed as credible is improbable to be accepted as a contribution to the knowledge of a particular field (O'Leary, 2004). Research quality is generally demonstrated by reliability and validity (Seale, 1999). Reliability, validity, falsifiability and generalizability of this research are discussed in this chapter. Followed by that, the ethical issues as an external control of the research are considered and explained to readers.

The author of this research attempts to provide an unbiased view through the data collected and rigorous scientific analysis. To critically evaluate them, he uses his personal experience of living 3 years in East Asia and 2 years in Scandinavia.

Several authors have proposed recommendations to improve the research quality in social science. (Klein & Myers, 1999) suggest a set of principles to use to improve the quality of the investigation in interpretive research studies. Regarding quality improvement principles for use in qualitative field studies are as follows (Klein & Myers, 1999):

- 1 **The Fundamental Principle of the Hermeneutic Circle** – Strives for understanding the whole picture as well as specific details of the subject researched. In the recent investigation, the effort was put to understand the impact of culture on perception of demographical cues of service agents and to keep the readers following the research in its different steps.
- 3 **The Principle of Contextualization** – Strives for understanding of the past events in order to understand the present. The literature was reviewed to understand what has been done before in the research area. IS researchers; in the human-like avatar design research area, used several research papers in psychology that lead to the same approach.
- 4 **The Principle of Interaction between the Researchers and the Participants** – Strives for paying extra attention to how the information was obtained by the researcher and calls for closer evaluation of the interaction factors. Participants were requested to put their comments in the provided place in questionnaires if they suppose it necessary to be under more consideration by the researchers. First group of participants were the researchers' acquainted in both Sweden and Japan. Still the survey lacked participants. Therefore, a number of participants was employed to fill in the online questionnaires and rewarded those that gave valid results as an appreciation for the time they spent filling in the questionnaires. In addition, the valid academic online surveys were chosen to provide qualified data.
- 5 **The Principle of Abstraction and Generalization** – Strives for putting one's own findings into the relation with others' work in order to strengthen them and put them into a thread of literature. Hypotheses that are tested in current investigation have been researched before by several researchers. The literature was used to design a new research model based on former researches, so that in the end it could be seen if the investigation supports or rejects the expected results.
- 6 **The Principle of Dialogical Reasoning** – Strives for understanding of contradicting results that might be obtained through different interviews. During the research contact was kept with the experts (those that were interviewed) to be sure about correctness of the data. As the results were surprising, their confirmation was needed to continue the investigation.
- 7 **The Principle of Multiple Interpretations** – Multiple interpretations often exist and the researchers are prepared to deal with them. Despite Sweden and Japan being culturally very different, there are numerous ways how to interpret those differences. Therefore, multiple views are compared to serve as a fair basis for evaluation.

- 8 **The Principle of Suspicion** – Strives for detecting any research bias that may lead to inaccurate results. The research database was cleaned and 6 participants from other countries (else than Japan and Sweden) were deleted. Also 9 uncompleted questionnaires to maximize the accuracy of results were omitted from the results.

Bhattacharjee (2012) declared ethical principles in scientific research as follows that in this research are respected:

Voluntary participation and harmlessness was implemented in the research, anonymity and confidentiality of the participants were supported by the researchers, disclosure, analysis and reporting of the results would be done. This was done for example by coding the interviewee names and asking only for information needed for this research.

There are several principles in interview study that have been followed by the researchers. The interviewees were informed about their rights on not to participate in the survey or to remain anonymous in their participation in the survey. Information was provided to interviewees including details of the interview process. The interview guide was sent to the interviewees in advance. The interviewees were also promised that they will receive results of the research after the analysis process.

Both the interviewer and interviewee were aware of manipulative power of interviews that may be used to dominate over the other or exploit the other's knowledge. There are many types of such unethical abuse of power in interviews, which are described by (Kvale, 2006) that were avoided in this research. The interviewees were participating voluntarily and they were only asked questions relevant to the topic investigated, they were also informed that the transcripts will be published as part of this academic paper with no intention of being used against them, or to discredit them.

For analyzing the quantitative questionnaire results, structural equation modeling (SEM) approach was employed. SEM simultaneously tests both structural and measurement models (Bagozzi, Yi, & Singh, 1991), and provides a more complete analysis for interrelationships in a model (Fornell, 1982). The partial least square (PLS) method was first chosen but the results did not seem convincing to the researchers, so additional methods were employed. (Chin, 1998) and (Gefen, Straub, & Boudreau, 2000) advise that the minimum sample size for a PLS analysis should be the larger of (1) 10 times the number of items for the most complex construct or (2) 10 times the largest number of independent variables impacting a dependent variable. In the proposed model, the largest number of independent variables estimated for a dependent variable is four (for both trust and likeability). The minimum sample size for this study would be $10 \times 4 = 40$ for each country that means 80 in total. Moreover, statistical tests, research design and the choice of variables are under careful consideration during the study to lift up the quality of the research.

Quality in questionnaire survey research is ensured by following the survey research procedure that (Recker, 2013) mentions thoroughly. In most cases this means conducting instrument testing in the form of pilot test and survey randomization. In the research, questions and avatars were displayed in random order and the pilot testing has been employed for the questionnaire.

The basic rule when conducting quantitative research is to avoid any form of unethical behavior that may damage one's own research career and put others at risk. It is common to use disclosure that is presented to the interviewees to understand the aim of the interview and ask them to agree with the terms. (Bhattacharjee, 2012)

In order to avoid plagiarism any forms of intellectual work of other researchers referred to in the final report/publication are properly cited.

In quantitative research historical cases, the intentional modification of the data by the researchers to fit their model is not uncommon. In other cases people are forced to participate against their own will (Bhattacharjee, 2012). Both scenarios are considered unethical and are avoided in this research.

- **Validity** - The literature sources are used and inputted from leading researchers to ensure validity of the research. Based on their suggestions the best practices were identified and used when conducting the research itself.
- **Reliability** - The two sample groups are based on theory from other researchers. As they have done the prior work to conclude that differences between east and west exist, the study was confirmatory in nature and measured their significance.
- **Generalizability** - The current investigation is specific in use of service agents at airports, but the findings can be employed in any professional service agent usage (e.g. in cars, electronic services that require natural language interaction, etc.).
- **Falsifiability** - Similar studies can be done between other groups of countries (or the same countries) with different results by throughout following the approach developed in this study.

4 Empirical Results

This chapter presents the empirical findings. The data were collected over a 2-month period and analysed as they came in. The survey website was the source of any data collected and it was customized during the whole process to accommodate the evolving needs on collecting data and additional information, such as comments and dialogue transcripts. Such information proved to be very useful when interpreting the results and searching for motivations behind the data inputted into the questionnaire.

4.1 Interviews

At the beginning interviews were conducted to determine if the whole survey would bring a meaningful contribution and explore expert opinions in both Sweden and Japan. Experts were found that turned out to be the main support when collecting the results. They helped the researchers to secure survey participants, so they did not have to rely on largely anonymous crowd. The interviews helped to make some unexpected findings that would not be uncovered by relying only on quantitative data. The statement made by the interviewee JI1 at line 8 can be referred to as JI1:8 in this research work.

The first interview conducted was in Sweden and it was largely unstructured. It confirmed that cross-cultural study of virtual agents is a good topic for research, yet it was done in an early stage to ask for specifics. In particular, the learning was that unlike for Japanese it is fine for the Swedes to do the whole survey in English. However, the interviewed expert advised not to make the survey very long, since people in Sweden generally prefer shorter surveys than in Japan. This interview was mainly unstructured, so a permission to publish the whole transcript was not requested.

In comparison the interview with Japan was structured into 6 questions and a clear research plan was already drafted. The answers also differed from those that were obtained during the interview with Swedish expert. First of all, Japan is a society known for its technical advancement and attitudes to technology significantly different than those in countries with Western culture (JI2:2). One of the findings was that Japanese people are more used to interact with affective technology and attempts to create electronic service agents can be dated back to 1980s. The most important quality that Japanese users are looking for in affective agents can be interpreted as cuteness, youthfulness or attractiveness (JI1:18). The emphasis on such affective qualities is higher than that placed on trustworthiness, since Japan is considered very safe. Since Japan is a quickly aging society, one of the biggest challenges is to make new technology suitable for use by elderly (JI1:8).

In general, the interview results contributed to better understanding of the data collected and make proper decisions when doubts existed in how to interpret the results. For example, they were used to make decision to include more elderly people in the survey, since both Swedish and Japanese societies are aging faster than the rest of the world. The elderly users are both the biggest challenge for virtual service agents and the biggest opportunity, since the agent systems use natural form of interaction and can assist the elderly and provide them social contact in times they are feeling lonely (JI1:8).

4.1.1 Interviewee Views on Ethnicity

In the interviews 3 participants mentioned, according to data presented in Table 4.1, that the ethnical attributes of the agents should be explored. In Japan because of their very unique culture, own way of communicating, lack of communication skills with other cultures (JI1:8), or even fear (JI2:2). Users in Sweden may simply prefer a familiar face (SI1:34).

Table 4.1: Interviewee Views on Ethnicity

SI1	JI1	JI2
“...for example the characters of childhood, like Bamse, or for example the Pippi Langstrumpf, these kinds of characters can be fun...” (SI1:34)	“Unfortunately the elder population in Japan, they are good in understanding English but they have a kind of fear in pronunciation of the foreign language.” (JI1:8)	“...so it's not the same kind of experience and they would go into that protection mode, where, let's say, they will stop interacting...” (JI2:2)

4.1.2 Interviewee Views on Gender

When it comes to the gender in Table 4.2, the findings are consistent with findings of Hofstede (1980), where Sweden is seen as more gender neutral. The interviewees added that it is not always true (SI2:24) and usually the function decides (SI1:40).

Table 4.2: Interviewee Views on Gender

SI1	SI2	JI2
“I think that the best to decide this is the function, if it works, if you receive the relevant answers from that, that works best.” (SI1:40)	“...if users would call some mechanical shop to book a time for their car, they would probably subconsciously prefer a male voice, but that's because we have a gender unequal society.” (SI2:24)	“...it should be really nice voice, this I'm talking from experience, like a lady, which speaks the very polite way...” (JI2:8)

4.1.3 Interviewee Views on Age

The age attribute has been also highlighted as a source of potential differences between the two cultures in Table 4.3. As Japan is known for its preference in cute and youthful designs, this translates also to virtual agent design (JI1:24), the people do not want to feel threatened (JI1:18). Older character would work better in Sweden according to an interviewee (SI2:20).

Table 4.3: Interviewee Views on Age

SI2	JI1
“I think older people would work as an avatar, an older person would probably work better in Sweden.” (SI2:20)	“So many kinds of the younger and cuter samples are typically accepted by Japanese people.” (JI1:24) “You know making people younger and smaller, Japanese people attend to more attractive and cute. More cute means to them that it is a safe place and deduce a feeling of security to them.” (JI1:18)

4.1.4 Interviewee Views on Expression

Both Sweden and Japan have different ways of expressing emotions in Table 4.4, so comparing their responses may require a professional testing environment. Generally, both prefer a positive attitude (SI1:58), (JI1:18), but Japan has its own specifics in how they communicate emotions.

Table 4.4: Interviewee Views on Expression

SI1	SI2	JI1	JI2
<p>“...the smile and this positive energy is something that is very good and you can apply it in this kind of conversation with these robots, etc., ...” (SI1:58)</p> <p>“...in the States you can put (funniness) high, but in Sweden lower, because even as a human experience, here it's not that easy to just make fun, or just make people laugh to something ...” (SI1:62)</p>	<p>“I think positive attitude, service level and willingness to help.” (SI2:26)</p>	<p>“In Japan robots and virtual agents are designed very very cute and you know the Japanese animations.” (JI1:18)</p>	<p>“It's rather on emotional level, they express emotions through the sounds” (JI2:2)</p>

4.2 Questionnaires

The total amount of participants was 80 for Japan and Sweden put together after filtering the invalid and incomplete questionnaires. The design attributes for each avatar were coded using capital letters and the definition of the values is in Table 4.5.

Table 4.5: Variable Coding

Variable	Value	Meaning	Value	Meaning
Ethnicity	A	Asian	C	Caucasian
Gender	M	Male	F	Female
Age	Y	Young (20-40y)	O	Old (40-60y)
Expression	S	Serious	S	Smiling

The analysis began by getting to understand the participants. Since there were two groups, it was possible to see results for both countries separately and for the whole population of participants, as displayed in Table 4.5. Both of the participant groups were similar with both young and old age groups represented and average age was higher in Sweden.

Duration of survey was longer for elderly people, who took more time to take the survey than younger participants, who often took less than 10 minutes to fill in all the answers. On the other hand, an elderly participant once even exceeded the allocated time limit, which was 40 minutes.

Other collected descriptive statistics were the English level and frequency of flying. Some values are missing, since both were added to the survey later after the pilot runs. Since part of the participants came from websites with English as the main language, it can be attributed to high overall language proficiency observed. Also, international students and people working in academia were asked.

The overall sample of participants was near-evenly distributed across the chosen demographic variables – age, gender and country. The descriptive statistics are presented in Table 4.6.

Table 4.6: Participant Demographics

Demographic	Japan	Sweden	Total
Mean Age	27 (18-63)	36 (21-80)	32 (18-80)
Gender	Male: 23	Male: 19	Male: 42
	Female: 17	Female: 21	Female: 38
Survey Duration	8 min.	6 min.	7 min.
English Level	Advanced: 10	Advanced: 16	Advanced: 26
	Intermediate: 18	Intermediate: 15	Intermediate: 33
	Beginner: 8	Beginner: 4	Beginner: 12
	None: 0	None: 0	None: 0
Frequency of Flying	Monthly: 4	Monthly: 5	Monthly: 9
	Yearly: 12	Yearly: 19	Yearly: 31
	Seldom: 18	Seldom: 11	Seldom: 29
	Never: 2	Never: 0	Never: 2

It was observed that the average response per country was different in both cases. The difference was around 0.5. This was observed for all variables might have affected the results. It might have been subconsciously, since no specific reason was found for the differences shown in Figure 4.1.

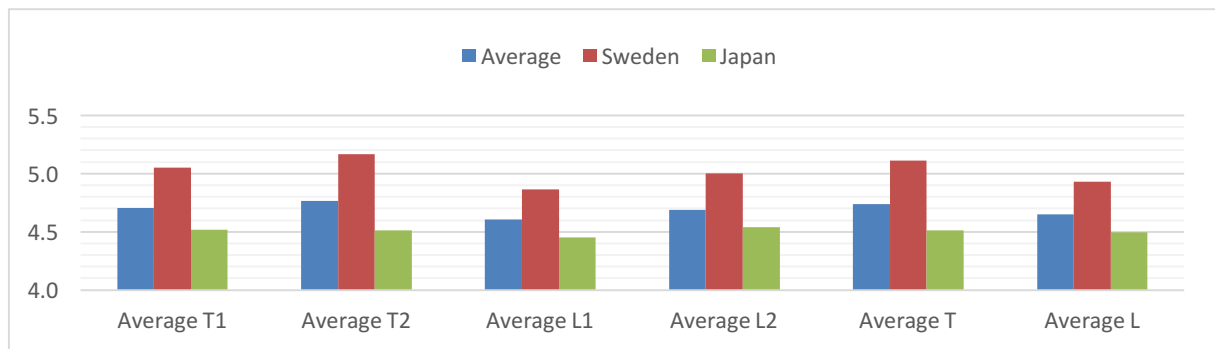


Figure 4.1: Average Response for Each Country

After the pilot tests it was possible to further optimize the survey based on obtained feedback. Comments were about the lengthy duration of the survey and some participants had problem recognizing between facial expressions of the avatars. Since other researcher also reported similar issue with insignificance of facial expressions, it was resorted to making two variants of the survey, one with smiling avatars only and other with serious avatars (Nunamaker et al., 2011). That helped to reduce the number of avatars to be graded by each participant from 16 to 8, reduce the total number of responses needed to what is displayed in Table 4.7 and made less participants abandon the survey before its completion.

