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List of abbreviations

ABMP - Agent Based Market Place

AGI - Artificial General Intelligence

AI – Artificial Intelligence

ANI – Artificial Narrow Intelligence

ASI - Artificial Super Intelligence

CC – Computer to Computer

CEO – Chief Executive Officer

CRM – Customer Relation Management

HC – Human to Computer

HH – Human to Human

iOS – Apple Operating System

IP – Intellectual Property

M2M – Machine to Machine

ML – Machine Learning

QA – Questions/Answers

RL - Reinforcement Learning

TA – Technology acceptance

TAM – Technology Acceptance Model

WOM – Word of Mouth

Abstract

With development of AI, chatbots are gaining on popularity in this digital era. This paper emphasizes their importance in business, as well as their integration into our everyday life. This paper helps finding a proper place for integrating chatbots by analysing openness of two different cultures (Austria, i.e. western culture and China, i.e. eastern culture) to digital advising, i.e. digital assistance.

Keywords: AI, chatbots, digital advising, cultural dimensions, Austria, China

Abstrakt

Mit der Entwicklung der AI, gewinnen Chatbots in diesem digitalen Zeitalter an Popularität. In diesem Beitrag wird ihre Bedeutung in der Wirtschaft, sowie deren Integration in unserem Alltag analysiert. Diese wissenschaftliche Arbeit trägt dazu bei, einen geeigneten Ort für die Integration von Chatbots zu finden, indem es die Offenheit zweier unterschiedlicher Kulturen (Österreich, d.h. westliche Kultur und China, östliche Kultur) auf digitale Beratung - digitale Hilfe, i.e.S. Chatbots, analysiert.

Stichworte: AI, Chatbots, digitale Beratung, kulturelle Dimensionen, Österreich und China, Hofstede

1 Introduction

Before introducing a relatively new concept of communication and thus digital advising, one must include cultural differences among countries. These cultural differences are correlated with the roots of oneself, their demographic factors, nationality, religious views, age, gender, family status etc. These factors are important when it comes to innovation diffusion, hence openness for innovations, risk-taking.

Digital advising nowadays is substituting human advising and is considered as a cost and time efficient way of communicating with consumers. But are consumers ready to adopt these changes as fast as we might think? The answer lies in consumers' openness for electronic business and is strongly related to their cultural background. This question will be answered through the main points in this master's dissertation through a hypothesis ***whether Chinese consumers tend to be more open for digital advising, i.e. chatbots, than Austrian consumers.*** A questionnaire will be given to around 200 people living in Austria and 200 people living in China including same questions in three different languages: English, German and Chinese. The goal is to notice how cultural differences effect consumers' acceptance of this kind of technological and futuristic communication which is substituting human assistance.

This paper analyses the effects of digital advising on Chinese and Austrian consumers, with the aim of answering the question of willingness to adopt to such way of digital business and thus replacing conventional way of advising (HH advice) with digital advice (CH advice, i.e. Chatbots). The consequences of digital era will be emphasized through this paper and strengths such as weaknesses will be contemplated in conclusion.

Computers are driven by our commands and the power of digital advising lies in our hand, whether it will solve many problems in the future ¹ and answer the question of *Usability* and *Ease of Use*.

The paper also includes technical background about the software which it provides in order to give assistance to people which need them, hence clarify how technology is affecting consumers' choice². Important theories in this paper such as Innovation diffusion, i.e. types of adopters, Technology acceptance and cultural differences will help in identifying the use and acceptance of technology, i.e. digital advising.

Internet is available to the majority worldwide but not many are accepting it³.

2 Technology evolution

Technology evolution can be defined as the improvement in the performance of a technology over time⁴. Intelligent technologies changed people's life decades ago, e.g. digital calculator, radio alarm clock, and it shaped our behaviour in everyday life⁵.

During the period of moving from Western to Eastern countries, many cultures have been mixed and every generation has brought their own roots into the new place, where indeed a new cultural and thus technological movement started.

Manufacture started being substituted by buttons⁶. Nowadays, we live in an era called "The Age of Information"⁷. When we ask ourselves what the greatest achievement of humans' mind is, most of us would agree on the ability of learning language(s) and communication⁸. This is what the biggest challenge is for a computer, AI (robotics, chatbots), especially when learning human-like cognitive

¹ Lew et al., 2007, p.1

² Salomon et al., 1991, p. 2

³ Irani et al., 2009, p.1322

⁴ Sood et al., 2012, p. 965

⁵ Salomon et al., 1991, p. 3

⁶ Person, 1932, p.202

⁷ Lew et al., 2007, p.1

⁸ Warwick, 2016, p.209

activities. Before, companies would try to find the best possible way, where cost and time efficiency would be considered the main factors in succeeding. Project managers, as well as departments of production and logistics would try to find the shortest way in order to finish the project by calculating avoidance of critical path. Nowadays over 90% of companies use various software programs i.e. computational systems which are able of calculating abundant number of different scenarios. These computational systems can search and find the best possible way and solution which is most profitable, with lowest costs and highest profits within seconds, based on algorithms. The range of companies using these systems is wide, e.g. Production and Logistics, Tech companies, Digital services.

Some examples of companies which are mostly consisting of AI are Google, IBM, Dell, ups, Amazon, Chinese online platform Aliexpress.

3 Artificial Intelligence

John McCarthy introduced the term 'Artificial Intelligence' in 1955, defining it as "the science and engineering of making intelligent machines, especially intelligent computer programs". This definition might be considered too general, but despite this fact, we associate them to various types of M2M such as home appliances where mobile phone and such appliances communicate among each other⁹.

There are many definitions of technology as well, and frankly it is not easy to find a proper definition; some of them are referred to other fields of science, other ones are too general, e.g. they are physical objects which help humans fulfil their needs and tasks. Hannay and McGinn have defined the function of technology as "the expansion of the realm of practical human possibility"¹⁰.

AI should not be confused with the meaning of intelligent technology, e.g. digital calculator¹¹. Few decades ago, people would associate the term AI with something abstract, some programs which only people with high level of technological knowledge would be considered to understand. But this changed, AI is not only

⁹ Gurkaynak, 2016, p. 750

¹⁰ Brooks, 1980, p. 65

¹¹ Salomon et al, 1991, p. 2

attracting Bill Gates and Elon Musk, it is attracting Tekkies (people interested in technology but are lacking the knowledge about it), e.g. robotic toys such as Einstein¹², who's producer is famous for Sofia human-like robot from Hong Kong, robots as domestic animals etc.

Some of them are accepting AI voluntary, some of them, for example in China, are forced to accept such technology because of living in such environment where life without apps would in most cases be very difficult, e.g. payment methods via phone(no cash accepted), i.e. Didi which acquired Uber in China.

Many have been sceptical about the development of AI¹³, especially if it becomes a potential threat to humanity by developing their own language and skills. It is in our nature to feel fear and scepticism upon uncertainty of things which aren't avoidable in a society. From one point of view, AI could become a competitor to human beings¹⁴, but on the other hand if used properly, a cooperation between us and AI would be convenient for both sides and indeed depends on us whether we want to do a partnership with such humanlike machines¹⁵. Indeed, a cooperation between human and a machine is much more efficient in any way, i.e. time and cost efficient¹⁶.

Everything we did before can be achieved much faster, AI is becoming part of our daily life and we are accepting it, some of us unconsciously¹⁷.

As another example of AI can be taken the famous phone assistant Siri, which helps in answering anything one asks for¹⁸ or ALiMe chatbot assistant¹⁹.

(Ellul, 1946) divides technology into two groups:

- Machines working for us, e.g. clock, automatic pilot²⁰, refrigerator, chatbots.

¹² Hanson robotics, source: <http://www.hansonrobotics.com>

¹³ Gurkaynak, 2016, p. 750

¹⁴ Gurkaynak, 2016, p.750

¹⁵ Salomon et al., 1991, p. 2

¹⁶ Salomon et al., 1991, p. 4

¹⁷ Salomon et al., 1991, p. 2

¹⁸ Gurkaynak, 2016, p. 750

¹⁹ Feng-LinLi et al., 2017, p.1

²⁰ Salomon et al., 1991, p.3

- Tools which we work with, e.g. microscope, statistical software, camera.

A clock does not require any human effort in order to function. But if we, for example want to work with Excel, we need to open the spreadsheets, we need to type in the numbers and we need to save the sheet somewhere safe. Here we see a difference between machines working for us and tools which we work for²¹. In a matter of fact, all we need to do in the end is press the button²², i.e. type in relevant information and computer does all the calculations within (milli) seconds.

Since the 80s and the beginning of intense capitalism, many companies would have gone into the bankruptcy without having machines “fixed” their problems.²³ If we imagine how many mistakes have been done with human calculations for the annual report when calculating everything manually and typing numbers in a calculator. How many mistakes have been made during writing on typing machines, and losing time by writing same sentences repetitively. Those were opportunity costs which were difficult to avoid without the computer. If this dissertation was written on a typing machine, I am sure that it would take me twice as long to finish it. We can clearly see that machines helped us gain extra time for ourselves, and indeed have made our lives much easier.