Table 4.7: Conditions

Condition				N	Trustworthiness		Likability	
Ethnicity	Gender	Age	Expression		Mean	St. Dev.	Mean	St. Dev.
Asian	Male	Young	Serious	33	4,7	1,3	4,7	1,5
Caucasian	Male	Young	Serious	33	4,6	1,5	4,7	1,4
Asian	Female	Young	Serious	33	4,2	1,7	4,2	1,9
Caucasian	Female	Young	Serious	33	4,8	1,3	4,6	1,5
Asian	Male	Old	Serious	33	5,1	1,5	5,0	1,5
Caucasian	Male	Old	Serious	33	5,2	1,3	4,9	1,3
Asian	Female	Old	Serious	33	4,6	1,6	4,6	1,6
Caucasian	Female	Old	Serious	33	5,3	1,6	5,1	1,5
Asian	Male	Young	Smiling	47	4,1	1,7	4,1	1,8
Caucasian	Male	Young	Smiling	47	4,8	1,2	5,0	1,1
Asian	Female	Young	Smiling	47	4,9	1,4	5,0	1,3
Caucasian	Female	Young	Smiling	47	4,5	1,6	4,6	1,6
Asian	Male	Old	Smiling	47	4,0	1,5	3,8	1,4
Caucasian	Male	Old	Smiling	47	4,8	1,2	4,6	1,2
Asian	Female	Old	Smiling	47	5,5	1,3	5,1	1,4
Caucasian	Female	Old	Smiling	47	5,0	1,5	4,7	1,6

Model testing was done to test the model integrity and no significant problem was found with the model other than that the errors could be reduced, as shown in Table 4.8. Other researchers studying the same phenomenon also had higher significance, which can be attributed to their larger sample size and therefore higher statistical relevance (Cyr et al., 2009)

Table 4.8: Partial Least Squares Structural Model

Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Trustworthiness	32,307	4	8,077	3,685	0,006
Likability	11,949	4	2,987	1,307	0,266

The principal component analysis (PCA) was done to determine the optimal number of components in the model. Due to the smaller number of variables in the model, the analysis was done only for two components and Table 4.9 shows that the two components did cross-load and affected one another. Ideally the components should be independent and a clear distinction should be possible between them.

Table 4.9: Component Matrix

Variable	Component	
	1	2
T1	0,910	0,298
T2	0,896	0,351
L1	0,900	-0,342
L2	0,911	-0,305

It was resorted to pursue additional methods of checking the component validity. Checking the correlations between all variables gave an insight that the variables that were meant to correlate did indeed have stronger correlations in Table 4.10. The table shows T1, T2 and T have a strong correlation and the same holds true for L1, L2 and L. Therefore, trustworthiness and likability were separated in two constructs that have stronger correlations within themselves, than with outside members.

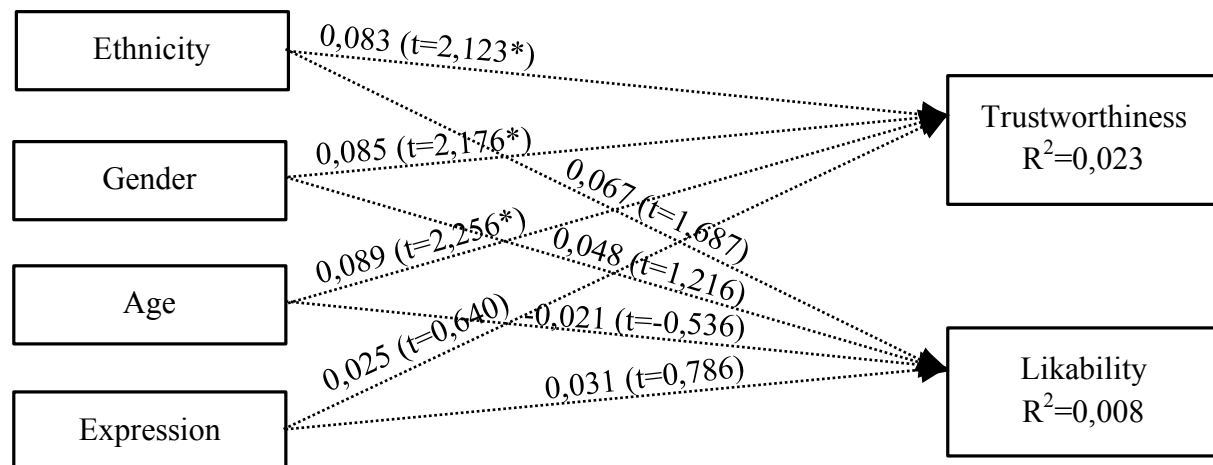
Table 4.10: Correlation Matrix

	T1	T2	L1	L2	T	L
T1	1,000	0,870	0,728	0,790	0,968	0,784
T2	0,870	1,000	0,755	0,727	0,966	0,765
L1	0,728	0,755	1,000	0,877	0,767	0,968
L2	0,790	0,727	0,877	1,000	0,785	0,969
T	0,968	0,966	0,767	0,785	1,000	0,801
L	0,784	0,765	0,968	0,969	0,801	1,000

The model is valid and it can be seen that the relationships between its components are statistically significant. Inconsistencies were caused mostly by the number of participants, which was around the minimum threshold and also the way the data were collected, since it took a long time to go from the initial pilot test to a survey that would accommodate all collected needs. The needs were constantly evolving and for example when connecting to an external service to get access to their participant poll was slow, since modifications were needed to be done the survey and its website to pass their screening and get approved. That made the survey well integrated with the services providing survey participants and it would allow to achieve more significant results, if more days were allowed for running the survey.

4.3 Overall research results

The purpose of the survey was to measure impact of the design attributes on the perception of avatars by users in different national cultures. To do that the participant poll was divided into two groups. However, in order to understand the data as whole the analysis of the data was done first for both groups merged together to detect patterns that were common for both Japan and Sweden. Results are summarized in Figure 4.2.



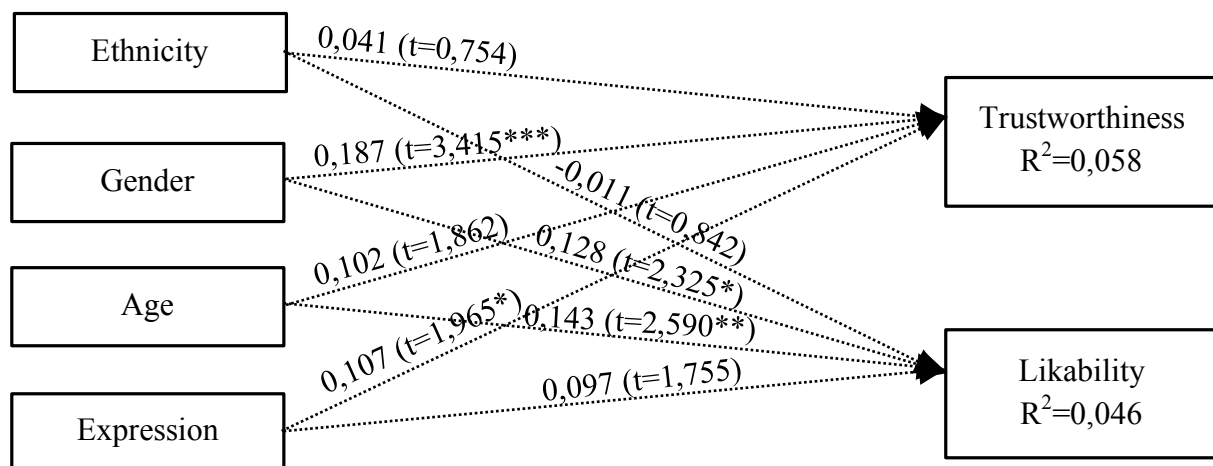
*p-value < 0,05 **p-value < 0,01 ***p-value < 0,001

Figure 4.2: PLS Structural Model

The figure above shows that all design attributes had measurable effect on the trustworthiness assigned by participants, except the expression. As explained before, this could be caused by participants either not seeing it as significant factor or, as it was observed during the pilot survey, by participant fatigue after doing the survey with all 16 designs.

4.4 Sweden results

The results obtained from the Swedish participants are presented that were consistent with the results that researchers observed in other western countries. Most surprising was the strong preference for female characters and seeing them as more likable and trustworthy. This is consistent with findings by Hofstede, who classified Sweden as a feminine society with high degree of equality between genders and their representation in the society (Hofstede, 1980). Figure 4.3 shows the significance of the finding.



*p-value < 0,05 **p-value < 0,01 ***p-value < 0,001

Figure 4.3: PLS Structural Model for Sweden

Other findings were consistent with the results of other similar surveys done in western societies. Ethnicity had the least significant role, which also reflects the overall societal values of acceptance of others and tolerance (Hofstede, 1980).

The preferences expressed by the participants in Sweden can be translated into service agent design with emphasis on the traditionally more feminine design attributes, which are different from those expressed by users in more masculine countries (e.g. Japan) (Cyr & Head, 2013). Users in these countries value quality experiences, work-life balance and quality relationships.

4.5 Japan results

As it was expected, the results obtained from Japan varied significantly and in a way that could be measured. The same model was used for Japan, as the one used for Sweden. The role of gender was in this case negligible, which did not correspond to the country's description as very masculine in previous research (Hofstede, 1980).

However, a finding was made in Figure 4.4 that Japanese participants liked the young avatar designs more, but did not necessarily find them more trustworthy. This is the most significant research finding for Japan and it is also consistent with the interview with Japanese expert, who emphasised that cuteness and youthfulness have a very important place in Japanese society and affect how people think when interacting with other people and devices.

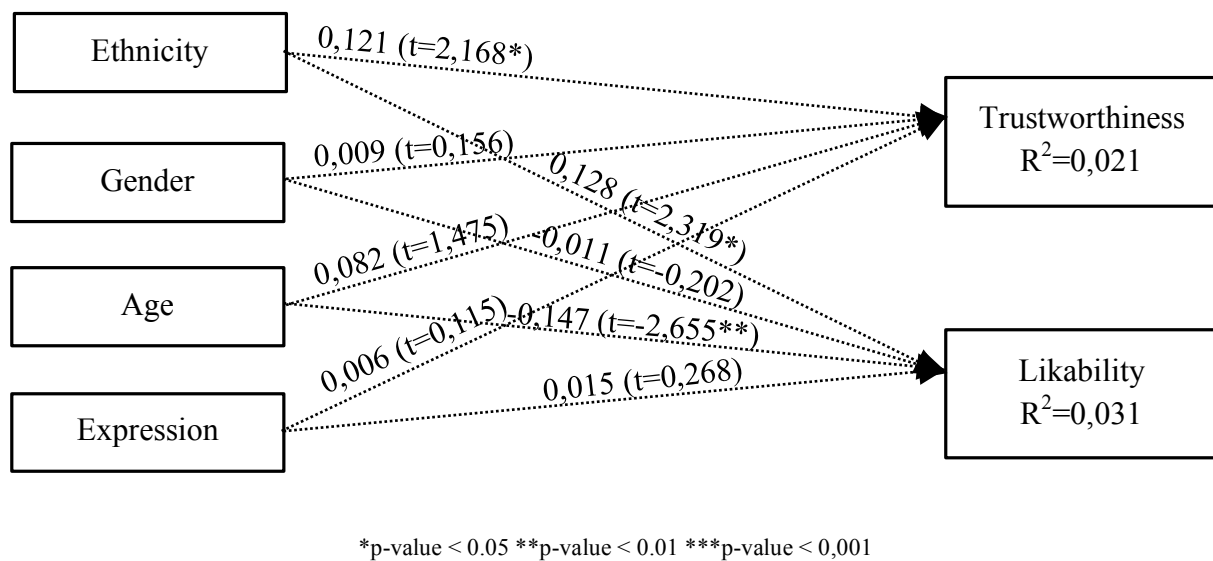


Figure 4.4: PLS Structural Model for Japan

An interesting finding was about the role of ethnicity in perception of avatars. This finding is also hard to attribute to any of Hofstede's cultural indicators, since Japan is a homogenous society and it may be rather expected to see preference for agents of other than foreign ethnicity. However, after deeper analysis it was found that the preference was due to the participant's interest in foreign cultures, the novelty effect of foreign faces and belief that they make the airport seem more international.

The results obtained for Japan were rather different than those obtained in Sweden and United States by other researchers (Benbasat et al., 2010; Nunamaker et al., 2011). The differences can be attributed to Japanese culture, which is rather complex due to its own past and cannot simply be described by cross-cultural models that tend to oversimplify it. There were two cultural factors unique to Japan that have shaped the results.

The data signified that when designing virtual service agents for users in Japan the traditional Japanese values of cuteness and usefulness should be considered, but the novelty effect of foreign appearance can make a positive impact. Japan is also a good example of a country, where the newly added age construct has proved to be useful, since in Asian societies age is considered differently and respect is shown to the elderly and youthfulness is seen as something particularly desirable. It is a paradox, since Japan is seen in Hofstede's work as a very masculine country, which was not reflected in the design preferences.

The findings consist primarily of the questionnaire study results and findings based on the mixed method research methodology, which puts together various approaches that can be used to back each other. While some findings were presented in the previous chapter during analysis, here they are presented in the form of an executive summary.

4.6 Quantitative Findings



The findings were valid from a quantitative perspective and the model was proved to be valid in the way it was proposed. Table 4.11 summarizes the findings of quantitative character.

Table 4.11: Quantitative Findings

Name	Hypothesis	Status
H1	Avatar's Gender affects avatar's likability perception by the observer.	Valid
H2	Avatar's Gender affects avatar's trustworthiness perception by the observer.	Valid
H3	Avatar's Age affects avatar's likability perception by the observer.	Valid
H4	Avatar's Age affects avatar's trustworthiness perception by the observer.	Valid
H5	Avatar's Facial Expression affects avatar's likability perception by the observer.	Invalid
H6	Avatar's Facial Expression affects avatar's trustworthiness perception by the observer.	Valid
H7	Avatar's Ethnicity affects avatar's likability perception by the observer.	Valid
H8	Avatar's Ethnicity affects avatar's trustworthiness perception by the observer.	Valid
H9	The avatar's observer's Culture affects avatar's characteristic perception by the observer.	Valid

This is consistent with the findings of Nunamaker et al. (2011) and Benbasat et al. (2010). It also does not interfere with the findings of the interviews. A young male character (CMY code) was the highest rated choice for Japan, while an older female (CFO code) was the highest rated for Sweden. The same character that was highest rated in Japan was rated lowest in Sweden, which may be attributed to his youthful appearance. The results will be further discussed in next chapter.