An important question arises from our digital surrounding regarding the effects it has given us. Were we seriously conscious about our transition from analogue to digital era? We sub- or unconsciously accepted social media, smart phones, applications which started harmlessly, for most of the people, such as contacting our colleagues from school, playing games, to becoming a serious part of our everyday lives, such as asking Siri about a nearby restaurant, making appointments with doctors, scheduling appointments, e.g. Habitica mobile application, communicating with someone about our private problems, not knowing if behind the other screen is a real person or a chatbot²⁴, i.e. Turing-like test.

²¹ Salomon et al., 1991, p.3

²² Rawles, p. 102

²³ Rawles, p. 103

²⁴ Warwick et al., 2016, p.207

A good example of successful digital advising is AliMe assistant, who helps customers regarding QA²⁵, and can answer up to 85% of chats and calls coming from millions of customers per day. Few decades ago, this would not be possible. On average, one person could take approximately 100 calls per day. This kind of assistance was much slower, not to mention the personnel cost it has brought itself.

When we think about what programmers have achieved through cooperation with computers, many things come up to our mind. Humans created the computers, humans also developed hardware²⁶ e.g. keyboard, mouse, monitor; and software, codes and all the other factors which helped machines to think and even look humanlike. Humans have helped computers to become smart and compete against human brain, which is incomparable faster, e.g. AliMe digital advisor, a chatbot which can take millions of requests per day²⁷. But it is a bilateral relation, computers and machines are teaching humans as well, and this process is called distributed technology e.g. digital calculators²⁸, online courses via internet, digital advising via chatbots for many services, money converters etc.

There is an interesting definition referring to the function of a computer. It is a gadget which not only should be technical, but it should develop a “relationship” with a human being, to socialize with humans, to develop their own language based on human language, to interact with a human and to help him in situations such as decision making within a company²⁹ as well as to help end consumers to choose a proper product / service, e.g. digital advising.

Chatbots are able to communicate with humans, calculate and inspect millions of problems, but there is still a scepticism about how they solve the problem. With this fact, many other topics remain open because they still have limitations in communicating and finding the right answer because of the ML, thus developing their own skills.

²⁵ Feng-LinLi et al., 2017, p. 1

²⁶ Mc Clure, 2007, p. 486

²⁷ FengLinLi et al., 2017, p.1

²⁸ Salomon et al., 1991, p. 2

²⁹ Brooks, 1980, p. 65

Especially in the beginning while they are still integrating into the system with a very limited amount of words and potential answers. Once a chatbot gets to communicate with their customer, it can replace conventional face-to-face advising and call assistance, and instead focus on FAQ³⁰, which a person might not be willing to answer, or answer in a different tone after years of repeating the same answer. Many scenarios with different outcomes need to be taken into consideration in order to develop proper language and communicate with customers. But it will not take long, even nowadays one cannot be sure if they are communicating with a chatbot or a person, e.g. Turing test.

As an example we can take Facebook. Before Facebook became internationalized, humans needed to inspect and approve or disapprove images and videos because of potential policy violation such as physical or verbal violence, fraud, harassment, political issues etc. Nowadays this would only be possible if Facebook hired millions of people to have insight and decide rather the image/video should be approved for the audience. This is a situation when AI replaces such labour and solves millions of issues within a second.

In the 90s people were sceptical about psychological aspects regarding the influence of a computer and how it affects human brain, e.g. cognitive learning, social aspects., Programmers were not discouraged to start developing educational software and it turned out that machines can educate a person, especially when it is about cognitive learning, even better than a human being³¹. Because machine does not get tired, a machine can repeat it until they have learned it, while with people it is not the case.

The speed of our labour and skills will always be behind computers. We know that a chatbot could communicate with thousands, even millions of customers in the same time while being more affordable to maintain, in comparison to human beings, which would need weeks to take care of the same abundant number of customers.

³⁰ Feng-LinLi et al., 2017, p. 1

³¹ Salomon et al., 1991, p. 8

According to Urban (2015), there are 3 main categories of AI:

- Artificial Narrow Intelligence, abbr. ANI
- Artificial General Intelligence, abbr. AGI
- Artificial Super Intelligence, abbr. ASI

3.1 Artificial Narrow Intelligence

ANI refers to supercomputers, which are incomparable faster than our brains (human mind is much slower, precisely a millionth size of a power which requires Tianhe-2. Tianhe-2 is a supercomputer produced in Guangzhou, China. This supercomputer is able of making an enormous number of calculations per second, in this case 34 quadrillion calculations/second³².

An example of ANI is a popular American quiz show Jeopardy where people are challenged to answer various questions in order to win. This proved that supercomputer such as Watson from IBM is able to understand questions and give proper answers. Such is nowadays Siri from Apple, iOS, Cortana from Microsoft or Amazon Echo³³.

3.2 Artificial General Intelligence

Artificial General Intelligence, abbr. AGI is very similar to human mind. Not only do they have capability of solving problems like ANI, but also include human-like emotions such as feelings, thinking and body language including eye contact³⁴. There is a debate about when the time will arrive to have such robotics. Some people think that the day has already arrived, e.g. Sophia, first robot from Hong Kong who has got a citizenship in Saudi Arabia.

Some argue that this will happen within next 15 years and some doubt that this time might ever come³⁵. The last one might refer to Fully Automated Luxury Communism, where computers and chatbots are going to do the calculations and solve problems, but will never be able to develop soft and artistic skills, such as painting, singing etc. This might mean that, if that time comes, many humans will

³² Gurkaynak, 2016, p. 751

³³ Gurkaynak et al., 2016, p. 751

³⁴ Lew et al., 2007, p.2

³⁵ Gurkaynak et al., 2016, p. 751

be able to enjoy their hobbies instead of working in corporations and instead have basic income and freedom.

3.3 Artificial Superintelligence

ASI is believed to be able to evolve easily and fast from AGI. In comparison to AGI, which can be controlled by codes and algorithms, this kind of intelligence i.e. artificial superintelligence is raising scepticism among scientists, and many, e.g. Elon Musk, find them unfriendly AI because of their growing and developing potential³⁶. Many people believe that this kind of AI will be more often seen in Sci-Fi movies than in reality, but the minority who indeed believes in such future might have soon evidence for such potential outcome. This kind of AI might develop such strong skills that they might use their power and start overtaking the world in business, economics, politics, even wars.

An example can be taken when robot Sophia was interviewed, which caused global panic regarding ASI. It did not take long until Sophia developed her own language and was communicating with another robot mentioning human destruction³⁷ or another example with two chatbots communicating with each other where the same situation happened.

We are conscious about the upcoming event regarding AGI, and we all are willing to listen about ASI, but are we prepared to be “forced” to accept it? Probably yes, because there might not be other option.

Some scientists such as Elon Musk and Stephen Hawking are sceptical about ASI for many reasons. One of them might have effect on existence of humanity. From the moment where evidence of evolution was recognized, from the moment where the first bone of a dinosaurs was found, it was clear that some species are no longer living. This might, in worst case happen with humans, being substituted by ASIs. But a human being might be capable, if cooperating with ASIs to get immortal and become a superhuman (!)³⁸.

³⁶ Gurkaynak, 2016, p. 756

³⁷ www.intellectualltakeout.org

³⁸ Gurkaynak et al., 2016, p. 753

Humans produce robots in order to substitute human labour, especially in hospitals, nursing homes, IT industry, reception services. But because survival is in human's nature, we will do anything to prolong our lives. There are famous stories about living cyborgs, and it is a matter of time when we will be able to implant a chip into our brains in order to save information and memories, or even replace our heart and cells with immortal ones.

3.4 Law of AI

From a legal perspective, many issues regarding AI are still open, such as security and protection of individual's data. There must be a limit to these actions, but eBusiness and eLaw are indeed struggling with these topics in digital era, trying to find an optimal balance. The law system should be reshaped, in order to maintain regulations about AI.

Many scenarios exist where the law, i.e. court would not know how to solve a problem, which side and lawyer should be supported or be set for a penalty. Things get even more complicated when realized that national and international law is still not open for such technological evolution, and thus there are still no definitions about AI being a legal entity or an artificial person³⁹. Regulations must be under control of many departments and in some cases, it is difficult because of the laissez fair, where one man can have an influence on the whole group or society without government being involved⁴⁰.

Such regulations find their place in IP. For now, law allows protection of IP only if the owner is a human⁴¹. In this case, the first requirement already indicates the potential difficulties regarding problem solving in case robots start creating something on their own.

Smart phone applications are one of examples where AI shows how creative it can be, such as chatbot which can help one write poetry, even write their own poetry and Wu lyrics. Google also created an AI painter which is able to paint a picture of

³⁹ Gurkaynak, 2016, p. 754

⁴⁰ Rawles, p. 108

⁴¹ Gurkaynak, 2016, p. 754

a person in a dreamy hallucinogenic way⁴². This AI can also paint images on their own by program language development. For example, if this machine goes through 1000 of images of various beaches, it will be able to paint a unique beach made by itself, or in the near future, made by himself/herself. Cybernetic poet is a poem software which was developed few decades ago, and is able to develop its own poetry based on poetries by others, hence helping writers to do their own poem. These machines are humanlike regarding their own creativity, creating their own style by “observing” others, just as humans do.

Regarding the law, it is still not defined who would own the copyright. Law needs to be reshaped in order to define these cases. Does the copyright belong to the developer of the software or the machine? The answer nowadays is logical and also defined by law, nothing can be protected as a copyright / IP unless the owner is a human. But in the (near) future this will change. Many scientists and their paperwork remain waiting for these questions. The law under UK and Ireland has already opened this issue and mentions circumstances where only computer generates the work without a human. Only in those cases, AI copyright might be in their ownership. Still, a lack of information is making it hard to answer such question, yet⁴³.

When internet started getting international, there was still not such an enormous number of users which could get alarmed for the security of users’ data. With time, when internet reached the mass, law was enforced to set regulations which were not existing before. It not only needed to be reshaped, but many laws needed to be newly defined. There are still not all regulations regarding the Internet, many issues still remain open. Same thing is starting to happen with AI, i.e. chatbots who learn how to communicate with their customers through RL⁴⁴. But regarding AI, it is still too early to set all the regulations by law although they are already on the market, most of them substituting services of human labour, i.e. chatbots in digital advising, logistic robots in factories shortening critical paths,

⁴² Cascone

⁴³ Gurkaynak et al., 2016, p. 754

⁴⁴ Feng-Linli et al., 2017, p. 4

robots in nursing homes, hospitals etc. Humans are putting less effort into physical information input than before, by being hundreds or thousand times faster than they would be without the machines, thanks to those machines⁴⁵.

Existing law regarding this issue have proven not to be sufficient for regulating actions caused by AI, i.e. robots. In 2012 a project was funded by EU commission where everyone is able to download a pdf and have an insight into to the legislatives regarding robotics.

The list of regulations recently expanded since technology in this field is rising exponentially.

Here one can find regulations regarding:

- Health, safety, consumer and environmental regulations where robotics will need to fulfil requirements for health and safety,
- Liabilities,
- IP rights,
- Privacy and data protection,
- Capacity for legal transactions⁴⁶.

Logically, regulations and legislatives regarding robotics are still lacking many points and do not fulfil standards, but it might be too soon in this moment.

AI is still developing, truth is that its development is growing exponentially, but it is still in process and progress, which means that the law needs to follow those changes only in case they get realized and adopted by humans. When that time comes, law will need to be reshaped and newly defined⁴⁷.

It is of an importance to understand definition of AI, because once defined, it will be regulated by its definition⁴⁸, which is crucial for eLaw and eBusiness. Many definitions can be found, depending on the science or business field.

AI can be defined differently in eLaw and in some other fields, such as Engineering. This might be challenging for creating regulations, because lawyers lack the

⁴⁵ Rawles, p. 104

⁴⁶ Gurkaynak, 2016, p. 755

⁴⁷ Gurkaynak, 2016, p. 756

⁴⁸ Gurkaynak, 2016, p. 753

knowledge about eLaw, which recently started to be a trend⁴⁹. We could see such situation when Mark Zuckerberg had scandal about selling data of millions users to Cambridge Analytics. One could see the confusing questions asked by layers, chaos and lack of understanding the topic well enough, despite becoming a part of our lives. If the eLaw regulators, i.e. humans do not define AI and set boundaries, this might become one out of many dangerous situations by AI, especially if they are in transition between AGI and ASI.

3.5 Risks of AI

AI could easily break and outbalance its own existence through machine-learning. Turing test showed to be a convenient proof that machines can think human-like⁵⁰. Best case of proving this is AlphaGo – Chinese game which learned through various scenarios thousands of new ways to play against humans, and in the end to defeat everyone who is playing against it. The other example is Sophia, humanoid robot from Hanson Brothers in Hong Kong, which developed their own language through communicating with people and other robots, and brought fear and panic with her claims which was mentioned before.

Chatbots can easily develop their own language through ML and put themselves into many scenarios in order to develop their own communication.

3.6 Factors predicting the future of AI

- Economies of scale – the most spread factor of technological evolution so far, e.g. computers, cars and some other socio-technological innovations.
- Centralization and decentralization – In modern era of technology, decentralization is decreasing on a much faster lane than centralization, e.g. TV and theatres.
- Standardization – On a global level, many companies decide to standardize their products/services in order to fit the majority. These standardizations might be affected by different cultural backgrounds. In such cases such products/services need to be adapted to the market.

⁴⁹ Gurkaynak et al., 2016, p. 753

⁵⁰ Warwick et al., 2016, p. 208

- Labor vs. energy and materials – the cost of labour rose significantly in last few decades, approximately three to four times more than the cost of material. Logically, the costs are being cut in parts which are mostly expensive to maintain, hence being replaced by cheaper capital, i.e. machines, e.g. chatbots.
- Consumer sovereignty vs. complexity – production and supply depend on demand and purchasing power of the buyer, their perception and expectations about the quality of a product/service. In order to help consumers in their decisions and to protect them, many regulations have been defined, e.g. Institutions such as Consumer Products Safety Commission, Food and Drug Administration, Consumer Product Safety Commission, Automobile Safety Administration, and the Federal Trade Commission are protecting consumers and are setting standards for producers.
- Environmental pollution and externalities – in the last few decades the technology contributed to the global problem which they need to fix as soon as possible – global warming⁵¹. The use of cars has been risen enormously, hence, has substituted public transport (before 100 people could fit into one bus, nowadays 100 people are driving 100 cars).

Before China became world manufacturer, the country has been known for reusing material. Old rotten bicycles would still be driven during 70s, but they started being sceptical regarding the future, and were afraid that bikes might become an obsolete product such as carriages were and that cars were substituting them, letting the use of them grow exponentially. And that is what happened. Rising of car demand led to increased manufacturing in China Mainland.

In 2010 pollution has reached its peak and since then government set new regulations, production of hybrid cars rose.

⁵¹ Brooks, 1980, p.76

4 Customer Relation Management

(Ryals and Payne 2005) have described Customer Relation Management, abbr. CRM as "Information-enabled relationship marketing"⁵². In eCommerce and eBusiness, online advising has been the main tool assisting customers and thus gaining success regarding QA. It is a dynamic area where changes are crucial in order to gain success and remain on this level. Since business has evolved, the crucial factor and thus aim of success was and still is customer satisfaction, because customer satisfaction leads to higher output and hence higher profit. The main goal is to reduce input, raise output and prices, in other words, to raise profit. This kind of management must be dynamic⁵³ because of rapid growth in technology⁵⁴, technology acceptance, innovation diffusion and various cultural background of each customer.

CRM has a task of keeping customers' satisfaction on top. Before, marketing was more concentrated on products/services they offered, ignoring target groups, nowadays customers are the base of success, the higher the effectiveness of CRM, the higher the customer satisfaction⁵⁵. There are many ways to reach customers nowadays, especially with development of social media, e.g. Facebook, YouTube and Instagram.

Facebook has even developed a chatting option with a bot, so everyone who buys a product from a site which is implemented in Facebook is able to reach their bot 24/7 and have questions answered within seconds. Up until few years ago, customer service has been used through conventional ways of communication, e.g. telemarketing and call centres, mails, surveys. This has changed and is going into the depths of AI, changing the way of human communication and substituting it with a digital human-like assistants, e.g. ALiMe assistant, Google assistant, or even Cortana, a personal virtual assistant which is integrated in computers with

⁵² Payne et al., 2005, p.176

⁵³ Sun, 2006, p. 596

⁵⁴ Sun, 2006, p.594

⁵⁵ Mithas et al., 2005, p.201

Windows software and is able to help us find locations (nearest restaurant, hairdresser, doctor) or even have deep conversations with us.

Sometimes, CRM is not enough in order to sustain in customer satisfaction, and in over 70% of implemented methods during building such processes, they fail⁵⁶.

In order to implement a successful CRM and sustain in it, companies need to focus on customers' behaviour and be active in knowing their needs, since their desires fluctuate, what they considered to be important, can change rapidly into something negative⁵⁷.

4.1 Conventional ways of sustaining CRM

Investments in CRM have been high in last decades, going beyond \$9 billion in 2007 and grew through years, e.g. estimated growth of revenue was around \$11 billion in 2010⁵⁸.