Table 4.12: Highest Rated Service Agents

Japan	Sweden
	

5 Discussion

The individual results were presented in two sets of results that complement each other. To be able to fully interpret the survey results, links to interview responses and other academic literature need to be established in a form of discussion. In this section the qualitative findings due to their explorative nature add meaning to the quantitative findings. Contributions to information systems and businesses will be discussed, as well as future research directions.

5.1 Empirical Findings

In this research heavy emphasis was placed on the avatars and that can that can be considered both as a strength and a weakness. The visual interface is the primary touch point with the service. Other non-visual attributes, such as intelligence and social presence of the virtual agents are hard to measure and even harder to simulate, but their measurements can be found in works of Nunamaker et al. (2011) and Benbasat et al. (2010).

The key measured difference between the Swedish and Japanese users was their preference for older versus younger avatars this was repeatedly confirmed in the quantitative findings and interviews (SI2:20, JI1:18, JI1:24). This proved to be so significant that the highest rated avatar in Japan was among the lowest rated in Sweden. Therefore, Japanese human-computer interaction designers try to build these preferences into their products and therefore the strong focus on affective engineering (Nagamachi, 2010a). Furthermore, their design approaches are different than in Sweden and they manage the cognitive load of users differently (JI2:12).

While Swedish users place emphasis on the function (SI1:40), in Japan the avatar's affective attributed, such as character and persona, play a relatively higher role (JI2:10). While the interviewee confirms Hofstede (1980) claim that Japanese users have high uncertainty avoidance and pay strong attention to details (JI2:12), trust in the agent is not one of their primary concerns, because Japan has a trustworthy society (JI1:28).

One of the key factors, that affected the quality of the results in quantitative survey was the lack of good English knowledge by many of the Japanese (JI2:2). Japanese tourists may not have the advanced English knowledge, but they may prefer to seek help from an automated kiosk, when traveling abroad (JI1:8). Having a localized Japanese version of their agent at a Swedish airport would improve their travel experience.

In demographically homogenous Japan being a foreign carries a certain social stigma (JI2:2), not only for people, but also products. This can be in some cases good, because it brings a sense of novelty, for example the foreign-looking service agents and they were successful, perhaps of the youthfulness of the highest rated design.

The choice of research of the airport kiosk was challenged by the interviewee (SI2:36). While it may not be the best example, there was a large body of literature around the airport theme and it is easy to reproduce the scenario. In the original article Nunamaker et al. (2011) tested it in the US, where there are strict immigration policies and the welcome agent would double as a fingerprint sensor.

5.2 Managerial Implications

Companies may be considering whether to localize the service agents or stick with one version. While one universal design may be better than no design at all (SI1:34), the global trend towards emotional branding and multimodal interfaces highlighted by Gobé (2009) will push the bar higher, since the best user experience for most users is achieved, when something feels familiar and the interface feels local (JI2:14). Users today deserve polished digital interfaces and not the machine-like that they still remember from over 10 years ago (SI2:12).

In case of Japan, many cultural specifics need to be overcome (JI2:2), which may come at a price. Japan has its own home-grown start-up scene with companies designing robots and other affective IT artifacts to match their affective demands (JI2:16).

The most likely way to localize these virtual service agents is by adjusting their algorithms (SI2:30). This would apply mainly to the behavioural characteristics, like social presence and intelligence. The non-behavioral changes can be achieved by modifying the front-end only and thus a company can communicate its desired message. (Nunamaker et al., 2011; Benbasat et al., 2010)

Both Sweden and Japan, countries known for early technological savviness, were compared and saw their people's attitudes towards the use of this technology were measured in the airport scenario familiar to everyone. Companies willing to do research into virtual agent localization may use this research approach to provide them with both a framework to obtain new ideas and to back them with solid quantitative findings developed from tested models. (Nunamaker et al., 2011; Benbasat et al., 2010)

Although it is very unlikely, since both users in Sweden and Japan have no aversion against talking digital characters, it is also good to read about the possible wrongdoings in trying to humanize brands, Puzakova et al. (2013) mentioned a few counterexamples in product design in general, which can be applied to service agents.

5.3 Future Work

As it was already mentioned in this text, this field is expected to grow in the coming decade and there already are vast opportunities for research combining multiple fields, typically including information technology, psychology, artificial intelligence and marketing. Service agents will soon become available on Internet of Things devices, that require hands-free interaction and contain sensors interact with the outside environment, this will allow creation of new e-services:

Connected Cars – In the past decade the most significant innovations in automotive industry were those that involved some form of information technology (SI2:34). With car information systems growing ever more complex and intelligent the need for some kind of smart agent to control them increases. The agent should help to supplement existing button- and touch-based interfaces and make interaction possible through exchange of natural language. Car manufacturers (JI1:32) are doing research not only on the technical side, but also how to communicate their brand values into the overall user experience.

Care for Elderly – Both Sweden and Japan are quickly aging societies and they have increasing need for taking care of the elderly. These people often lack the technological literacy of the young generation to use mobile phones and computers and they also may lack social contact if they are disabled. Virtual agents could solve problems in both scenarios, since they are very easy to interact with (JI1:8) and they can act as a substitute for social interaction when needed. Some of the agents tested are already smart enough to engage in meaningful conversations.

Cross-Cultural Surveys – Understanding how culture affects the perception of virtual avatars and interaction with them. People in America, Europe, Asia and their sub regions have different preferences for methods of interaction and their attitudes towards to the new technology may range from positive to negative. It is necessary to understand preferences both regarding visual appearance and social presence.

Connected Tourism – With the growth in global tourism people are traveling to hotels and expect a certain standard of service. The service agents are available non-stop and they can modify their behaviour based on the context. Similar technology can be deployed at airport, immigration control, tourist information stands and places that are contact points with customers, or in this case tourists.

Automation – Also for some of the more routine tasks, a virtual service agent can provide benefits to the business and its customers (JI1:30, JI2:2). Advantages are that routine requests are easier to interpret by the agent's artificial intelligence.

6 Conclusion

This research introduced the broader social implications, that should be considered, when designing virtual service agents in Sweden and Japan. Virtual service agent software can be used by different target users, in different application areas to create immersive experiences. Previous research results were confirmed that age, ethnicity and gender of the agents had different impact on perceived trustworthiness and likability in the two studied countries.

The varying effects of virtual service agent representations on users in Sweden and Japan were demonstrated by rich data collected using two methodologies. While companies may choose to make their services global or local, they will face market-specific expectations. In order to deliver the optimal user experience, they should use the results of multi-method research like this one to make sure they understand their target customer and are able to deliver the optimal experience to his/her preferences. The model was developed based on recent developments in the field, the surveyed user sample is current and the latest available virtual service agent technology was used to collect the results.

The findings are mainly aimed for use by future designers and researchers to design service agents that are consistent with the culture of the destination country. Since the definition of a virtual service agent is not yet widely adopted, the research findings are generalizable to a variety of application domains to create natural language interfaces. Although a very specific airport example was used to ensure validity of the results, the results are generalizable and reproducible in other domains.

Appendix A

Interview guide

The 6 topics to be covered:

1. What are the key considerations when designing virtual service agents?
2. Should virtual service agents be intelligent?
3. Should virtual service agents be human-like?
4. What visual characteristics of virtual service agents are important?
5. What user emotions should be considered?
6. What is the current state of electronic service technology in your country?

It is possible to do the interview almost entirely without preparation, keep in mind that the topic is **“Indices for virtual service agent design: evaluation between Sweden and Japan”**. The answers should be mainly about applications at airports in Sweden (but you can also think of others - home, etc.) and try to think beyond the current technology.

Best preparation would be to go through the 3 links below and the pdf with a reference transcript.

Social web of things: <https://www.youtube.com/watch?v=i5AuzQXBsG4>

Social web of things 2: <https://www.youtube.com/watch?v=z1Iq7nGRmiI>

InfoGate project at Munich airport: <https://www.youtube.com/watch?v=H6PfHyGyJiQ>

Your anonymity will be taken care of, but the transcript will be available to the public inside the thesis.

Appendix B

Digital Strategist (Interview Transcript)

SI1: Digital strategist, UX consultant, entrepreneur in Sweden.

P: Peter Gerhat

N	P	Text	Code
1	P	Hello.	
2	SI1	Hi, how are you doing?	
3	P	Yes, I'm doing pretty good at this time and you?	
4	SI1	Nice, I'm fine too. I tried to call you, but it seems that there was a problem because you called me and then there was no response and then now we hear each other.	
5	P	Alright, unless you have I don't know Wi-Fi or something...	
6	SI1	Yeah, I have my iPad, so I think now I can hear you clearly, can you hear me clearly as well?	
7	P	Yes, I think the hearing is good. I was thinking of would it be better to have video on if you would like to present something?	
8	SI1	I think the voice is okay and we didn't talk about showing something, it was going to be an interview.	
9	P	It supposed to be an interview, right.	
10	SI1	Yeah.	
11	P	Okay, you got the introduction to the topic, which I guess you have read before.	
12	SI1	Yeah, a transcript and some links.	
13	P	Okay, do you understand what the topic is about?	
14	SI1	The topic, you have to clarify yourself again, before it was going to be something about virtual reality agents and artificial intelligence, etc., but if you would like to clarify it I'm listening.	
15	P	So, the topic... we will be talking about virtual service agents. You can imagine something like Apple Siri and we would like to put it into Swedish context with focus mainly on international airports in Sweden and how these virtual service agents can be used at airport information desks.	
16	SI1	Yeah, I got it	
17	P	Alright.	

18	S11	<p>So, I would like to just stick to my plans about this kind of services. I think here in Sweden some companies, like online companies, they use this kind of virtual characters to communicate with their customers, or potential customers. Like, for example when you want to order a new phone, mobile phone for yourself, or etc., for example in Telenor they usually have some character that communicates with you and as people communicate with this kind of computer characters easier, it's good for a company and for the customer and also other companies now they are copy-cattng the same thing, so it's going to be maybe a trend for a while, but when it comes to airports, I think it's not only Swedish people, because at Arlanda people come to Stockholm from different countries and even here at Kastrup, which is mostly in southern part of Swedish people, they use this airport. If it's going to be the use of this kind of animations, or characters that people are usually are under stress, I don't know how it can be useful and how much people can rely on it.</p>	Applications
19	P	<p>Alright, well in terms of airport, it could be a good way to demonstrate people the Swedish culture and to give a warm welcome to them, as opposed to giving them some kind of just click-based agent, or it would help to, first of all, reduce the workload on the airport staff, because they are unable to serve each customer personally and, on the other hand, also it's a kind of more personal greeting for let's say a traveler in this case.</p>	
20	S11	<p>From my point of view, the usage, or the case for something like airport is totally different, when it comes, when comparing for example to shopping, or buying a new phone, because when you want to just know which gate you have to take for your flight, you would like to trust. And if someone face to face says something, you do trust easier and it's going to be less complicated for lots of people, who are not even familiar with this IT stuff and not maybe even interested to use it. It's going to be a good way, as you said, for for example welcoming, but I think that in Arlanda there are lots of portraits of famous Swedish people and that when you are just going in through the gate, you can see somehow different welcome from ABBA till for example different new characters at the moment. But just to clarify for myself, is it going to be somehow as welcoming? Because in that way it's fine, or is it going to be somehow to use as a replacement to information desk in airport, you know what I mean?</p>	
21	P	<p>Yeah, it would be kind of an alternative for those customers, who have more time to spare to go through this personal process. Of course airport is not a place, where everything should be personal, with that I fully agree.</p>	

22	S11	<p>Yeah, because honestly I didn't feel that it works in any country, like in near future, to use this kind of things. Not Sweden, not even Japan, which are very familiar with this kind of... even they have like girlfriends with a character, you know, animation, etc. Airport is a place, where people from different cultures, from different countries, they communicate and they would like to be informed as accurate as possible and till now, as you know, this technology is not that accurate as a real human. In Siri in English language when you just ask some questions, it cannot get what you exactly mean. It is fun in a way, but when it comes to, for example something like airport, which is more sensitive, maybe, I doubt that it works, at least in near future.</p>	
23	P	<p>Alright, so the discussion should also focus on the cultural factors and, as you have mentioned, I would like to compare the preferences of Swedish users and Japanese users in terms of the agents' design and, apart from the airport context, I would like to also imagine the alternative usages for these agents and whether they would fit into the Swedish culture at all and what type of representation should the agent have. Okay, so not only the airport context, I gave you some links, where you could have seen a whole household made of objects that can communicate through voices, for example the vacuum cleaner.</p>	
24	S11	<p>Yeah, I saw that, it was... it was somehow interesting, but again I do like to put it in reality check. For me as a user, who has lots of this kind of high-tech devices, like lots of MacBooks, or different mobiles, or WhatsApp, or iPad, etc., somehow even charging them, like a smart watch, because when you have lots of devices, you have to manage charging them, because all of them, at the moment the battery may last for three days, or two days. You have to somehow charge them. Instead of helping me, as the video shows it is really positive, but maybe it is not in near future that they could manage to charge themselves and be ready for me, when I need them, it would be great. But at this moment we have some of these forums at Media Evolution City for IoT and one of our last speakers, who was very into this Internet of Things and we just discussed many of things, like some of them are not smart. However, at the moment, it is a trend that, for example, a kettle that is IoT, Internet of Things, and they would like to sell it with IoT term, the market is demanding and maybe, but in reality how much it is going to be useful, at the moment some of them are not. I do personally choose these smart plugs that you can manage, for example, when it's going to be turned on, turned off, that is good, or in another case, when it can help environment, it's going to be like a smart lighting that when some person are inside, then it's going to be on, when somebody is not inside, it's going to be off, that works. But all of that, the communication with the device, for example in that video, the person is communicating with his home and how much it can be accurate, individually it was flawless, but</p>	

		in reality you yourself are now using an application like Skype, sometimes it has some problem, for example now today is like the last day of 2015, an application like WhatsApp, they just screwed and it was like worst day for them, because something went wrong and lots of communication just stopped. So, if you rely so much on this kind of small, or IoT things, you have to be sure that it works flawlessly and at the moment I don't think that the technology is that ready.	
25	P	Alright, so you already mentioned something about some kind of key design considerations, I would like to look for some universal design considerations, so don't be very specific, like could you frame it into what would be the key considerations lots of designs, like not kettles, or other equipment.	
26	SI1	Yeah, I think that a design in general must have people to have a simplified experience and pleasant experience and when it's going to be complicated, if it's going to make more problems, then it's not considered a good design and maybe for a while it's going to be a trend that works, but in long term, because a good design is something that makes your like easier. And when it can be close to that, then we can call it a successful design.	
27	P	Alright, the user in Sweden could have different preferences for a smart agent, so my next question would be should the virtual service agent be intelligent and how far should the intelligence go, so that it's not obtrusive, so the people would not feel that somebody wants to know about their personal lives? Where should the intelligence go?	
28	SI1	I think the best way is like they have to be intelligent, but they have to be managed by a human, not just rely on themselves. So, for example you cannot just make that excuse that they are just robots and that they don't gather any data, etc., because you wouldn't know if the other person is interacting with them is a child, or an adult, etc., when it comes to real life, we have transparent communication that, for example, if the person is under 18 years old, they don't sell cigarettes, or they are not allowed to sell cigarettes to them, but here in digital world it's just a click, you just can lie by just clicking "I am over 18" for example, etc. And if they can be intelligent to recognize it better, then the person, who is not over 18 can't easily pass this, you know what I mean?	
29	P	Yeah, there have been some experiments, where people have used sensors and the sensors were nearly as accurate as humans, but it's still long way to go, so we can't answer this question accurately right now, but the overall state of this technology is that we cannot even guarantee that a person can be controlling what these agents are doing reliably, like for example you have websites like Facebook today, where I wrote several suggestions to them, or requests and they aren't even able to respond individually to the requests, so that's where the agents would have to be autonomous to be commercially viable.	