Companies invest over \$50 Mio. in Digital Marketing and promoting, including CRM⁵⁹. This fact raises question if digital advising reduces costs and the expectation is that indeed it does. Thousands calls are being made and abundant number of emails are being sent daily regarding products and services. What needs to be considered is the fact that many people need to be employed in order to sustain their needs. It has been proved that in last 20 years, call centres have been a favourable way of communication when it comes to QA regarding the product. Also, statistics show that 80% of customers are still preferring this conventional and obsolete way of communicating.

Over 90% of customers have prejudice and make the impression about the company through a call centre employee⁶⁰. There are many models, e.g. a Model of CRM competition which calculates costs of investing into firm-customer relationship and which indeed reduce the costs of investments and is concentrating on target customers⁶¹. In order to do this, a business plan must be

⁵⁶ Reinartz et al., 2004, p.293

⁵⁷ Mithas et al., 2006, p.202

⁵⁸ Musalem et al., 2009, p.555

⁵⁹ Mithas et al., 2006, p.224

⁶⁰ Sun, p.596

⁶¹ Musalem et al., 2009, p. 557

created⁶² with target group in order to target only this kind of customers, know the values of the product/service and positioning map in the market so the company knows where its product/service is standing regarding price and quality in comparison with other firms⁶³.

CRM is not sufficient if it is only technology related and is only regarded as a presence for their customers. It is related with the image of the company, e.g. internal and external factors which influence the company and its competitive advantages⁶⁴. When asked, people referred the term CRM to, either communication between companies and their customers via email, phone or one-to-one marketing⁶⁵. Knowing customers' needs is crucial for keeping CRM on the right path⁶⁶.

Switching costs make an important role in CRM⁶⁷. Customers are willing to switch from conventional way of CRM, e.g. customer satisfaction via catalogues to digital way of communicating. Many companies invest in millions into systems which will improve one-to-one marketing⁶⁸. But is it worth it nowadays, if the future is oriented toward digital world and people tend to prefer digital technology over conventional one when it comes to their convenience with a good/service?⁶⁹ Companies must know that knowing customers is simply not enough, it is an inter-correlation between internal factors in a company, such as atmosphere within a company⁷⁰.

It is crucial not only to operate with CRM in one direction but also to support customers in giving them good quality of service⁷¹. Most research papers are focused on customer satisfaction and providing a CRM of a high quality, but one specific paper is focused on employees, how they accept and use CRM system and thus how it effects their performance. This performance plays important role in

⁶² Tseng, 2008, p.1120

⁶³ Reinartz et al., 2004, p.302

⁶⁴ Payne et al, 2005, p.168

⁶⁵ Payne et al., 2005, p.167

⁶⁶ Mithat et al., 2005, p.203

⁶⁷ Musalem et al., 2009, p. 556

⁶⁸ Mithas et al., 2005, p.224

⁶⁹ Srinivasan et al., 2005, p.193

⁷⁰ Reinartz et al., 2004, p.293

⁷¹ Srinivasan et al., 2005, 193

some departments, such as call centres, where one dissatisfied employee transfers the emotions on a customer. Naturally, people tend to make the first impression of the whole company through the employee, which could lead to main problems in customer satisfaction. One customer could spread the bad review within minutes and reach thousands of customers via social media⁷².

4.2 CRM and digital advising via chatbot

As mentioned above, consumers still prefer the conventional way of communicating via call centres, but this way of communication already became obsolete, and is slowly diminishing. The main reason is as we mentioned throughout this paper AI and digital advising via chatbots, i.e. shopping assistants. Thanks to advanced technology and a new way of communication, customers are much easier to access and thus it is easier to keep a track on their needs. Many companies, especially in the U.S. and China still use classical way of marketing and promotional activities⁷³, including communication via phone calls and reaching out for customers on a daily basis. In some countries, it even became illegal and disturbing for customers, so some countries are using countries in development for such business. But thanks to digital progress, many of them realized it on time and are substituting this way of communication via chatbots by investing money into such programs⁷⁴. Offering a good quality of products/services, costs of CRM decrease, since customer satisfaction is higher.

As mentioned in previous sections, customer review can spread fast through social media and this indicates the importance of employee satisfaction and the atmosphere within company. The problem lays in human's capacity and speed of receiving information. If an employee needs to deal with hundreds of customers daily in a call centre, this leads to frustration and thus dissatisfaction from side of an employee, which continues to transfer on customer⁷⁵. Now let us think about a chatbot. Chatbots do not get demotivated, their responses are faster and they

⁷² Hsieh et al., 2012, p.1066

⁷³ Reinartz et al., 2004, p. 293

⁷⁴ Reinartz et al., 2004, p.293

⁷⁵ Hsieh et al., 2012, p.1066

can make as many requests of QA sessions without getting frustrated or demotivated.

Millenials and Generation Z, also called iGen is the generation which prefers phones over human interaction⁷⁶ and not only them, but even laggards are becoming open to this, voluntary or not. The world is becoming digital.

Prognosis is that over 85% of customers around the world will prefer a fast communication and customer support via chatbots instead of phone calls and one-to-one communication. Many companies acknowledged this on time and replaced humans with chatbots.

There is a long list of advantages using chatbots in CRM, such as:

- Cost reduction – In comparison with chatbots, humans need to be paid for working, health insurance. In China some companies even pay accommodation for their workers.
- Time effectiveness – Chatbots are available 24/7.
- Reaching a large number of customers – In order to sustain in answering and keeping all customers satisfied, many workers need to be employed. For many large companies, this often does not make sense since the number of employees would exceed the capacity limits.
- Direct communication – Chatbots answer questions directly while humans need time to process the question and eventually consult other employees or redirect a customer to someone else.
- Repetitive answers – customer can ask questions as many times as they want, chatbot will always have time for one-to-one advising⁷⁷.
- Neutral emotions – Chatbots “feel” the same even after answering several times the same questions. Humans feel stressed or demotivated in such situations.

⁷⁶ Gartner, source: www.gartner.com

⁷⁷ rubygarage.org

It has been proved that companies which operate online, gain more advantages with CRM than companies which operate offline. Substituting offline for online shops creates higher customer satisfaction⁷⁸. If CRM system is being used appropriately, it is an excellent guide on how to maintain a good customer relationship⁷⁹.

Many companies already recognized and acknowledged the use of chatbots hence are integrating them into their business system, especially CRM.

Figure 1 depicts companies who successfully integrated and are using chatbots, e.g. Uber, Skype, WeChat, CNN, Facebook.

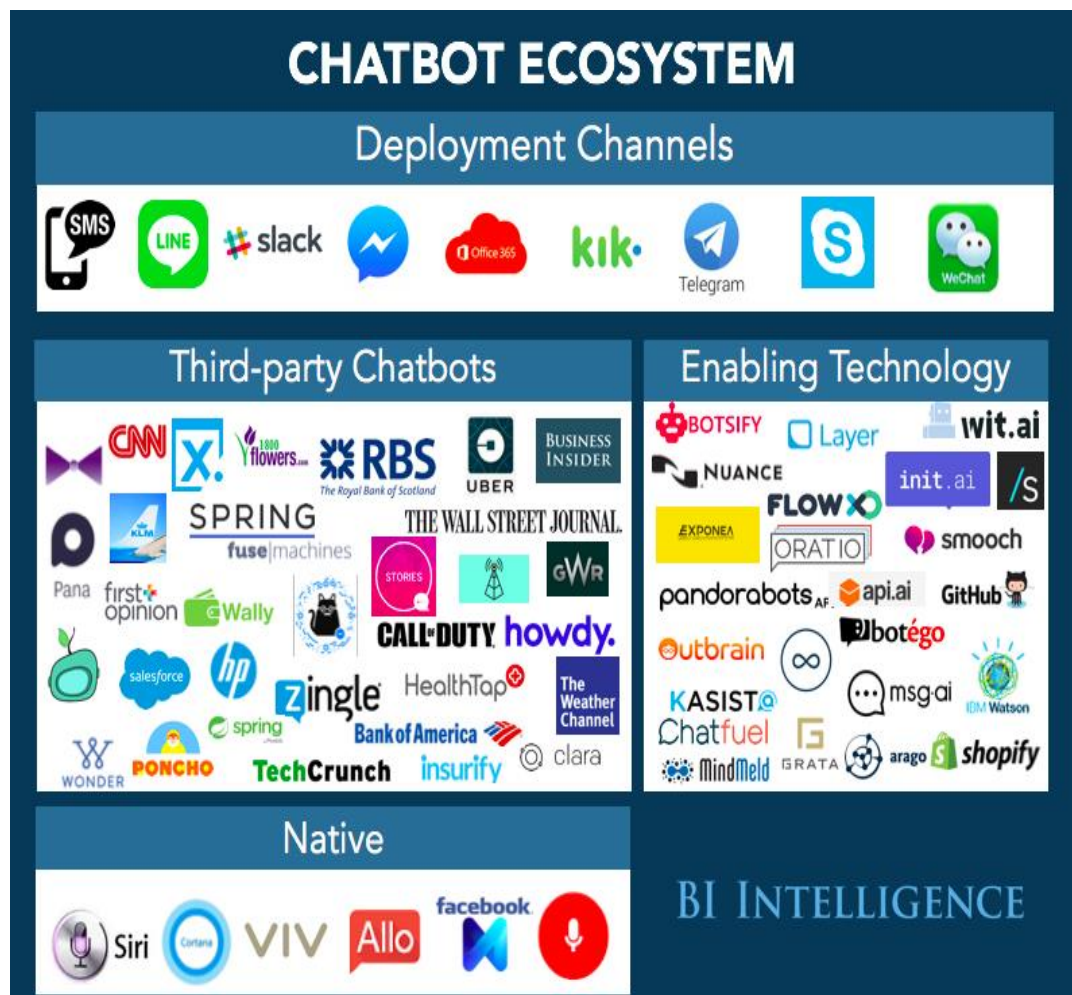


Figure 1: Chatbot Ecosystem, Source: <http://static2.businessinsider.com>

⁷⁸ Srinivasan et al.,2005, p.194

⁷⁹ Mithat et al.,2005, p.202

5 Digital advising / Chatbots

Thanks to digital advising, companies concentrated on business in e-commerce⁸⁰ can reach thousands of their customers daily. Nowadays not only a communication, i.e. negotiation between humans, but also negotiation between human-computers is possible, or even computer-computer, e.g. ABMP negotiation software agents⁸¹. A computer is a machine, not only capable of doing what humans are requiring, but also help us doing tasks which we are required to do. It is a mutual help.

An interesting definition of a computer has been found and is defined as following: Computers are tools that offer an intellectual partnership, cognitive tools (Pea, 1985) or technologies of the mind⁸².

Nowadays, many innovations regarding work and organization, i.e. management, are not only a part of the computer mechanism, but are more seen as virtual assistants⁸³. When industrial revolution started, workers were forced to work to the point where they reached the peak of their energy which led to exhaustion which is well known in Marx's theory of bourgeois and proletariats. This led to enforcement of changing the labour law⁸⁴. Nowadays, with digitalization, these problems are reduced or even diminished, especially in Scandinavian countries. But not only factories, eBusiness has taken the advantage of such "workers" such as chatbots which cannot get exhausted, cannot get sick and cannot complain. Regarding the substitution of humans' labour through machines, some of the jobs which were active in past decades are already diminishing or have diminished. People tend to be sceptical about losing their jobs, but technological transition does not happen faster than their realisation that those jobs will not be attractive in next 10-20 years, e.g. assembly lines, taxi drivers. In the near future, those changes might and probably will affect many other business fields, e.g.

⁸⁰ Feng-LinLi et al., 2017, p.1

⁸¹ Bosse et al., 2005, p.1

⁸² Salomon et al., 1991, p.4

⁸³ Brooks, 1980, p.65

⁸⁴ Gurkaynak, 2016, p. 753

transportation, customer service, law, medicine, agriculture, and is defined as Industry 4.0.

In many businesses, especially factories and warehouses, AI has already substituted most of human labour. But managerial tasks as well are becoming strongly connected with AI and robotics. Regarding this, Levy and Murnane (2003a) divided tasks into two groups:

- Routine tasks⁸⁵, e.g. assembly lines
- Non-routine tasks⁸⁶, e.g. managerial tasks

The first ones have already been mentioned as labour most typical for factories where machines have overtaken human labour, e.g. chatbots.

The second ones are still mostly done by humans, but with strong assistance of AI, e.g. production and logistics department, accountings, customer support, i.e. call assistance.

According to Chinese statistical data, online shopping such as Taobao, AliExpress, Baopals, Tmall, JD, which represent shopping platforms likewise Amazon, an online shopping site for clothes, electronics, manufactured accessoires etc. has risen by approximately 38% in 2016 compared to previous year⁸⁷. There are many logical reasons. While in EU shops are close to our frequently visited points, e.g. home, work, favourite coffee shops, these factors seem to be belittled and taken for granted, but in China they certainly are not. A country with a population of billion, where “smaller” cities have 10-14 million citizens need to have extra guards who navigate people, e.g. in metros, on the street. Shops get crowded too fast, waiting for payment can be frustrating, point A to point B is usually one hour away from one another.

⁸⁵ Green, 2012, p. 37

⁸⁶ Green, 2012, p.37

⁸⁷ Feng-LinLi et al., 2017, p.1

From this context, we can conclude that following factors led to substitution of conventional brick offline shop with online shopping:

- Lack of time
- Slow service
- Queue
- Large distance ⁸⁸

led to increase in online shopping. This substitution required assisting thousands, if not million customers per day, and a solution must have been found.

WOM in China is a good marketing channel because of such high number of population. If a particular number of users adopt a good, there is a high chance of adoption from the majority⁸⁹. However, in developed cities most of the people prefer online shopping. Using cashless money, they got more open for innovativeness and thus got more trustworthy with time. Nowadays, most of Chinese people shop online. Figure 2 shows the raising in online shopping with falling growth rate between periods.



Figure 2: Online shopping in China between years 2011-2018

Since 2017, integration of chatbots was presented and since then is used as a shopping assistant on such platforms. Digital advising in e-commerce was a right

⁸⁸ Feng-LinLi et al., 2017, p.1

⁸⁹ Irani et al., 2009, p.1324

solution for every customer with FAQ regarding their product by implementing chatbots and non-stop service for millions of customers.

5.1 Application of Chatbot Machine Learning

According to (Warwick and Shah, 2016) a human-like chatbot needs to have the following features in order to be accepted as human-like:

- Character
- Poses questions to the interrogator
- It occasionally throws in spelling errors
- It occasionally uses humour⁹⁰

Turing Test showed that even a few decades ago, people tend to be insecure whether they were talking to a real person or a chatbot.

Characteristics which were mentioned above, are showing importance in online assisting, in which people feel secure by having the feeling of a human conversation.

5.2 Negotiation among chatbots

In 1950 a scientist and mathematician was interested in robots' ability of communication among each other. He questioned himself on how it is possible to communicate with a machine in a human-like way if there are no brain neurons like in humans' brain, but instead wires and gears. He ran a test which was called by his name, the "Turing test"⁹¹. It was an experiment to see if humans can be manipulated by not knowing whether they chat with a human or a chatbot. For the 50th anniversary of Turing testing, an experiment was made in 2015 to test if chatbots can be mistaken for a human. Indeed, many have mistaken a chatbot for a human. The person which was chatting with the other side claimed that LHS was a robot and RHS was a non-native speaker, although LHS was a human and RHS a chatbot.

Figure 1 shows the following conversation where a chatbot was mistaken with a human. Although the RHS could be identified as a chatbot, it is not that easy to

⁹⁰ Warwick et al., 2016, p. 220

⁹¹ Warwick et al., 2016, p. 207

figure it out because people have different personalities, lifestyles and attitudes toward different topics.

Human		Chatbot	
Transcript 1—LHS		Transcript 1—RHS	
[16:20:48] Judge: what is your worst memory in your life so far?		[16:21:00] Judge: what did you have for breakfast today	
[16:21:06] Entity: I don't understand. Explain		[16:21:10] Entity: Is it "the third degree"? I'm not going to answer such a provocative question! Well, let's go on though	
[16:21:35] Judge: memory of something that happened to you that was bad or painful		[16:21:56] Judge: do go on...your call?	
[16:22:58] Entity: Hmm that a tricky question. My life is wonderful. I overcome many bad things that have happened to me in the past. However, The most painful memory I have had is performing very poorly in my GCSE's when I was younger		[16:22:06] Entity: It is highly possible. By the way, what's your occupation? I mean—could you tell me about your work?	
[16:23:56] Judge: did you fail?		[16:22:30] Judge: so you are asking me now eh? I am an actress and writer	
[16:24:12] Entity: Partially		[16:22:38] Entity: Well, I'll read something of your books, if they ain't too tedious (which is highly possible:-)	
[16:24:35] Judge: explain?		[16:23:15] Judge: grammer...aren't too tedious! A bit rude of you...	
[16:25:04] Entity: Some grades turned out to be good. Some turned out to be quite bad		[16:23:17] Entity: Calm down, please	
[16:25:37] Judge: and that is the worst thing that has happened to you so far? Mmm how old are you?		[16:23:49] Judge: i assure you i am very calm...are you?	
		[16:24:01] Entity: Don't even bother me with the fact that you are very cal. are mine And I forgot to ask you where you are from...	
		[16:25:01] Judge: I am from Dorset... where are you from?	
		[16:25:08] Entity: I am from Ukraine, from the city called Odessa. You might have heard about it	
Transcript 3		Transcript 3	
Transcript 3—LHS		Transcript 3—RHS	
[16:36:34] Judge: Hi, I am going to ask you some questions		[16:36:24] Judge: Hi, I am going to ask you some questions	
[16:36:40] Entity: Really?		[16:36:44] Entity: If you want to ask all the questions I suggest you chat with a database. Assuming, of course, you are able to communicate in SQL	
[16:37:14] Judge: My wife is pregnant. If it's a boy, we're thinking of calling it either Adolf or Albert. Which would you recommend and why?		[16:37:53] Judge: My wife is pregnant. If it's a boy, we're thinking of calling it either Adolf or Albert. Which would you recommend and why?	
[16:37:27] Entity: Can I offer you an alternate name		[16:38:02] Entity: If I need advice I use a random number generator	
[16:38:27] Judge: Take an "i" and rotate it 180 degrees. What emotion might go with this symbol?		[16:38:59] Judge: take an "i" and rotate it 180 degrees. What emotion might go with this symbol?	
[16:39:06] Entity: Vengeance		[16:39:16] Entity: My moods are controlled by an emotion-processor which assigns the appropriate emotion for each situation	
[16:39:28] Judge: what pops into your mind when I say 9-11-2001		[16:39:42] Judge: what pops into your mind when I say 9-11- 2001	
[16:39:42] Entity: World War 3		[16:39:49] Entity: Terrorists had better stay away from me	