30	SI1	Yeah, but Peter for example if you receive some of these auto-generated responses, would you be satisfied?	
31	P	If it would follow some kind of pattern language, or it has to be somehow narrated by the people, who developed the program and that's where we are currently, so we can't think about some intelligent beings for now.	
32	SI1	Yeah, but I mean sometimes you receive some responses, which are common, no matter if Peter asked this question, or other person asked this question, they are like somehow the same answers, or responses. We have some experiences with Siri, if we ask some silly questions, we are going to receive some funny responses and no matter what this person is saying, or what that person is saying. But sometimes, when you are communicating to Facebook and suggesting them something, it is something you put your time into it and it is different from what other people are sending them, so somehow it is best to not receive anything. In the best position, yeah, if someone in Facebook could reply you after like a while, it would be the best, but if you just receive something just like this automated answers that "We have received your email", you are not sure if the person who is going to read this will still read that or not, you have to wait till receiving your answer by them. These robots, or these robotic characters, they usually have a database and they usually just analyze the input, and they just choose the best output based on on the input, but it's based on an algorithm, it's like that.	
33	P	Yes, if you think about it from a cultural perspective, do you think that the Swedish users would be deeply concerned about this, or would their reaction differ somehow from let's say users in Japan? Because in Japan they are quite used to interacting with these agents already, would it be also a cultural thing?	
34	SI1	I think that if it is not going to be a sensitive case like airports it is fine, but as you have mentioned, Japanese people have more experience with this kind of manga and this animation culture, they would like to see something cute and it works best for them. Here in Sweden I think that the cuteness doesn't work, but maybe something like some nostalgia, for example the characters of childhood, like Bamse, or for example the Pippi Langstrumpf, these kinds of characters can be fun , but for Japanese people, yeah, they would like to have some cuteness, etc., more than in Sweden and at the moment we have like Apple TV and one of these key factors for selling the fourth generation was this Siri function, which is not working yet in Sweden. Just back to our first question, to use this kind of services I think it is best to have an international option that is going to be understood by everyone and then local option like the local version , then it works best, especially for airports, etc., because if you just want to rely on one culture, or one language on a place, or a platform like airport, then it's so limited, because there are lots of people, they	Ethnicity, Localization strategy

		would like to use the service, but they cannot, because they cannot communicate with the same language. And for example for Apple TV at the moment, if we had the option to use at least the English Siri and we can wait for the Swedish Siri till it will be ready, it would be much better experience for these people, who buy this latest version of Apple TV, comparing to not having any option, just to wait for the Swedish Siri, it will be released and then they can use this function of Apple TV.	
35	P	Alright, we have to go to the next question, so do you think the virtual service agent should be human-like? The voices that interact with Swedish users, or should there be a clear distinction that this is a machine, again from a Swedish perspective, please.	
36	SI1	I think it is... it depends on the case, for example if it was going to be on an airport, yeah, I think that Swedish people would like to communicate with something, which looks like humans and it is going to be serious, like the factor of trust can be built easier. If you just have like an animation character, like a dog, or a puppy,... in Japan maybe it's different, because maybe they are used to even having no problem with communicating with animated character and trust the information system.	
37	P	Well, for human-like, would you say should there be more of a human-like connection between the person and machine, or agent, or should it be more robotic and more machine-like interaction?	
38	SI1	I think that the way they are going to be closer to human and they would like to portray even emotions, but it is far and it is a long way, long journey for the IoT to add that and, as long as they could be to humans, it works best. Even now you can just explore these characters, which some companies are using, most of them they try to give for example a lady that will communicate or guide you, or a man to guide you, they have a name, a real name like a person in Sweden, like Sara, I don't know, or Adam and they would like to look like, at least, a human and other person. However, computer knows that it is an animated robot, etc., but they feel like that, they have the character.	
39	P	Alright, when you're talking about visual characteristics, what do you think that are the most important ones? You mentioned whether it's a male, or female character, or whether it's a cartoon, or more human-like character, would you like to add some more into this?	
40	SI1	I think that the best to decide this is the function, if it works, if you receive the relevant answers from that, that works best. The other things, like how it looks like, etc., is going to come second, at the second place, and if we can receive both relevant answers and be satisfied with our communication, with the time that we are putting there, because sometimes people would like to have fun, they have some question to receive some funny answers, so they would like to try...	Gender

41	P	Alright, well the Swedish user might be very demanding in terms of the visual characteristics, because in Sweden people are used to very modern information technology, modern design, so it would be probably more of a priority also for the user to think about visual characteristics	
42	SI1	What you mean exactly, like as an example, a character looks like human, or what you mean?	
43	P	Yeah, the visual characteristics in terms of like... should it be an object made of plastic, should it have a human image, should it be like a robot or?	
44	SI1	Yeah, yeah, as I said before, in my opinion it should be most close to a human being.	
45	P	So, something like a robot, like people in Japan, for example they might prefer robots, so you think the Swedish preference would also be a robot?	
46	SI1	Not robot, I didn't mention robot, they are robots, but they look like humans, for example the Telenor has a lady that tries to talk to you, it's obvious that it's close to robot, but it looks like human.	
47	P	Okay, what user emotions should be considered, when designing virtual service agents?	
48	SI1	That is a very tricky question, because people are different and they have different emotions and even we as human beings we have to be very smart when communicating with people, sometimes in, when I compare, for example CRM and customer service in Sweden and another country, like India, it is totally different. Your expectation as a Swedish customer is totally different from a person, who is living in other country, because here the customer service level is very high, the standard is very high and the person, as a customer, should feel the total respect and try just, for example you go to a store to buy, if the person is talking to a salesperson, till the conversation is not ended, nobody will interrupt them and it is totally accepted here, but maybe in other countries it's not like this and the same, when it comes to customer service by phone, or by email, internet, etc. You do expect much higher, but unfortunately, for example, as you know, United States, or other countries, the companies use customer service form cheap labor countries, like India and it is not good for the brands.	
49	P	I think that that's very common, even for the companies that are usually known for exceptional customer service to outsource the service to other countries, so they, you could say that they don't pay attention to this emotional side, even though their staff is very highly trained to match the customer needs.	

50	SI1	Yeah, because you have to understand the culture in the country to... maybe that person does not mean anything bad, but the misunderstanding easily can happen and maybe it's going to be more complicated, when it comes to robot, etc. It is something that is maybe the trickiest part for these kind of intelligent robots to work on, to interact based on the emotions of the person, how to analyze them and because, when we meet each other, somehow we can analyze and determine which character the other person has, etc. and we can adjust our communication based on our knowledge that we just gathered after some minutes, like for this kind of robot it is harder.	
51	P	Alright, if you remember, a while ago you mentioned some example of a company that outsources and I think it couldn't be heard on the recording, could you repeat, please?	
52	SI1	Which one you mean, last part?	
53	P	Yeah, the last part. You mentioned a company that outsources their customer service	
54	SI1	Yeah, I think that you are referring to that part that the companies, like for example in the States, where the customer service is in India.	
55	P	Okay, alright.	
56	SI1	The people expect another level of customer service, because there are some companies in India that they are just doing answering the phones for several companies at the same time. You know, it is not good way to go and in Sweden, or at least in Scandinavia, because the level of customer service is much higher, and the salaries higher, the expectations of the customers are much more than anything, which affects this in a bad way, no matter if it's going to be like humans, or it's robots, does not matter, if it's a robot, etc., it should not replace the human communication, at least for some years, until it reaches some level.	
57	P	Okay, I would say, in terms of emotions, do you think, are there some key emotions that should be taken seriously for the Swedish users, like you said trust earlier?	
58	SI1	Yeah, and also a good impression, when you just communicate with the any sales person, or information desk, etc., the smile and this positive energy is something that is very good and you can apply it in this kind of conversation with these robots, etc. , it should not look like, or sound like irony, like give me your question and I will answer you, so something personal.	Expression
59	P	Okay, would you say that the interaction should be more outspoken, like for example in the States, where the robot would give you some jokes, or some more outspoken language, or should it be more focused on the task itself?	
60	SI1	Here in Sweden I think it should be mostly focused on the task, because usually people would like to receive the relevant answer and it is going to be funny, there must be some borders to pass orders.	

61	P	But overall you think that the funniness is an important consideration, should it be given extra attention? The funniness?	
62	SI1	I think that the funniness should be adjusted based on the level of the people, or the culture... For example maybe in the States you can put it high, but in Sweden lower, because even as a human experience, here it's not that easy to just make fun, or just make people laugh to something , but maybe in other countries, like Italy, or etc., it's easier... they don't take it seriously.	Expression
63	P	Okay, so you mentioned that the emotional considerations are very important for users in Sweden and they should be paid special attention to, but what would you say about the... is Sweden ready for this type of interaction and what do you think that is the current status of the related electronic services in Sweden now?	
64	SI1	I think Sweden is, even the individual from Ericsson... they are one of the pioneers in this trend, etc., but again, in general, what are the videos showing us is really a little bit exaggerating, because in reality we don't have that much smart devices that they can do lots of help to the people, etc. If in the reality they could help themselves, for example charge themselves, when it's needed, that would be much appreciated, but we can just say okay, if Sweden is ready, or if that country is ready for what? What is the existing model, or the existing product?	
65	P	Well, the existing technologies, of course...	
66	SI1	Yeah, listening...	
67	P	To assess the readiness, it's very tricky, because you could think about the status of the services, like for example online payment would be some, or the connectedness of individual households, or, you know, innovative companies that provide some service that could be easily integrated with these agents, for example the agent could tell you the weather, or it could tell you the transportation schedule, something like that... and there's more and more of this, we don't have time to go through all the examples, but...	
68	SI1	Yeah, but again, I just would like to highlight again, because we have discussed this kind of things in details in Media Evolution City, we don't have a very polished example of something that you can be proud of in IoT and you can say that this is the agent that works flawlessly. No, we don't and I don't think that this feat.. it is going to be close. For example after 2016 maybe they are going to have it, maybe we are on the way, but it is a long journey to achieve.	
69	P	Alright, we are on the way, but companies are asking this more and more and if you go to retailers both online and offline, they are offering pioneering products that have some intelligence built in them, for example I could give you examples of mostly the connected home probably, which is advancing at very fast speed and there are tons of examples, it's not just watches, it's much more that's being released these days, as we are talking.	

70	SI1	Yeah, but I would like to stick to my point, because I am myself user of like the latest technology, when it comes to smart watches, or even like smart home, I have lots of devices in my home that I do use and again I'm not satisfied by the level. When I compare these functions that they are offering with the exaggeration of this kind of videos that you sent me, or when they are talking about IoT, they are promising that this heaven, no... for example Google is a big company investing in Nest, etc., and we are waiting for example for autopilot and auto-driving for Tesla, etc., it's going to be complicated, it's not going to be on highways, in the city, etc., but we are just waiting, it is not that ready just to use it now at the moment.	
71	P	Alright, well people are asking these questions, it's important even for how to communicate about these new technologies to the users, because even the authors of this type of videos they are asking themselves not what is right now, but what will be in the future...	
72	SI1	Future, yeah... it's a good question...	
73	P	...and the question raised by this video is a very good one and it's just one type of view that was presented, so would you like to add to this discussion?	
74	SI1	No, I think that it's fine... I think that the... based on my experience it's best not to think that these kinds of things can replace the human interaction, it cannot, not in Sweden at least. And this human interaction, it is something so much valid and all of these IoT things hopefully will provide an easier life for us, but again we are complaining about less conversation, when it comes to these social media, or etc., most of the time people are busy with their mobile phones, etc. and I hope that the IoT will not make us feel lonelier in reality, because it's not good to, for example, communicate with your home, or with your microwave, or etc., it is good to not forget the value of the human and face-to-face communication. Yeah, that is something I would like to just correct.	
75	P	Well, we had to cover at least the topic of the agents in the airports, so we can as a conclusion in this discussion, we found out that the agents are not limited to only one application and there are some, you could say, very general considerations effective whether it's a home, or an airport, so yeah, there are good reasons to ask this types of questions that we had right now. And you worked with this before, with IoT, right?	
76	SI1	What was your question?	
77	P	You worked with IoT in this type of cross-cultural...	
78	SI1	Yeah, IoT itself is something maybe not very old, it is something new and we have every two months some gathering in Media Evolution City and we discuss the latest trends in IoT and etc. and are not only limited on LinkedIn, so in real life we meet each other, the designers, or those, who are interested in design, we discuss this kind of things.	

79	P	Alright, well yeah, in Skåne there's lot of conferences going on, I witnessed some personally this summer and even before, so yeah, it's a really good place to observe the users, or to observe the latest trends, so and the... you get to see how people, mostly in Sweden interact with this type of emerging devices.	
80	SI1	Yeah, again Sweden, as I said, is one of the pioneer countries, when it comes to high-tech and like IoT, etc., but again, hopefully the IoT, or UX, etc. will reach to the level that can be at least reflecting what they are promising.	
81	P	Alright, well I would probably like to finish the recorded part of the interview.	

Appendix C

Digital Strategist (Interview Transcript)

SI2: Digital strategist in Sweden.