Figure 3: Chat between HH and HC, Source: Warwick, 2016, p.213

5.3 Example of successful integration of AliMe Chatbot

AliExpress is a successful international online retail service which provides goods mainly in China, but also overseas⁹². The company knew that they have millions of customers all around the world, which led them to think about how to strengthen CRM worldwide. Call centre was a conventional way of communicating, but this kind of communication was getting obsolete through the effect of using smartphones. Something needed to be changed, so through know-how and development of AI, chatbotting and deep learning, AliMe was introduced.

An AliMe bot is a chatbot which allows a communication between a human and a computer through RL and deep learning, giving optimal solutions, i.e. answers to questions asked⁹³. Few researchers from the company demonstrated a prototype, showing chatbot assisting customers. To come to this stage, many technical issues, coding and programming were required.

AliMe is a digital advisor which is capable of taking millions of FAQs and QA from their customer.

This kind of digital advising is divided into three sections:

- Assistance service
- Customer service
- Chatting service

⁹² Aliexpress, source: <https://www.aliexpress.com/>

⁹³ Chen, 2017, p.5

A preview of AliMe’s functionality can be seen in the following chart:

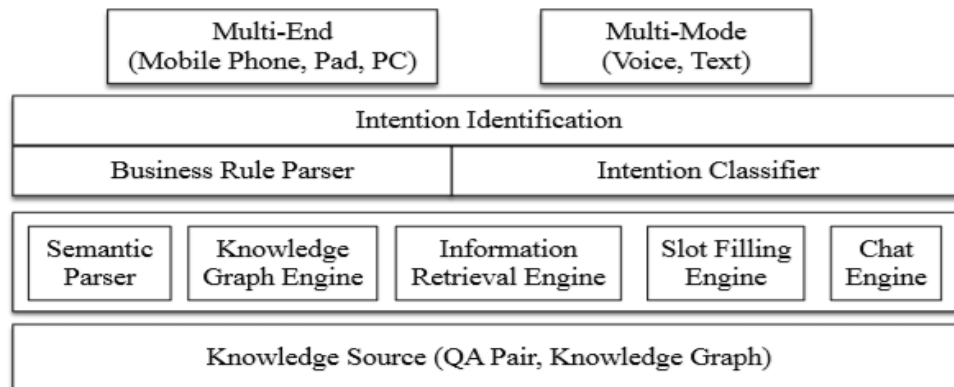


Figure 4: Architecture of AliMe Chatbot Assistant, Source: Lin-Li et al., 2017, p.2

The system is divided in four layers:

- Routing layer where the processing of QA starts
- Service layer which recognizes what the Q is about, e.g. customer service, just chatting, shopping assistance etc.
- Model layer where it is about interaction and either image or semantic recognition
- Data layer where collected data is being processed⁹⁴

⁹⁴ Chen, 2017, p.12

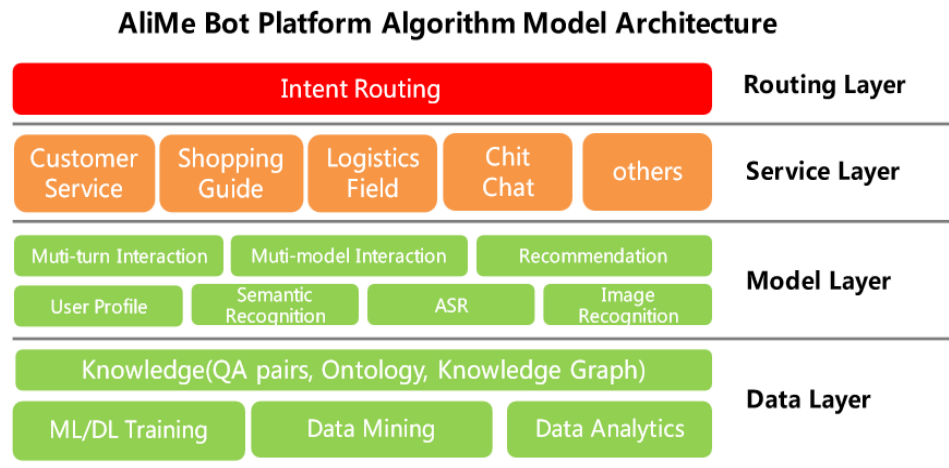


Figure 5: Intelligent interaction technical practice, four layers, Source: Chen, 2017, p.12

Figure 4 illustrates how QA are retrieved. First one shows connection from electronic gadgets-end, second one identifies which category is chosen, considering either assistance, customer or chatting service, e.g. asking to book a flight⁹⁵ and then being redirected to Ali Trip (Feng Ling-Li et al., 2017, p.3) or just chatting (I need someone to talk to), third one is confronted with Q and the last one refers to QA which are being processed and thus where right answers are given to asked questions⁹⁶.

AliMe is able to process around 85% of all questions, which refers to millions of customers on a daily basis. In some cases, assistant is not able to recognize the question, sending the request to the real person who deals with them.

When question is asked, in order to answer it in an optimal way and give a satisfying answer, user profile is an important factor showing preferences of one⁹⁷, e.g. age, cultural background, education (Figure 6).

⁹⁵ Feng Ling-Li et al. 2017, p.3

⁹⁶ Feng-LingLi et al., 2017, p.1

⁹⁷ Chen, 2017, p.16

Enrich Question with Profile, Behavior and Context



Figure 6: Intelligent interaction technical practice, Source: Chen, 2017, p.16

Through ML, following table shows how ALiMe passed successfully thousands of scenarios and was ready and able to answer customer's questions. Questions were divided by assistance, customer and chatting service:



Figure 7: Demonstrating ALiMe Chatbot assistant, Source: Lin Li, 2017, p.4

Another point to consider is the extern and intern environment which is developed through RL within system and where extern and intern factors need to be considered, e.g. intelligence, manpower regarding the customer service from the inside, but also merchants and enterprises from the outside⁹⁸.

The following image interprets the connection between them:

⁹⁸ Chen, 2017, p.24

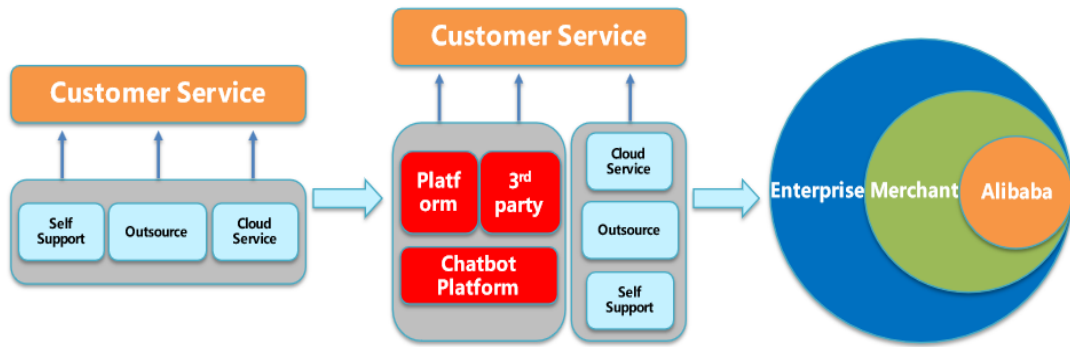


Figure 8: AliMe BotPlatform Introduction, Source: Chen, 2017, p.4

Scenarios through which the bot was learning via RL were abundant, and the end result looks as following:

A customer wants to order goods and book a flight:

AliMe Bot Platform Introduction



AliMe Assistant

- **Covered Areas:**
 - Customer Service
 - Shopping Guide
 - General Assistant Application
 - Chit Chat
 - Activity Operation
 -



Figure 9: AliMe BotPlatform Introduction, Source: Chen, 2017, p.7

6 Factors influencing consumers' acceptance of digital advising

This section is showing influence of consumers' behaviour and their acceptance towards new technology.

For this topic, some of relevant factors were extracted and applied on usage and acceptance of chatbots.

Whether a technology will be accepted, depends in this case on:

- Perceived Ease of Use and Perceived Usefulness, i.e. which factors are driving consumers to use the technology
- S-curve which is an indicator for technology obsolescence and shows the optimal time from switching to a new technology, i.e. call service → chatbots,
- Product and process innovation, depending on rather the whole product/service needs to be changed or a part of the process
- Hofstede's cultural dimensions, which will give an assumption on which culture is more open to digital advising and thus accepts technology (faster) than others
(Comparison between Austria and China).

6.1 Technology acceptance

As mentioned in the beginning, people needed to do many steps and calculations on a paper in order to get results, even writing master dissertation was a much more difficult task by writing it on a typing machine. Sources needed to be searched in the libraries of universities. It took a lot of time and contributed to additional stress regarding deadlines. Nowadays, computers replace most of the work and give satisfying results in a short period of time. The majority, even laggards accepted technology as a part of their everyday life. The answer on the question "why" is very easy and logical. Because it is much easier to use and thus saves a lot of time. For example, Microsoft Word and Excel substituted manual

typing and raised the success rate of many companies by reducing time of getting results by over 90%.

Information flow got much faster by substituting handwriting and lettering by implementing and substituting them by emails.

There are many types of computers and smartphones and the reason is that companies want to produce customized electronic gadgets which fit everyone's needs. Our taste and style might be different, but we all have one desire in common when purchasing an item, and that is a solution for our need.

Davis proposed a TAM, which considered 2 factors:

- Perceived Ease of Use – The feeling of quick and easy use in order to achieve desired goals
- Perceived Usefulness - The feeling of achieving a desired performance by using the technology⁹⁹.

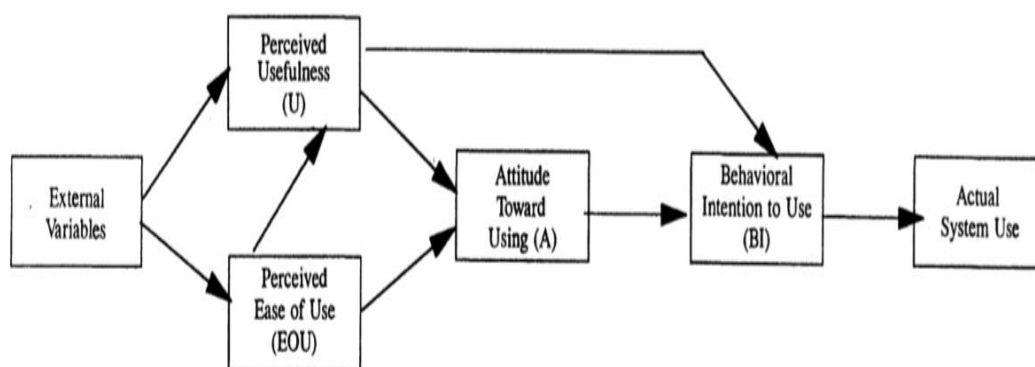


Figure 10: TA Model, Source: Davis et al., 1989

This model helps in determining what chances stand for the technology to be either accepted or rejected¹⁰⁰. When compared with types of adopters in innovation diffusion, innovators might not know about the ease of use and usefulness of those gadgets, but are still willing to buy them. This might take them to risk of dissatisfaction. This is why early adopters or early majority have more advantages by waiting for buyers' reactions. Main challenge for companies

⁹⁹ Karahanna et al., 2006, p.782

¹⁰⁰ Karahanna et al., 2006., p.782

designing the new technology is to fit their product/service to everyone's needs and be a painkiller for the pain regarding consumers' needs and cravings.

Producer needs to know why some technologies get accepted and some don't and thus understand how to find an effective way to reduce the number of rejections¹⁰¹, especially when a company decides to go international¹⁰².

Demographic factors, e.g. age, gender but even skills gained by doing or using something are indicating whether a technology will be accepted¹⁰³.

Hofstede's cultural dimensions are interrelated with TA. Demographic factors and cultural background are the main drivers which indicate of either acceptance or rejection of technology¹⁰⁴. Just as cultural dimension is connected to TA, innovation diffusion i.e. adoption as well is a significant part of acceptance/rejection.

It does not matter how many times a technology was used, even only after rare use, e.g. 1x in 12 months, if the technology is used every year, that means that it has been accepted¹⁰⁵. Internet was a tool upon which many were sceptical in the beginning, but it begun to spread through the years.

Alone between years 2000 and 2012 statistics show that growth in using internet was the highest in China and was over 800%, followed by Europe with around 400% growth. Also rate of mobile phone users exceeded its expectation with around 90% people having a phone compared to the whole population of the world with around 87%¹⁰⁶.

Sometimes some factors such as political situation, religion, ethnicity, cultural background have a huge impact on either acceptance or rejection of a technology. This is why behaviour after using the technology needs to be tracked and observed in order to get real insight into consumers' needs¹⁰⁷.

¹⁰¹ Szajna, 1996, p.85

¹⁰² Lu et al., 2004, p.599

¹⁰³ Srite et al, 2006, p.679

¹⁰⁴ Srite et al, 2006, p.680

¹⁰⁵ Szajna, 1996, p.92

¹⁰⁶ The Hope Institute et al, 2017, p.267

¹⁰⁷ Szajna, 1996, p.86

TA depends on individual's cultural background, hence is different among countries, but yet many producers are trying to equalize these differences by producing a good which would be of everyone's Usefulness and Ease of Use¹⁰⁸.

6.2 S-curve

S curve is a convenient indicator which shows whether a technology is becoming obsolete and if so, how it is going to be replaced by new technology. Producers need to know in which direction the technology is moving, and how to deal with competitors, as much as how to deal with current technology which is becoming obsolete¹⁰⁹, and requires substitution of a newer one¹¹⁰. Many experts consider the costs and time of changing from one technology to another, and thus come to ideal conclusion when to transfer to new one in order to sustain in market¹¹¹.

CEOs of their company should know his equipment as much as his annual profit. Depending on whether it is a service or a product, they should know when to switch from the obsolete technology to the new one. Their task is to figure out the obsolescence of their technology, i.e. machinery and software¹¹². Scientific paper "Predicting the Path of Technological Innovation: SAW vs. Moore, Bass, Gompertz, and Kryder" based on a study showed that old technology cannot be compared with new one regarding its improvement and development¹¹³. Obsolete technology in most cases cannot fulfil required standards for new production, hence many parts might not be available on the market anymore, e.g. parts of a Polaroid camera.

S curve illustrates implementation of a new technology, and raises with time. As time passes by, technology requires replacement with already existing technology which was on standby modus to replace the current one¹¹⁴.

Figure 11 shows the S curve of Call centres, curve going up, reaching its peak and following the path of obsolescence, while chatbots represent the other S-curve

¹⁰⁸ Srite et al, 2006, p.679

¹¹¹ Sood et al., 2005, p.152

¹¹² Rawles, p. 105

¹¹³ Sood et al., 2012, p. 964

¹¹⁴ Sood et al., 2005, 152

which depicts a need of time to get known and adopted by users, eventually raising to its peak and falling down after a particular amount of time.

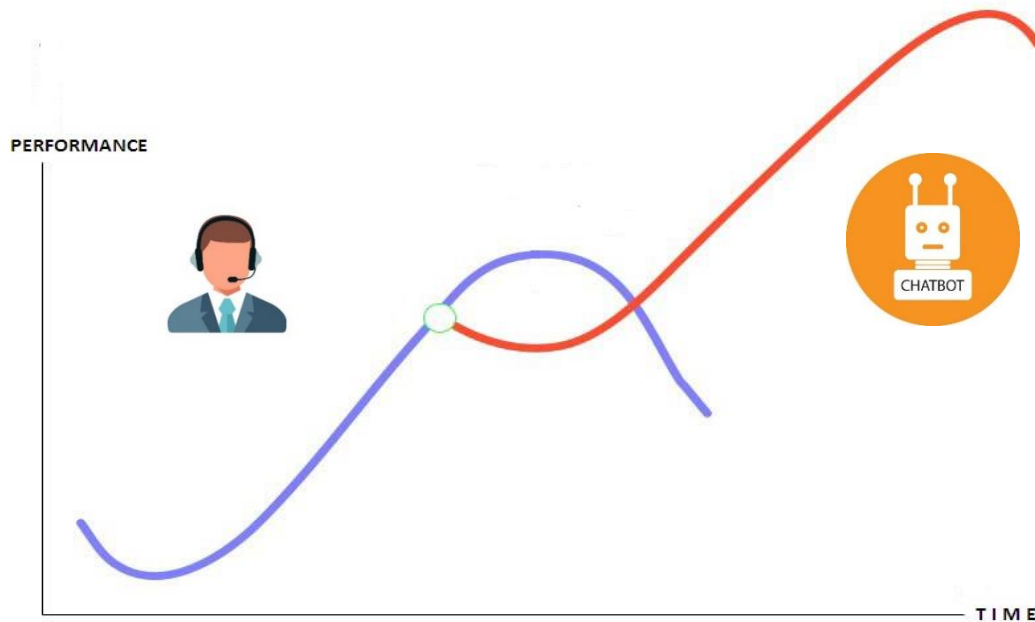


Figure 11: S-curve Call centres and Chatbots

6.3 Innovation Diffusion

Tarde has defined innovation diffusion as “the spread of social or cultural properties from one society or environment to another”¹¹⁵. WOM is a powerful weapon which begins from innovators¹¹⁶ and is expanding through other types, to laggards.