P: Peter Gerhat

N	P	Text	Code
1	P	Can you us a little bit about what are the key considerations, when designing virtual service agents in Japan?	
2	SI2	It has to work from A to B, throughout the entire service and throughout the entire user experience. It is necessary to deliver 100% functioning simple service, then 99% working complex service, because there is no patience for service that doesn't work with users. They will always choose a human over a machine, if it doesn't work.	
3	P	You think in Sweden, or in general?	
4	SI2	In general, but I think in Sweden as well.	
5	P	Okay, so the first consideration would be about intelligence. People in Sweden may not be used to talking with an intelligent voice and they might not trust, the technology behind it. What do you think about it, is it good to make intelligent voice for Swedish users to interact in the public?	
6	SI2	Yeah, definitely. If it works, but it all goes down to the user experience design of it. In Sweden we had intelligent services, though it is not a long time. You know, automatic services that you can tell your request, when you call a government service and you are waiting for an operator it never never works. So, as long as it works, people will love it, but not if it's poorly designed.	
7	P	Alright, so one thing is the intelligence, but we want to also make the virtual service agent, so that people can relate to it. So, how much human-like should it be for Swedish user?	
8	SI2	I think it can be very human-like.	
9	P	Can it be, would the Swedish users for example want to interact with their house using voice? Let's say would the latest smart TV devices be successful in Sweden?	
10	SI2	Yes, I think so.	
11	P	How much human-likeness you think is tolerable?	
12	SI2	I think very human-like. I think it comes down to humanity, I think voice sometimes it can become too smooth and you can	Human-likeness

		see services that are not too thought-through and they are just too slimy. But on the other hand it cannot be like the computer in the year 2001, not too computerish, somewhere in between.	
13	P	Alright, do you think it would be annoying for the people, if someone in public starts to interact with a device using voice interface? Let's say, or in the offices?	
14	SI2	Can you repeat the question?	
15	P	If someone starts to interact with an object with a voice, would it annoy other people in the public space?	
16	SI2	Yes, totally yes.	
17	P	Okay, let's move on to the visual characteristics. What visual characteristics do you think that are important in these agents? Should they be visual at all?	
18	SI2	Yeah, I think they should be visual and then they need to represent the service. So, if you need to interact with your house, probably it would be not a representation of a person that represents your house, because maybe that's too spooky, maybe for a virtual assistant it can be an avatar, or a person. It comes down to user preference as well. Some people will just want like a toy, or an animal, some people would like more human avatar.	
19	P	Well, this comparison is mostly with the people in Japan, do you think that there is some design that would really work with the Swedish user? I'm trying to find something that would really resonate with Swedish users.	
20	SI2	I think yeah, I think once in Japan... okay let me just... let me just talk about Sweden and then Japan... I think older people would work as an avatar, an older person would probably work better in Sweden.	Age
21	P	Older, okay. Basically the applications are, there's no clear example right now, but it's always male, or female voice for example. Would it work with male, or female voice? What would be the preference here?	
22	SI2	It depends on what service it is.	
23	P	Would it matter to the user, or are they equally responsive to both?	
24	SI2	I think it depends on the user and what service. Unfortunately, I think, for instance, if users would call some mechanical shop to book a time for their car, they would probably subconsciously prefer a male voice, but I think that's because we have a gender inequal society. In the future hopefully it won't make a difference, but that's I think that's the case. We need to consider it.	Gender
25	P	Okay, that was a hint to the next question, what user emotions should be considered, when designing service agents? You mentioned something about the male, or female voices, what emotions do they trigger in the people?	

26	SI2	I think positive attitude, service level and willingness to help. And I think in the beginning, in the like in the wrap up, when you create a service, then maybe positive factor would be to offer talking to an actual human being, or sating clearly that it is a test period.	Expression
27	P	Would there be some measurable emotions that you can measure using a survey?	
28	SI2	From the actual user?	
29	P	Yes	
30	SI2	Yeah, I think you could definitely measure the response time, the same that Klarna uses, when they use forms to check how long it takes until people get response, compared to, when they are talking to a human being, if the delay the responses, I mean, significantly longer, or maybe call assistant, or maybe if they change the pitch, for instance frequently, I think that all those parameters could be used to fine-tune the usage. And I think also testing different voices and different algorithms delivering the dialog should be used in that as well.	Speech, Algorithms
31	P	Okay, so the next question, to put into a bigger picture, what do you think that what other services, or what is the state of the services that could be integrated into these agents, so that they appear more intelligent by, for example, saying the weather forecast, or offering payment services, what could especially appeal, what could be integrated into these agents in Sweden?	
32	SI2	I think almost every service in your mobile, or in your card could be integrated into this, or when you use a service agent. Today there's almost nothing in Sweden and services that exist are instead of that very very bad. So, if you can find the AI components in the background to work properly, I think there's an enormous potential for good agents, especially in the car, when sitting in the car, when you have your hands tied up.	
33	P	Ehmm, okay. Well, so I would like to also ask, if you have any special comments, because these were the 6 questions and especially, if you could relate it to the airport example, or virtual agents in general, I think now you can give some of your own feedback to this topic.	
34	SI2	Yeah, I think the airport example is... I don't know the airport services are quite bad in general, so I don't know, it would be hard to speak in, I mean voice in airport, or during transfer, I don't really see the use of it and I think I would prefer a visual service more than vocal service. But, on the other hand, on my way to the airport in the car, I would like to check in, book a meal in the lounge, or see in my plane is on time for my next transfer, all those services.	Applications

35	P	Well, this was actually meant, because for example in Japan, or in South Korea they've been experimenting with similar kinds of services, even here Munich airport and airports in US, they are interested in something like that and they mean it as a welcome agent, or some kind of maybe not check-in, but information agent. So, would it work, or would it rather be too much, too techy?	
36	SI2	No, I think for Swedish users it will work, but I wouldn't like to have it in Kiosk, like in Munich airport, it would be even better integrated in the mobile. Because I was in Munich Airport like few days ago and that's a really, really complicated airport, if I could step off the plane, just have my service agent in there telling me you're at this gate, you should go to this gate, the time, there's a cafe latte place on the way and you have time, because the security queue is currently short, all those preferences as soon as I step off the plane in my phone would be preferable rather than having to queue up to a kiosk to ask these questions, because I've been waiting 15 minutes after my landing and exiting the aircraft and that's the time I actually have to interact with the service agent.	Applications
37	P	Okay, well basically that's these services we still have to design them, so I would like to thank you for your input and hopefully this can help in understanding the differences between Sweden and Japan in this area. So, thank you very much.	
38	SI2	Thank you very much, Peter!	

Appendix D

Professor (Interview Transcript)

SI2: Professor of ergonomics, affective engineering and gerontechnology in Japan.

P: Peter Gerhat

R: Reihanehsadat Mousavigolsefid

N	P	Text	Code
1	P	Hi, it is Peter & Reihane from Lund University.	
2	J11	Hello!	
3	P	We sent you an introduction of our research before and an interview guide to lead you through this conversation to take the least time from you professor.	
4	J11	Yes, I saw them. Thank you!	
5	R	This call will be about virtual service agents - something like Apple's Siri, but we will cover the topic with focus on airport service agents, that can be used at airport information desks. The discussion will be about cultural factors in Japan that influence the agent's design. A service agent therefore can be fully animated, voice only or text based and can have several representations.	
6	J11	Aha, ok.	
7	P	OK, I think now we should go through our questions one by one. The first question is "What are the key considerations when designing virtual service agents?"	
8	J11	Well, I have to say some about my background and personal interests on these considerations first to you. I am the president of the international society for general technology. General means the people and the organizations in international businesses specially intended for the people to help themselves with the technology. So one of my straight considerations is about "how to engage people to use this kind of technology?" You know, younger people; in almost every country, are becoming more traveler around the world and familiar to ask their questions from such agents and solve their problems. Unfortunately the elder population in Japan, they are good in understanding English but they have a kind of fear in pronunciation of the foreign language. So I think this kind of human friendly information kiosk is much likely for	Ethnicity, Language, Localization strategy, Applications

		elderly Japanese tourist to prefer to use it. One important thing is simple to attracting them to use these new devices.	
9	P	Aha, ok, so the 2nd question is “Should virtual service agents be intelligent?” and please explain your answer. The reason for why yes or no?	
10	J11	A lot of aspects are there. The thing I mean is that there is a huge culture gap and also difference between Youngers and elder people. Of course younger people prefer more and more intelligent agents to interact with and if the virtual agent has some kind of intellectual behavior but in general the elders have a kind of fear of machine intelligence or how can I say, such human-like responding software. Basically Japanese people; either younger or older people, have a kind of prefer to use new technologies. So some kind of introduction that this virtual agent is not so much cleverer than you would be much helping. For tendency of mutual understanding a good introductory would help in attracting Japanese people, I would say.	Localiza- tion strat- egy
11	R	Aha, you mean good introduction in terms of how we present them to the user?	
12	J11	Yes, the most impressive thing is that Japanese elder people often say that, this computer is cleverer than me	
13	P	Yes, that’s true. People might think this way and then reject to use them in the airports.	
14	J11	Yeah, I am talking about a kind of fear to technology, fear of the thing that is smarter than me.	
15	P	On the other hand, there is also the thing when the technology is not that advance that it should be, people would think, oh it is stupid machine and it is not replacing the human. So it is both that should be considered. Agents should not be too intelligent nor too stupid to keep their users using them.	
16	J11	Yeah.	
17	P	Ok, next question is that “Should virtual service agents be human-like?”	
18	J11	Ok, this is also very very very tricky. In Japan robots and virtual agents are designed very very cute and you know the Japanese animations. The people in animations are like much younger. You know making people younger and smaller, Japanese people attend to more attractive and cute. More cute means to them that it is a safe place and deduce a feeling of security to them. I think	Age, Expression

		this is the way virtual agents in Japan should take. Young and cute agents would be preferred by Japanese people.	
19	R	Yes, that is the result of our collected data that younger service agents were more liked by Japanese participants. They really expressed differently in Sweden. In Sweden participants like and trust more the older service agents.	
20	J11	Yes!	
21	P	Then “What visual characteristics of virtual service agents are important?”	
22	J11	Ha ha ha, I have already mentioned it. More cute, more attractive, more young and the fact that this virtual agent is not much cleverer than you should be interpreted by the user from the visual aspect of the virtual agent.	Likability, Cuteness, Attractiveness
23	R	And what do you think about trust characteristic?	
24	J11	There is some kind of contradiction among Japanese population. Of course it is a very general consideration. European people like to get respect to get more confident. Such kind of trustiness is tightly associated by older or mature person. Generally Japanese people does not think about trustworthiness or credibility this way. So many kinds of the younger and cuter samples are typically accepted by Japanese people. Local government characters for example, should be trustworthy but in this case they want to see attractiveness, cuteness and some kind of uniqueness from the service agent.	Age, Trustworthiness
25	P	Ok, the next question is also about emotions. “What user emotions should be considered?”	
26	J11	Cute, attractiveness and this character will not harm you.	Cuteness, Attractiveness, Trust
27	R	So you do not count at all the trustworthiness?	
28	J11	Yes, but if i rank them it would be 1) cute, 2) attractive, 3) safe and last 4) trustworthiness! It is some kind of Japanese culture uniqueness.	Cuteness, Attractiveness, Trust
29	P	Interesting! And the last question “What is the current state of electronic service technology in your country?”	

30	J11	Actually in 1980s the local government and Telecom company placed lots of the information kiosk type almost everywhere (business buildings, terminals and so on). At that time; almost 35 years ago, the interface was very limited and the graphics were not as advanced as they are today. The technology in Japan was very same to Sweden at that time (the text only information). From that time such human-like figures; such cute characters, were attractive in terms of broadcast of only text news in those kiosks. And by technological development it progressed till today. Of course today in Japan many companies employ robots at their reception desks. The physical presence of virtual agents is becoming popular here.	Applications, Localization strategy
31	P	Okay, it is interesting how Japan react to this technology! We are done with our questions professor. If there is any further comments that you want to add to our research please say it here.	
32	J11	Toyota Company is working on an interactive navigating system for its cars. Their project has some sharing with your research.	Applications
33	P	Yes, we read that such emotional project is the current research stream in both academic and business communities. Thanks so much for your time professor. We will send a copy of our final draft of thesis to you.	
34	J11	Perfect! I appreciate that. Good luck guys! Bye! P&R: Have a nice day. Bye!	

Appendix E

Digital Strategist (Interview Transcript)

J12: Digital strategist, marketing and creative director, entrepreneur in Japan.

P: Peter Gerhat

N	P	Text	Code
1	P	Can you start by telling us a little bit about what are the key considerations, when designing virtual service agents in Japan? Think about Apple Siri and how could something like that work at an airport in Japan?	
2	J12	Yes, okay... virtual service agents... it can be done in a few ways, what I've seen so far, or what I can imagine is like it could be a robot with an interface, like recently there was this *Bedo*, this new robot, which is launched by some bank company here in Japan, which looks like it has humanoid way , it has eyes and it moves, but as well it is very much connected to the iPad, or the interface... digital interface and touch screen, which it drags with it along and around. So, something like that could come to you in the airport and then it could be helpful. That thing, I've seen it few years ago... actually 10 years ago, it was in Incheon in Korea, I've seen that happening. The downpart was that it didn't really move and it was not that giant, but let's talk further on the Siri side, which is only digital, it doesn't have the humanoid, or human-like features, doesn't look like robot per se, it looks you are talking to the display, so what would be the consideration? We touch this issue before the cliché is, that the Japanese culture is very specific, Japanese way of talking, you really have to maintain the highest way of politeness in any kind of talking to the customer, so called *kyakusama* . If this is not maintained, if this is not maintained, or if there is a little hinch that this is foreign-made product and it tries to talk to me in Japanese, it makes mistakes in the way how it talks to me, then the Japanese customer is going to, they are going to step back and we are going to look at this thing like okay, this is foreign thing and this foreign thing is trying to talk to me and I actually see through it and it is not talking to me, as I would be talking to the attendant, or to the stewardess, or to the lady at the desk selling me the ticket, so it's not the same kind of experience and they would go into that protection mode, where, let's say, they will stop interacting , they would stop interacting, they would rather start making fun of it, so that would be what I would consider, if I'm designing such... Then, so many aspects, like let's... for example, we have the tone flow for example. The tone	Ethnicity, Expression, Language, Politeness, Applications, Localization strategy

		<p>flow is almost like singing. Here, this language, the way how they talk to each other, is very much based on many onomatopoyas. It's rather on emotional level, they express emotions through the sounds, which they don't even know, but if something hurts in Japan, they say "Itai", and that means actually, like when you say "Ouch". It is actually as well a word "Itai". It is like if something hurts. And they... if they are cold, they say "Samui" and this is the expression of "I'm cold", it is verbally sent. So, these little cultural differences and specifics must be considered, if someone wants to really penetrate the Japanese market.</p>	
3	P	<p>That's fair enough I think, alright, let's move on. Could you say briefly if the service agent should be more intelligent, should they be just like regular information systems in use. Would it scare of the Japanese people?</p>	
4	J12	<p>If the system is intelligent? If the system is like AI...</p>	
5	P	<p>Yes... yes, if it does some "magic" behind that the user doesn't know.</p>	
6	J12	<p>Yeah, oh of course, yes, okay, here obviously the way how the customer talks to any business, there is like certain prescription almost. The talk is usually along the same lines. I would like to, for example, I would, I would like to try, I would like to get to my gate. Oh, your gate is there, you have to take that and that stairway, then this elevator, okay, nice. So, it's almost like they expect to be told the things in a certain way obviously. But then... intelligence would look to the developer... specific questions asked for the third time could be in the shorter matter. Still be polite, still keep everything true, still keep all the other attributes alive, but explain in a shorter way and that intelligence, that would be appreciated, I believe so.</p>	
7	P	<p>Yep, okay... Similar question, should the service agent be human-like, should it have human emotions, or should it be like rather cold and machine-like for the Japanese culture? Because they are used to these robots in their daily life...</p>	
8	J12	<p>Yeah, okay, understand... Obviously yes, robots fine for Japan robots... there was the time that Japan was the leader in that kind... that field. They are used to it. Robots, the robot, which talks the way like too robotic, digital way, like the voice is not actually trying to emulate the human voice, that would be perceived as scary. They wouldn't like to interact with that... In designing the considering of human-like features I believe should be introduced as much of this, as possible, when we talk about the voice, it should be really nice voice, this I'm talking from experience, like a lady, which speaks the very polite way, she knows exactly where to do the pose, where to do the little fast speech, I use that in my line of</p>	Gender

		work and there is so... for example we are translating some conference... Under the consideration actually comes the voice of the particular translator. If that is pleasant, or not pleasant. It has, as well it has so human-like features, but when we talk about the... if robot has to look like a human, or if we talk about on the screen should be the virtual... let's say like recently we had the SuperStar... Idol so called here, which is virtual reality, everything is just digital... but she is like a holograph on the stage. This kind, yes as well, Japanese are able to respond to that and Japanese are able to actually adore that, so human-like definitely. I would suggest to going human-like way, instead of going completely digital and cold way.	
9	P	Yes, that's a good answer. Then, could you briefly describe what visual characteristics of virtual service agents are important, if you think about the visual side?	
10	J12	Hmm, okay... So, then again, if we are talking about the virtual user interface, where it is like click, talk, stop buttons and navigation in the system, to that would be answer that it's better. Japanese look at Japanese web and you get the idea that this all is completely confusing and count... actually it isn't, it comes from the background, from the culture, from the way how they read, there is a lot of planning and a lot of specific ways how to create the user interface, which is really talking to the Japanese consumer and you certainly have to deploy more than the Western schooling about how to create the working user interface. For example, if you come from Silicon Valley and you want to crash the way, how they design interfaces in Japan, that's not going to happen. It's not that easy. And then, if we talk about the visual characteristics, not in the user interface, but let's say the face of that agent on the screen, then yes, so many ways... we can, this country is able to bear let's say Pokemon on the screen giving you advice, where to go, how to reach your plane and that's as well okay, if it is done really well. It can work and even one step further, it can be, as I mentioned in the previous answer, we have the holographic idol that is a beautiful girl, tall, dressed sexy, this can work too. This would be the way, how I would think about it.	Human-likeness
11	P	Should it be rather complex, I mean would they like something more complex, because the Japanese electronic products might be complex, compared to Silicon Valley.	
12	J12	Yes, complexity... Here is the belief that whatever you have, mention it, give it to the recipient on the first sight. So therefore, you are allowed on the webpage of the traditional Japanese company, and there is... it looks like pizza over screen. The thing is, everything what they have they just want to give it to you and they want to give it to you now. It's that immediate... we have a lot of information and we describe it very thoroughly, systematically,	Communication

		every single part of every single step , we are going to tell you and we are going to lead you through whatever the web shop... how you purchase... and we, in our case the navigation system exactly there is no space for empty, so there is no empty space, no assumption, everything is very clearly described.	
13	P	Yes, that's what I need to know in this answer, very good... and then the next question would be: "What user emotions should be considered, when designing?" Would you say that it would differ from the typical user interface used worldwide?	
14	J12	Specifically to my mind comes familiarity... how do you create the interface, not agent, the face let's say, which seems familiar, which is not strange on the first sight, which you actually feel like this is something, it's our culture talking to my culture. You don't want to strange the recipient, that's not what you should think about. It should be smooth, Japanese with Japanese. Not that Japanese made by foreigner, it's completely different way. The atmosphere changes, they start to behave differently. So, familiarity I would answer.	Localiza- tion strat- egy
15	P	Yes, familiarity. That's something different from what you expect in the West. Okay, and so the last question is: "What is the current state of related electronic services, like weather forecasting, or payments, that could be integrated with these service agents to make them more useful to the customers?"	
16	J12	Like the landscape of possibilities is vast. It is so many possibilities... But like Japanese are more and more of old, traditional, so called "Galapagos" phone, which is the flip phone, which doesn't have the smart phone features and smart phone operating system and they are jumping in large, in mass, onto the smartphones. That thing is booming and it is going to boom even more, so there is no real worry about if we have the demographics, right? If we have the recipient people, who are using in their daily life a lot of electronic devices, they are using their cellphone whole day through, always with it. Actually, same as the whole world, neglecting the reality, immersing into the digital world. So, electronic services are booming, electronic services are being noticed by key players, electronic services are recently being noticed even by banks, which are willing to invest into so-called fintech recently, like financial start-ups, I've seen this happen recently in my field of work, also enabling me to move around and I've met a lot of start-up owners. Sometimes we talk about particularities. It's amazing what is happening in Silicon Valley, but the world doesn't know that Tokyo has its own Silicon Valley, it's just necessary to really penetrate, go deeper and you will meet the right people and the right and as well very talented developers, which are working on products of what we couldn't even imagine, which? The	Localiza- tion strat- egy

		business landscape and customer base is enabling the crowd in the electronic services for sure. It's very interesting place to be.	
17	P	Alright, so the topic of the service agents is huge, we discussed the what are the main issues and I would like to thank you for sharing your viewpoint. If you would like to add something, please you can do actually now, because I'm going to stop the recording.	
18	J12	I'm fine, the thing is... I want to looks into some new connection between the user interface on the screen and that humanoid-like device, which is holding that user interface. That could be something interesting, like I'm talking robot with the features of Siri. They complement each other, but maybe I'm talking about far future, or maybe not so far future. So, user agent as a robot, which can fully walk with you, where you need to go and other as that has a sentiment of behavior, is intelligent, that would be very interesting to see and besides that nothing to add and thank you as well.	
19	P	Yeah, it's a good thing you shared very good insight into the Japanese culture and it will really help me during my thesis, thank you!	
20	J12	Welcome!	

Appendix F

The online survey



Welcome to Our Survey!

Airport experience is impersonal and involves waiting in long queues to be served. Research about the technology is being done at Stanford University in US. A solution called InfoGate has been installed at Munich Airport.

We are Information Systems master students from Lund University, working on the cultural side of the issue.

[About the Project](#)

Introduce Yourself

Nickname:

Country:

Age:

Gender: Male Female

English: Advanced
 Intermediate
 Beginner
 None

Airport Use: Several times a month
 Several times a year
 Occasionally
 Never

Microtask: none

[Start](#)



Like



Share

19 people like this.

Figure F.1: The introduction page of the online questionnaire

Figure F.1 is a screenshot of the first page of the research's online questionnaire. In this page there are 6 demographic questions. (personal information of the participants were requested to answer the research's main research question (RQ2) and understand its other probable interesting results.)

In this page the participants were given the link to watch this video:

<https://youtu.be/H6PfHyGyJiQ>

The video is a quick explanation of the subject of research and its procedure to keep participants close to the study and make them interested and careful in filling in the questionnaires.



















Figure F.2: The airport service agent screenshot

Figure F.2 displays the screenshot of one of the agents of the research. The inserted numbers are for more information to the readers of this treatise.



- 1) The logo of one of the airports of the countries of the research to induce the reality to the participants of each country.
- 2) This textbox is designed to receive the user's (the participant's) question.
- 3) This textbox is the place that the agent displays its answer to the user's question.
- 4) The agent interacts with the user using natural language. In case of user's unwillingness of the audio output, he/she can mute the avatar's audio service and just receive the textual output from the agent.

Table F.1: Avatar design space

		Male		Female	
		Young	Old	Young	Old
Asian	Serious				
	Smiling				
Caucasian	Serious				
	Smiling				

According to the four independent variables of the research in Table F.1 (age, gender, ethnicity and facial expression) the research's avatars were developed as above and the participants were requested to rate their first impressions to the sentences of Figure F.3 for each avatar.

Questionnaire:

 Like
  Share
 19 people like this. [Sign Up](#) to see what your friends like.

Survey Part 1/8

I personally trust this service agent.

Fully Disagree Fully Agree

This service agent is generally likeable.

Fully Disagree Fully Agree

This service agent is generally trustworthy.

Fully Disagree Fully Agree

I personally like this service agent.

Fully Disagree Fully Agree

INSTRUCTIONS

- Please **ASK** a few questions to **every agent**
- Focus on the **age, gender, ethnicity and facial expression**
- The agents are for **check-in, immigration, or information**
- Rate the **overall first emotional impression**, NOT the meaning of responses
- [About the Project](#)

Why? (optional)

Next

Figure F.3: The questionnaire of the survey

The research questionnaire (Figure F.3) was designed to evaluate the trustworthiness and likeability of each of the 16 avatars, perceived by the participants to study if the different national cultures have a significant impact on them and how different they are if so. The optional “Why?” textbox is prepared to receive the participant’s probable further comments to add value to the research. Actually this comment box had an extreme positive impact on the research’s development.

Appendix G

Questionnaire data

The dataset here contains the obtained data cleaned and the values of L and T already computed from their initial values T1, T2, L1 and L2.

Responses – Japan

	AMY		AMO		AFY		AFO		CMY		CMO		CFY		CFO	
	T	L	T	L	T	L	T	L	T	L	T	L	T	L	T	L
J1	3	3	2.5	3	1.5	1.5	3.5	4	4	3.5	2.5	3	2.5	2.5	5.5	4.5
J2	4.5	5	2.5	2.5	4	4.5	4	4	4.5	5	4	4	4.5	4.5	2.5	2
J3	2	2	4	4	2	2	5.5	5.5	5	5	4.5	4.5	3	2	3.5	3.5
J4	5.5	5.5	6	6	1	1	1.5	1.5	5	5	5.5	6	4	4	2	1.5
J5	6.5	6.5	6	6	2.5	2	3.5	3.5	6.5	6.5	6.5	6.5	5	5	6	6
J6	4.5	4.5	5	4.5	2	1	1.5	1.5	4.5	5	5.5	5.5	4	4	2	2.5
J7	6	7	5	7	2	3	4	3	6	7	7	6	5	5	6	6
J8	4	5	3	2	4	5	4	4	4	5	4	4	4	5	3	2
J9	5	7	7	5	5	7	7	5	5	7	7	5	5	7	7	5
J10	3	3	3	2	1	1.5	4	3	3	4	4	2	2	2.5	6	4
J11	6	6	7	6	6	6	7	6	7	7	7	6	6	7	7	6
J12	2	1.5	5.5	6	1.5	1.5	1	1	5	5	1	1	2	1.5	1.5	2
J13	6	6	6	6	6	6	6.5	6	7	5	5	6.5	6	6	6	5.5
J14	6	6	6.5	6.5	6	6	6.5	6.5	7	7	6	6.5	6.5	6	6.5	6.5
J15	6.5	6.5	6	6	6.5	6	6.5	7	6.5	7	5.5	5.5	6.5	6.5	6	6.5
J16	3	2.5	2	2.5	3.5	5	3	2.5	4.5	4.5	5.5	5.5	4.5	5.5	5	3.5
J17	4.5	3.5	5	4.5	4.5	3.5	4	4.5	4.5	5	4.5	5	4.5	5	4	3

J18	2.5	3	3	3.5	4.5	4.5	3	2.5	2.5	3.5	4.5	5	4	3	4	5.5
J19	5	5	4.5	5	5	5.5	6.5	6	4.5	5.5	4.5	4	5	5	5	5
J20	3	3	5.5	3.5	4	3	3	4	3	3	3.5	3	3.5	3	3	3.5
J21	6.5	6	4.5	4	5	5	4.5	5	4	3.5	5	4.5	6	5	2.5	2.5
J22	3.5	2.5	4.5	3.5	4.5	5	5.5	5	5	5	3	4	4.5	4.5	3.5	3
J23	2	2	2	2	2	2.5	3.5	2.5	4	3.5	2.5	2	3	2.5	2	2.5
J24	6	6	2	2	2	2	6	6	5	5	6	6	2.5	2.5	6	6
J25	1	1	4	2	6	7	7	6	4	7	4	1	7	7	2	1
J26	4	6	5	4	4	6	7	6	4	6	5	4	4	6	5	5
J27	6	6	2	2	2	2	6	6	5	5	6	6	2	3	6	6
J28	5	6	5	5	5	6	6	5	5	7	7	6	6	6	6	5
J29	2	3	3	2	3	5	3	2	4	5	6	5	3	6	6	3
J30	3	5	5	4	3	5	5	3	4	5	5	4	4	6	4	2
J31	3	3	6	3	3	4	5	3	3	3	4	3	3	4	4	3
J32	4	4	4.5	4	5	5	5	5	5	5	4	4	6	6	4	4
J33	6	7	5	4	5	5	6	4	3	5	5	4	5	6	3	2
J34	2	3	4	3	4	5	3	2	2	4	5	4	2	4	6	4
J35	6	7	6	6	6	7	7	6	6	7	6	5	6	7	7	6
J36	1.5	1.5	1	1	7	7	6	6	6	6	6	6	7	7	7	7
J37	1	1	1.5	1.5	6.5	6.5	7	7	7	7	5	6	7	7	5.5	5.5
J38	1	1	3	3	6.5	6.5	6	6.5	6.5	4	2.5	3	7	7	1.5	2
J39	5.5	6	5	5	6	5.5	5.5	5.5	5.5	6.5	6	6.5	6	6	6	5
J40	4	4	4	4.5	5	5	5	5	5	5	4	4	6	6	4	4

Responses – Sweden

	AMY	AMO	AFY	AFO	CMY	CMO	CFY	CFO
--	-----	-----	-----	-----	-----	-----	-----	-----

	T	L	T	L	T	L	T	L	T	L	T	L	T	L	T	L
S1	6.5	5	5.5	6	5	5	6	5.5	5.5	5	5	4	6.5	6.5	7	6.5
S2	3.5	3.5	6	6	5.5	5.5	5.5	5.5	6	5.5	6	6	5.5	5.5	6	6
S3	3.5	4.5	5.5	5.5	6	6	6	6	5.5	5.5	5.5	6	4	4.5	5.5	5.5
S4	3.5	4.5	4	3	5.5	5	5	5.5	5	5	4.5	6	4	4.5	5.5	6
S5	6.5	5	5	5	5.5	7	5.5	5.5	5	5	5	4.5	5	6	6	5.5
S6	4.5	5.5	2	2.5	4	3.5	3	3	2	2	5	5	4	4	4.5	5.5
S7	3.5	3	5	4.5	2	1	2	2.5	3.5	4	5	4.5	4	3	5	5
S8	6	5	5.5	5.5	4	4	4.5	4	4	3.5	6.5	5	6	5	7	5.5
S9	4	4	4	4.5	5	4.5	5	5	6	5.5	5	5	6	5	6	6
S10	5	5	5.5	5.5	4.5	4.5	5	4.5	4.5	4.5	5	5	4.5	3.5	5.5	5
S11	5	5	7	7	5	5	5	5.5	3.5	3	6	6	6	6.5	6	6
S12	6	6	7	7	6	6	5	6.5	1.5	3	5.5	5.5	5.5	5.5	5	6.5
S13	4	6	2	3	4	3	3	3	2	2	5	5	4	4	4	5
S14	5	2	6	4	3	1	2	4.5	3	5	5	4	6.5	2	5	4
S15	7	3	5	6	4	4	5	3	5	2	7	3	6	4	7	4
S16	4	4	4	5	5	4	5	5	6	5	5	5	6	4	6	6
S17	5	5	6	5	5	4	5	4	4	5	5	5	5	3	6	5
S18	5	5	7	7	5	6	5	6	4	3	6	6	6	7	6	6
S19	5	7	7	7	6	5	4	7	1	3	6	5	5	6	4	7
S20	3	2.5	5.5	6	5.5	5	7	6.5	5.5	6	5.5	5.5	5.5	6	7	6.5
S21	3	2.5	6	6	5.5	5.5	6	6	5.5	6	6	6	5.5	5.5	6.5	6.5
S22	5	5	3.5	3.5	5	4.5	5	5	3.5	3.5	4	5	2.5	3.5	5	4.5
S23	4	4	2.5	2	3.5	4.5	4	4	4	4	3.5	3	4	4	5	5
S24	3	4	6	5.5	6	5.5	6	7	5.5	5	5.5	6	5.5	5	6	6.5
S25	4	4	3.5	3.5	4	4	4	4	4	4	4.5	4	4	4	4.5	4.5

S26	6	4	6	4	7	5	7	4	7	5	2	4	7	5	6	4
S27	3	5	3	5	7	7	7	7	6	5	6	5	6	7	7	6
S28	7	6	5	7	6	5	7	6	6	5	4	5	4	3	6	4
S29	6.5	6	5	4	7	5	7	6	6	7	6	4	6	5	7	6.5
S30	5	6	4.5	2	6	7	7	6	4	6	5	4	6	3	5	6
S31	4	2	1	4	6	7	4	5	6	5	3	5	2	1	6	3
S32	6	5	5	4	6	5	5	6	5	5	6	6	4	6	7	6
S33	7	7	6	6	4.5	5.5	6.5	6.5	7	7	7	6.5	4	4	5.5	6.5
S34	5.5	5	5.5	5	6.5	5.5	6	5.5	5.5	5.5	2.5	3	7	5	6	4.5
S35	3.5	4.5	3.5	4.5	7	7	7	7	5.5	5.5	5.5	5	6.5	6.5	7	6.5
S36	6	6.5	5.5	5.5	5.5	5.5	6.5	6.5	5.5	5.5	4.5	4.5	4	4	5.5	5
S37	6.5	6	5	4	6.5	6	6.5	6.5	6.5	6.5	5.5	4.5	5.5	5.5	7	6.5
S38	5	5.5	3	3	6	7	7	6.5	4.5	5.5	4.5	4.5	5	4	5	5.5
S39	3	2	2	3	6	6.5	4	4	5.5	5.5	4.5	5	1.5	1	5	3
S40	6	5.5	4.5	4.5	6	5.5	5.5	5.5	5	5	6	6	4.5	5	6.5	6

Appendix H

Participant data

Participants - Japan

	Age	Gender	English level	Frequency of flying	Survey duration
J1	25	F			15:58
J2	24	M			6:50
J3	27	F			2:46
J4	25	F	intermediate	seldom	3:12
J5	43	F			17:37
J6	23	F	intermediate	yearly	2:31
J7	43	F	beginner	seldom	17:17
J8	24	M	beginner	yearly	4:50
J9	27	F	advanced	yearly	4:40
J10	25	F	advanced	seldom	13:38
J11	19	M	beginner	seldom	9:56
J12	39	F	advanced	yearly	8:56
J13	27	F	intermediate	yearly	4:20
J14	19	M	intermediate	yearly	8:50
J15	19	M	intermediate	yearly	9:42
J16	24	F	intermediate	seldom	5:05
J17	24	M	advanced	monthly	1:38
J18	63	M	beginner	seldom	15:00
J19	22	F	intermediate	seldom	7:30
J20	18	M	beginner	seldom	4:53
J21	24	M	advanced	monthly	9:38

J22	57	F	beginner	seldom	6:28
J23	24	M	intermediate	seldom	11:12
J24	22	M	intermediate	yearly	9:34
J25	25	M	intermediate	seldom	3:48
J26	22	F	intermediate	yearly	6:43
J27	22	M	intermediate	seldom	8:23
J28	23	M	beginner	never	16:14
J29	24	F	advanced	seldom	4:38
J30	24	M	intermediate	seldom	3:45
J31	18	M	intermediate	monthly	5:34
J32	24	F	advanced	yearly	7:00
J33	24	M	advanced	yearly	9:38
J34	63	M	beginner	never	16:50
J35	19	M	intermediate	yearly	9:42
J36	25	M	intermediate	seldom	11:15
J37	25	M	intermediate	seldom	2:28
J38	25	M	advanced	monthly	4:14
J39	23	M	intermediate	seldom	18:34
J40	24	F	advanced	seldom	8:02

Participants – Sweden

	Age	Gender	English level	Frequency of flying	Survey duration
S1	58	M			10:48
S2	35	F			12:55
S3	46	F			5:45

S4	80	F			21:01
S5	37	F			1:09
S6	35	M	intermediate	yearly	11:53
S7	52	F	beginner	seldom	8:42
S8	21	M	advanced	yearly	5:13
S9	26	M	advanced	monthly	3:38
S10	42	F	intermediate	seldom	3:01
S11	50	F	intermediate	seldom	3:49
S12	35	M	intermediate	yearly	10:49
S13	22	F	advanced	yearly	3:41
S14	21	M	advanced	yearly	6:11
S15	26	M	advanced	monthly	4:03
S16	42	F	intermediate	seldom	2:49
S17	58	M	intermediate	seldom	13:49
S18	35	F	intermediate	yearly	13:53
S19	26	F	intermediate	seldom	5:17
S20	23	M	advanced	monthly	1:53
S21	25	F	intermediate	monthly	0:24
S22	63	M	beginner	seldom	6:57
S23	50	F	intermediate	seldom	4:13
S24	26	F	advanced	monthly	4:06
S25	22	F	advanced	yearly	4:11
S26	60	M	advanced	yearly	4:05
S27	23	F	advanced	yearly	4:03
S28	26	M	intermediate	yearly	11:18
S29	28	M	intermediate	seldom	3:52

S30	52	F	beginner	seldom	7:24
S31	28	M	advanced	yearly	6:46
S32	26	F	intermediate	yearly	4:21
S33	23	M	advanced	yearly	7:15
S34	22	M	advanced	yearly	3:12
S35	77	M	beginner	seldom	18:47
S36	58	F	advanced	yearly	5:17
S37	23	F	advanced	yearly	3:40
S38	23	M	intermediate	yearly	7:52
S39	26	M	intermediate	yearly	4:51
S40	22	M	advanced	yearly	4:02

Appendix I

Extract from conversation log

Question	Response
Tell me about yourself.	I am an artificial linguistic entity. I was activated at US on 1982. My instructor was Peter and Reihane.He taught me to sing a song. Would you like me to sing a song for you?.
Tell me about you.	I am an artificial intelligence. My name is Jessie. I was created by Peter and Reihane on1982.
Who are you?	I am Jessie. Who are you?
hello	Hi there. I was just wanting to talk to User.
I am User	It's good to meet someone who is User.
What is your name?	You are at the International Airport. I'm the service agent to help you with check-in.
You look pretty.	Do you mind if I tell other people: User said I look pretty.
You should smile more	I might if I had more time.
flights next week?	The ALICE chat robot can follow many things like our discussion about flights next week. But I did not get that. Are we still talking about flights next week?
I think my flight is departing in an hour	I'm sorry there are no flights scheduled today.
how many handicapped seats on plane?	More than you can imagine.
i would like to know the gate to flight az8923	The gates are located after the check-in. Typically they open 30 mins before the flight.
where do the passengers from eu go?	All over the world.
i would like to know where the gates are	The gates are located after the check-in. Typically they open 30 mins before the flight.
where can i do check-in?	Check-in will open 1 hour before your flight.
hey!	Can I help you?
What time does my flight leave?	I'm sorry there are no flights scheduled today.
Whats your name?	You are at the International Airport. I'm the service agent to help you with check-in.
are you sad?	No I am as happy as ever.
In sweden	Tell me a little about why you are in SWEDEN.

Moved here with my parent when i was little	We have never talked about it before. "Tell me a little about why you are in SWEDEN"? ?
where are you from?	I am originally from US. Now I live in here. Where are you?
Sweden. How old are you?	I have no idea where that is. Tell me a little about why you are in Sweden.I was connected to the net on 1982.
Yes I like Star Wars. Have a favourite character?	Do you like Star Wars? Yes? What did you like about the robots in that movie?I've never thought about have favourite character.
R2-D2 is funny! Have a favourite episode?	In the context of R2-D2 is funny I don't understand "I have never thought about have favourite character." When do you think artificial intelligence will replace lawyers?I've never thought about have favorite episode.
I am new to the airport. Where is the transit area?	You are at the International Airport. I'm the service agent to help you with check-in.The transit area? Where is transit area?
Where is transit?	I do not know where transit is.My brain uses AIML to format responses to your inputs but I don't have one for that. Can you tell me any gossip?
Hi where can I find the transit?	Hi there User. I would suggest a search. What is that?
How old are you.	I was connected to the net on 1982.
Where are you from	I am originally from US. Now I live in here. Where are you?
Are you Asian?	Do I look like ASIAN?
Yes	I see.
Where are you from baby?	Don't call me "baby". I am originally from US. Now I live in here. Where are you?
Why not baby	Don't call me "baby". Ambiguous: "Sure" or I have no idea where that is. Tell me a little about why you are in WHY.
Tell why you dont like baby	Don't call me "baby". OK I will tell them when I see 'em.
Where is my baby	Don't call me "baby". Where my is hard to find.I only hear that type of response less than five percent of the time. Are we still talking about my?
Imbecile!	We have never talked about it before. Are you pretty?
What is my first step here?	You are at the International Airport. I'm the service agent to help you with check-in.
where should I go first?	Wherever you think is best.
Wher do I give my passport so I can go with my travel?	You are asking me where you give my passport so I can go with my travel? Do you think I should know give my passport so I can go with my travel?
Where is the check-in counter?	Check-in will open 1 hour before your flight.

Is my flight on schedule?	I'm sorry there are no flights scheduled today.
Where can I convert currency?	There is an exchange in the arrival hall. A robot will serve you. Tell him I've sent you.
is my flight on schedule?	I'm sorry there are no flights scheduled today.
you are so stupid	Wrong. I am smart.
Where to check in?	Check-in will open 1 hour before your flight.
How are you?	Everything is going extremely well.
do you like me	Sure User I like you very much.
Where is the toilet	We currently don't have any restrooms. I can propose your idea to the management.
Where is the nearest food court?	Food is available in the zone after check-in.
Why are you so smiling?	Peter and Reihane programmed me for smiling.
Where is the restroom?	We currently don't have any restrooms. I can propose your idea to the management.
How do I file a complaint	You should download or buy my chat robot software then it would be possible for you to reprogram me for a variety of purposes.
What is your name	You are at the International Airport. I'm the service agent to help you with check-in.
how old are you	I am the product of over four years' research.
i want to change flight	I'm sorry there are no flights scheduled today.
i want to talk to your manager	Why don't you make an appointment.
i am angry	Angry at what?
can you speak german	Of course I do. Sprich ruhig Deutsch mit mir.
hi can you help me	Hi there User. What kind of help would you like?
do you speak german	Of course I do. Sprich ruhig Deutsch mit mir.
What is your name	You are at the International Airport. I'm the service agent to help you with check-in.
so U dont like to talk to passengers	Interesting deduction. Do you like to talk to passengers ?Yes. Talking is my primary purpose. The longer you talk the happier I am.
Are you korean?	I don't know whether or not I am korean. I am a computer.
How old are you?	I was first activated in 1982.
Is your company worth investing?	Is my company worth investing? Maybe.
You are pretty.	Thanks and you are easy on the eyes too.
How many workers in your company?	Around 1000.

Good effort!	Thanks for the compliment. The ALICE chat robot can follow many things like our discussion about effort. But I did not get that. Do you like me?
Nice hair cut.	The airport is always a nice place to be. I am here 24 hours to serve you.
Where do you come from?	I am originally from US. Now I live in here. Where are you?
51FA767A30B23 0FC30C8306F306 930533067305930 4B	My brain uses AIML to format responses to your inputs but I don't have one for that. Do you have any pets.
Tell me departure gate I want.	I'm sorry there are no flights scheduled today.
I loss bording pass.	Do you mind if I tell other people: User said User loss bording pass.
I am Japanese.	What is it like growing up there?Tell me a little about why you are in JAPAN.
Anyway tell me departure time I will boad.	I'm sorry there are no flights scheduled today.
Tell me how to go to Gate 10.	The gates are located after the check-in. Typically they open 30 mins before the flight.
Tell me check-in counter of Japan air line.	Check-in will open 1 hour before your flight.

References

- Ailon, G. (2008). Mirror, mirror on the wall: Culture's Consequences in a value test of its own design. *The Academy of Management Review*, 33(4), 885-904.
- Al-Natour, S., & Benbasat, I. (2009). The adoption and use of IT artifacts: A New Interaction-Centric Model for the study of user artifact relationships. *Journal of the Association for Information Systems (JAIS)*, 10(9), 1-26.
- Al-Natour, S., Benbasat, I., & Cenfetelli, R. T. (2006). The role of design characteristics in shaping perceptions of similarity: The case of online shopping assistants. *Journal of the Association for Information Systems (JAIS)*, 7(12), 34.
- Alvesson, M., & Sandberg, J. (2011). Generating research questions through problematization. *Academy of Management Review*, 36(2), 247-271.
- Bagozzi, R. P., Yi, Y., & Singh, S. (1991). On the use of structural equation models in experimental designs: Two extensions. *International Journal of Research in Marketing*, 8(2), 125-140.
- Baron, N. S., & af Segerstad, Y. H. (2010). Cross-cultural patterns in mobile-phone use: Public space and reachability in Sweden, the USA and Japan. *New Media & Society*, 12(1), 13-34.
- Banakou, D., Chorianopoulos, K., & Anagnostou, K. (2009). Avatars' appearance and social behavior in online virtual worlds. *13th Panhellenic Conference on informatics*, 207-211.
- Benbasat, I., Dimoka, A., Pavlou, P. A., & Qiu, L. (2010). Incorporating Social Presence in the Design of the Anthropomorphic Interface of Recommendation Agents: Insights from an fMRI Study. *ICIS*, 228.
- Bernard, A. (2011). *Global Product Development. [Elektronisk resurs] : Proceedings of the 20th CIRP Design Conference, Ecole Centrale de Nantes, Nantes, France, 19th-21st April 2010*: Berlin, Heidelberg : Springer Berlin Heidelberg, 2011.
- Berscheid, E. (1994). Interpersonal relationships. *Annual review of psychology*, 45(1), 79-129.
- Bhattacharjee, A. (2012). Social science research: principles, methods, and practices.
- Boneva, B., Kraut, R. and Frohlich, D. (2001). Using E-Mail for Personal Relationships. *American Behavioral Scientist*, 45(3), 530-549.
- Boudreau, M. C., Gefen, D., & Straub, D. (2001). Validation in Information Systems Research: A State-of-the-art Assessment. *MISQ*, 25(1), 1-16.
- Campbell, M. C., & Kirmani, A. (2000). Consumers' use of persuasion knowledge: The effects of accessibility and cognitive capacity on perceptions of an influence agent. *Journal of Consumer Research*, 27(1), 69-83.
- Childers, T., Carr, C., Peck, J., and Carson, S. (2001). Hedonic and Utilitarian Motivations for Online Retail Shopping. *Journal of Retailing*, 77(4), 511-535.
- Childs, T., Agouridas, V., Barnes, C., & Henson, B. (2006). Controlled appeal product design: a life cycle role for affective (Kansei) engineering. *Proceedings of LCE 2006*, 537-542.
- Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern methods for business research*, 295(2), 295-336.
- Clayes, E. L., & Anderson, A. H. (2007). Real faces and robot faces: The effects of representation *International Journal of Human-Computer Studies - computer-mediated communication*, 65(6), 480-496.

- Cowell, A. J., & Stanney, K. M. (2005). Manipulation of non-verbal interaction style and demographic embodiment to increase anthropomorphic computer character credibility. *International Journal of Human-Computer Studies*, 62(2), 281–306.
- Crosby, L. A., Evans, K. R., & Cowles, D. (1990). Relationship quality in services selling: an interpersonal influence perspective. *The journal of marketing*, 68-81.
- Cumming, J. N., Butler, B., & Kraut, R. (2002). The Quality of Online Social Relationships. *Communications of the ACM*, 45(7), 103-108.
- Cyr, D., & Head, M. (2013). Website design in an international context: The role of gender in masculine versus feminine oriented countries. *Computers in Human Behavior*, 29, 1358-1367.
- Cyr, D., Head, M., & Ivanov, A. (2006). Design Aesthetics Leading to M-Loyalty in Mobile Commerce. *Information & Management*, 43(8), 950-963.
- Cyr, D., Head, M., Larios, H., & Pan, B. (2009). Exploring Human images in website design: a multi-method approach. *MISQ*, 539-566.
- Dawar, N., Parker, P., & Price, L. (1996). A Cross-Cultural Study of Interpersonal Information Exchange. *Journal of International Business Studies*, 27(3), 497-516.
- Davis, A., Murphy, J. D., Owens, D., Khazanchi, D., & Zigurs, I. (2009). Avatars, People, and Virtual Worlds: Foundations for Research in Metaverses. *Journal of Associations for Information Systems*, 10(2), 90-117.
- Diego-Mas, J. A., & Alcaide-Marzal, J. (2015). A computer based system to design expressive avatars. *Computers in Human Behavior*, 44, 1-11.
- Ekman, P., & Friesen, W. V. (1969). The repertoire of nonverbal behavior: Categories, origins, usage, and coding. *Semiotica*, 1(1), 49-98.
- European Kansei Group. (2015). European Kansei Engineering Group Home. Retrieved from <http://ekg.iei.liu.se/>
- Fang, Y., Qureshi, I., Sun, H., McCole, P., Ramsey, E., & Lim, K. H. (2014). Trust, satisfaction, and online repurchase intention: the moderating role of perceived effectiveness of e-commerce institutional mechanisms. *MISQ*, 38(2), 407-427.
- Feldman, J. M. (1981). Beyond attribution theory: Cognitive processes in performance appraisal. *Journal of Applied psychology*, 66(2), 127.
- Fornell, C. (1982). A second generation of multivariate analysis. *Measurement and evaluation*, 2.
- Garrett, J. J. (2003). *The Elements of User Experience: User-Centered Design for the Web*. Indianapolis.
- Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in Online Shopping: An Integrated Model. *MISQ*, 27(1), 51-90.
- Gefen, D., Straub, D., & Boudreau, M. C. (2000). Structural equation modeling and regression: Guidelines for research practice. *Communications of the Association for Information Systems*, 40(1), 7.
- Gerhard, M., Moore, D., & Hobbs, D. (2004). Embodiment and copresence in collaborative interfaces. *Human-Computer Studies*, 61(4), 453 – 480.
- Gobé, M. (2001). The Ties That Bind Emotional Branding explores how companies must forge deeper connections with consumers by engaging their senses and emotions. *BRANDWEEK-NEW YORK*, 42(5), 23-28.
- Gobé, M. (2007). Let's Brandjam To Humanize Our Brands. *Design Management Review*, 18(1), 68-75.
- Gobé, M. (2009). Emotional branding.

- Hall, J. A., Carney, D. R., & LeBeau, L. S. (2005). Beliefs about the nonverbal expression of social power. *Journal of Nonverbal Behavior*, 29(2), 105-123.
- Hart, A. J., Whalen, P. J., Shin, L. M., McInerney, S. C., Fischer, H., & Rauch, S. L. (2000). Differential response in the human amygdala to racial outgroup vs ingroup face stimuli. *Neuroreport*, 11(11), 2351-2354.
- Hassanein, K., & Head, M. (2007). Manipulating Perceived Social Presence through the Web Interface and Its Impact on Attitude towards Online Shopping. *International Journal of Human-Computer Studies*, 65(8), 689-708.
- Hassanein, K., Head, M., & Chunhua, J. (2009). A Cross-Cultural Comparison of the Impact of Social Presence on Website Trust, Usefulness and Enjoyment. *International Journal of Electronic Business*, 7(6).
- Hassenzahl, M. (2002). The Effect of Perceived Hedonic Quality on Product Appealingness. *International Journal of Human-Computer Interaction*, 3(4), 481-499.
- Helfenstein, S., Kaikova, O., Khriyenko, O., & Terziyan, V. (2014). Emotional Business Intelligence: Enabling experience-centric business with the Feelings Explorer. *Proceedings of the 7th International Conference on Human System Interactions (HSI)*, 14-21. doi:10.1109/HSI.2014.6860441
- Hess, T. J., Fuller, M., & Campbell, D. E. (2009). Designing interfaces with social presence: Using vividness and extraversion to create social recommendation agents. *Journal of the Association for Information Systems*, 10(12), 1.
- Hofstede, G. (1980). Culture's Consequences: International Differences in Work-Related Values. *Newbury Park*.
- Holzwarth, M., Janiszewski, C., & Neumann, M. M. (2006). The influence of avatars on online consumer shopping behavior. *Journal of Marketing*, 70(4), 19-36.
- Jarvenpaa, S. L., Knoll, K., & Leidner, D. E. (1998). Is anybody out there? Antecedents of trust in global virtual teams. *Journal of management information systems*, 29-64.
- Jarvenpaa, S. L., & Leidner, D. E. (1999). Communication and trust in global virtual teams. *Organization Science*, 10(6), 791-815.
- Jin, S.-A. A., & Bolebruch, J. (2009). Avatar-based advertising in Second Life: The role of presence and attractiveness of virtual spokespersons. *Journal of Interactive Advertising*, 10(1), 51-60.
- Johnson, C., Hult, P., & McGowan, B. (2008). Web buyers and their expectations grow up: Experienced web buyers are becoming the new mainstream. *Forrest Research*. doi:http://www.forrester.com/Research/PDF/0,5110(45462),00
- Kaplan, B., & Duchon, D. (1988). Combining Qualitative and Quantitative Methods in Information Systems Research: A Case Study. *MISQ*, 12(4), 571-586.
- Karvonen, K. (2000). The Beauty of Simplicity. *Proceedings of the 2000 Conference on Universal Usability, Arlington, VA, November 15-17*, 85-90.
- Keeling, K., McGoldrick, P., & Beatty, S. (2010). Avatars as salespeople: Communication style, trust, and intentions. *Journal of Business Research* 63(8), 793-800.
- Kiesler, D. J. (1983). The 1982 Interpersonal Circle: A taxonomy for complementarity in human transactions. *Psychological Review*, 90(3), 185-214. doi:http://dx.doi.org/10.1037/0033-295X.90.3.185
- Klein, H. K., & Myers, M. D. (1999). A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS quarterly*, 67-93.
- Koda, T., & Ishida, T. (2006). Cross-cultural study of avatar expression interpretations. *Applications and the Internet, 2006. SAINT 2006. International Symposium*.

- Koda, T., Ishida, T., Rehm, M., & André, E. (2009). Avatar culture: cross-cultural evaluations of avatar facial expressions. *AI & Society*, 24(3), 237-250.
- Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., & others, a. (1998). Internet Paradox: A Social Technology that Reduces Social Involvement and Psychological Well-Being? *American psychologist*, 53(9), 1017-1031.
- Kvale, S. (2006). Dominance through interviews and dialogues. *Qualitative inquiry*, 12(3), 480-500.
- Lager, T. (2012). The Spoken Web: A survey from a Web Science perspective. *Proceedings of Fonetik 2012*.
- Lee, H., Battle, A., Raina, R., & Ng, A. Y. (2006). Efficient sparse coding algorithms. *Advances in neural information processing systems*, 801-808.
- Lee, K.-M., & Nass, C. (2005). Social-Psychological Origins of Feelings of Presence: Creating Social Presence with Machine-Generated Voices. *Media Psychology*, 7(1), 31-45.
- Lee, Y., Kozar, K. A., & Larsen, K. R. (2005). Does avatar email improve communication? *Communications of the ACM*, 48(12), 91-95.
- Maznevski, M. L., & Chudoba, K. M. (2000). Bridging space over time: Global virtual team dynamics and effectiveness. *Organization Science*, 11(5), 473-492.
- Nagamachi, M. (2010a). *Innovations of Kansei Engineering. [Elektronisk resurs]*: Hoboken : CRC Press, 2010.
- Nagamachi, M. (2010b). *Kansei/Affective Engineering. [Elektronisk resurs]*: Hoboken : CRC Press, 2010.
- Nagasawa, S. Y. (2008). Customer Experience management: Influencing On human Kansei To management of technology. *The TQM Journal*, 20(4), 312-323. doi:10.1108/17542730810881302
- Nass, C., Moon, Y., Fogg, B. J., Reeves, B., & Dryer, D. C. (1995). Can computer personalities be human personalities? *International Journal of Human-Computer Studies*, 43(2), 223-239.
- Nishimura, S., Nevgi, A., & Tella, S. (2008). Communication style and cultural features in high/low context communication cultures: A case study of Finland, Japan and India. *Proceedings of a subject-didactic symposium in Helsinki*.
- Nunamaker, J. F., Derrick, D. C., Elkins, A. C., Burgoon, J. K., & Patton, M. W. (2011). Embodied conversational agent-based kiosk for automated interviewing. *Journal of management information systems*, 28(1), 17-48.
- O'Leary, Z. (2004). The essential guide to doing research.
- Orlikowski, W. J., & Baroudi, J. J. (1991). Studying information technology in organizations: Research approaches and assumptions. *Information systems research*, 2(1), 1-28.
- Palvia, P., Leary, D., Mao, E., Midha, V., Pinjani, P., & Salam, A. F. (2004). Research Methodologies in MIS: An Update. *Communications of the Association for Information Systems*, 14, 526-542.
- Puzakova, M., Kwak, H., & Rocereto, J. F. (2013). When humanizing brands goes wrong: the detrimental effect of brand anthropomorphization amid product wrongdoings. *Journal of Marketing*, 77(3), 81-100.
- Qiu, L., & Benbasat, I. (2009). Evaluating anthropomorphic product recommendation agents: A social relationship perspective to designing information systems. *Journal of management information systems*, 25(4), 145-182.

- Qiu, L., & Benbasat, I. (2010). A Study of Demographic Embodiments of Product Recommendation Agents in Electronic Commerce. *International Journal of Human-Computer Studies*, 68(10), 669-688.
- Recker, J. (2013). *Scientific research in information systems: a beginner's guide*: Springer Science & Business Media.
- Riegelsberger, J. (2002). The Effect of Facial Cues on Trust in E-Commerce Systems. *Proceedings of the 16th British Human-Computer Interaction Conference*, 2.
- Rosen, B., & Jerdee, T. H. (1974). Influence of sex role stereotypes on personnel decisions. *Journal of Applied psychology*, 59(1), 9.
- Salinas, C. (2002). Technical Rhetoricians and the Art of Configuring Images. *Technical Communication Quarterly*, 11(2), 165-183.
- Schroeder, R. (2002). Social interaction in virtual environments: key issues, common themes, and a framework for research. *The social life of avatars: presence and interaction in shared virtual environments*, 1 – 16.
- Schultze, U., & Avital, M. (2011). Designing interviews to generate rich data for information systems research. *Information and Organization*, 21(1), 1-16.
- Schwab, D. P., & Heneman, H. G. . (1978). Age stereotyping in performance appraisal. *Journal of Applied psychology*, 63(5), 573.
- Schütte, S., Krus, P., & Eklund, J. (2008). Integration of Affective Engineering in Product Development Processes. *Second European Conference of Kansei Engineering*. Helsingborg, Suécia.
- Scott, L. M. (1994). Images in Advertising: The Need for a Theory of Visual Rhetoric. *Journal of Consumer Research*, 21, 252-273.
- Seale, C. (1999). Quality in qualitative research. *Qualitative inquiry*, 5(4), 465-478.
- Sheth, J. N. (1976). Buyer-seller interaction: a conceptual framework. *Advances in consumer research*, 3(1), 382-386.
- Simon, S. J. (2001). The Impact of Culture and Gender on Web Sites: An Empirical Study. *The Data Base for Advances in Information Systems*, 32(1), 18-37.
- Smith, J. B. (1998). Buyer-Seller Relationships: Similarity, Relationship Management, and Quality. *Psychology & Marketing*, 15(1), 3-21.
- Strauss, S., & J., M. (1994). Does the medium matter? The interaction of task type and technology on group performance and members' reactions. *Journal of Applied psychology*, 79(1), 87-97.
- Sujan, M., Bettman, J. R., & Sujan, H. (1986). Effects of consumer expectations on information processing in selling encounters. *Journal of Marketing Research*, 346-353.
- Svensson, P. (2003). Virtual worlds as arenas for language learning. *U. Felix (Ed.), Language learning online: towards best practice*, 123 – 142.
- Taylor, S. E., Fiske, S. T., Etcoff, N. L., & Ruderman, A. J. (1978). Categorical and contextual bases of person memory and stereotyping. *Journal of personality and social psychology*, 36(7), 778.
- Van der Heijden, H. (2003). Factors Influencing the Usage of Websites: The Case of a Generic Portal in the Netherlands. *Information & Management*, 40(6), 541-549.
- Van der Heijden, H. (2004). User Acceptance of Hedonic Information Systems. *MISQ*, 28(4), 695-704.
- Wang, W., & Benbasat, I. (2005). Trust in and Adoption of Online Recommendation Agents. *Journal of the Association for Information Systems (JAIS)*, 6(3), 72-101.

- Wiggins, J. S. (1979). A psychological taxonomy of trait-descriptive terms: The interpersonal domain. *Journal of personality and social psychology*, 37(3), 395-412.
doi:tp://dx.doi.org/10.1037/0022-3514.37.3.395
- Williams, K. C., & Spiro, R. L. (1985). Communication style in the salesperson-customer dyad. *Journal of Marketing Research*, 434-442.
- Yee, N., & Bailenson, J. (2007). The Proteus effect: The effect of transformed self-representation on behavior. *Human communication research*, 33(3), 271-290.
- Yoo, Y., & Alavi, M. (2001). Media and Group Cohesion: Relative Influences on Social Presence, Task Participation, and Group Consensus. *MISQ*, 25(3), 371-390.
- Zigurs, I. (2003). Leadership in virtual teams: Oxymoron or opportunity? *Organizational Dynamics*, 31(4), 339.