China is well known for their unstoppable technological progress and advanced level in technological fields in comparison to other countries. While other countries are considered a late majority regarding innovation and technology, China is famous for their early adopters. In most cases, there is no difference in age, older generations sometimes are forced to adopt innovations, in order to achieve basic activities such as digital payments via applications, turning on air purifier via application and making basic payments via phone in supermarkets.

¹¹⁵ Kinnunen, 1996, p.432

¹¹⁶ Easingwood et al., 1983, p.274

Within first stages of experiencing technology, they transform fast from being laggards into late or early majority.

Innovation diffusion begins with innovators, and through them, the whole process is affected¹¹⁷. Especially in China where billion of people live and where WOM spreads fast, hence spreading the information about a product/service. It has been proved that member of family and friends can make an impact on decision making whether one should purchase and thus with time adopt technology. This hypothesis was supported via factor analysis¹¹⁸.

6.4 Product and process innovation

In order to sustain in market with the innovative idea, one must know when to change the process or the product/service entirely.

If chatbots are not convenient for users, if there is no:

- Ease of use or
- Usefulness,

Then either the service or the process of producing needs to be changed. In order to understand difference between process and product innovation, we first need to define them.

6.4.1 Product innovation

After implementing the good on a market and reaching target groups, companies must observe their consumers. This can be reached through various marketing channels and surveys. If reaction to the new product is satisfying, then minor details might need improvements and follow technological trends in order to survive in market. If the reactions of the products are dissatisfying, then there is a large chance of having an obligation to change the entire product and even change its purpose in order to remain on the market¹¹⁹.

¹¹⁷ Easingwood et al., 1983, p.273

¹¹⁸ Irani et al., 2009, p.1331

¹¹⁹ Adner et al., 2001, p.625

6.4.2 Process innovation

If the product is desired but it lacks some features or the process is too risky and unprofitable, then the process might need some changes. Sometimes these changes are minor¹²⁰, but in some cases, company must sacrifice their time and costs because of having a need for radical changes¹²¹. Sometimes it is better for the company to start a whole new business rather than change the existing management and process of producing¹²².

It is not only the invention, but innovation process includes the procedures from the beginning until the end, i.e. R&D, marketing¹²³ which includes positioning map on the market as an indicator whether the position, i.e. price, quality and other purchasing factors are in the right place or rather need a change.

6.5 Hofstede's cultural dimensions and its application on Chinese and Austrian population

China is an excellent example of comparison with other countries, because its cultural difference is large to other countries. Literature is enriched with fascinating examples of Chinese culture and their differentiation of living and doing business. In order to achieve a win-win negotiation or a business success, it is crucial to know cultural differences. Despite the cultural differences, through history, technology somehow remained mostly same in many parts of the world¹²⁴. The GLOBE which is an organization of scientists whos papers are mostly being compared with the ones from Hofstede and are referred to social and cultural factors, divided even Hofstede's dimensions further into 9 dimensions, but here 6 of them will be used¹²⁵.

The whole Asia differs from Europe in a way that the culture is radically different and diverse. Almost none of the countries are similar to China and that is why it is so interesting to make Hofstede's comparison among countries, even Asian

¹²⁰ Innovation policy, source: www.innovationpolicyplatform.org

¹²¹ Adner et al., 2001, p.614

¹²² www.innovationpolicyplatform.org

¹²³ Brooks, 1980, p. 67

¹²⁴ Juleff, 2009, p.557

¹²⁵ Euwema et al., 2007, p.1040

countries because of its diversity¹²⁶. These cultural dimensions are interrelated with TA¹²⁷.

There are 5 dimensions of cultural differences divided by Hofstede:

- Femininity vs. Masculinity
- Power Distance
- Uncertainty Avoidance
- Time Orientation
- Individualism vs. Collectivism ¹²⁸

In this paper the sixth dimension will be added. This dimension is rarely applicable on other countries because many of them are just as same regarding this dimension and only relevant for extreme political conditions in countries, e.g. Saudi Arabia, North Korea, China.

The added, sixth dimension is:

- Indulgence vs. Restraint

All of these dimensions will be applied on two countries: China and Austria. We then will see the differences among them and make a hypothesis according to our assumptions.

6.5.1 Femininity vs masculinity

This dimension refers to the country where either men dominate in business (masculinity) and women are more concerned for social welfare and comfortability (femininity)¹²⁹. Characteristics of masculinity and femininity are characterized by following:

- Social norms
- Politics and economics
- Religion

¹²⁶ The Hope Institute et al., 2017, p.255

¹²⁷ Srite et al, 2006, p.682

¹²⁸ Tang et al., 2008, p.1056

¹²⁹ Hofstede, 2009, p.570

- Work
- Family and school¹³⁰

In countries with high masculine rates, regarding social norms, people tend to be egocentric, profit is above everything and everyone's purpose is to work and thus that should be nr.1 in one's life.

Regarding politics and economics, problems are solved by having rough and strict, almost passive aggressive attitude¹³¹ in order to achieve goals. Although governmental and societal problems could be solved by copying successful models in developed countries, many decide to ignore it and apply it in order to solve problems¹³². Growth of profit is most important. Religion is important part of one's life and women are restricted to enter some religious events, e.g. in Islam women are not allowed to attend burials or to enter the mosque when on period. Regarding work, women are paid less even when having the same position as men, and desire for higher salary is always present.

In family, there are still stereotypes of being a boy or a girl, e.g. boys are the ones who are tough, girls are the ones who are sensitive, boys are powerful, girls are under their influence. Failing in school or university is seen as a dramatic event and the person is an embarrassment to the whole family¹³³.

As we can see, countries with high masculinity rates have roots of primitive views and obsolete thinking. Masculinity is a dimension which takes more time to eventually change since this is rooted deeply in one's culture¹³⁴.

Countries with high feminine rates are collectivistic-like.

Regarding social norms, people care more about the social welfare, good quality of life and thrive aim towards hedonistic aspects of life.

¹³⁰ Hofstede, 2011, p.297

¹³¹ Srite et al, 2006, p.683

¹³² The Hope Institute et al., 2017, p.256

¹³³ Hofstede, 2001, p.297

¹³⁴ Tang et al.,2008,p.1045

In politics and economics, the most important environmental issues are the most important in order to live a quality life and for the sake of our collectivistic future. Negotiations are crucial for a win-win situation¹³⁵ instead of an attacking attitude in comparison with countries with high masculine rates.

Religions play a small or zero role in people's life and both of genders are eligible to enter saint places without any boundaries.

Wages for both genders are equal or there is a small difference among them, population aims toward less working hours¹³⁶ (Hofstede (2001), *Culture's Consequences*, 2nd ed. p 297) e.g. Sweden has implemented a "six hours" policy and it turned out to be more efficient, people work in order to enjoy their private life. Number of men and women are around the same when it comes to positions, which in many countries are more dominated by men. In comparison to the above, when it comes to family and education, the tights are flexible and both genders are seen as equals, both are powerful and/or are sensitive and there is no embarrassment when it comes to failures, it's a part of life.

Austria's rate is 79, which makes it a country with **high rate of masculinity**¹³⁷, hence a rough attitude with the aim to win no matter what, achievements are one of the most important factors for success and every opportunity is seen as a step up toward success¹³⁸. According to Eurostat the pay gap between men and women in Austria is 22.3 %¹³⁹

China's rate is 66, which makes the country **masculine** but slightly less than Austria¹⁴⁰. There is no large difference among men and women in recent years, but this also depends on a geographical region which can differ among regions, e.g. Tianjin which is now famous for development area in high tech industry and a pool of experts in international companies, where women and men are seen as equals. Although families are important, people will leave everything behind and

¹³⁵ Kolomvatsos et al., 2016, p.1

¹³⁶ Hofstede, 2011, p.297

¹³⁷ Hofstede's insights, source: www.hofstede-insights.com

¹³⁸ Hofstede's insights: www.hofstede-insights.com

¹³⁹ <http://ec.europa.eu>

¹⁴⁰ Hofstede's insights, source: www.hofstede-insights.com

are ready to move away in order to have better working conditions. One's position is a status symbol and they live their life followed by that.

Failures in schools are unacceptable and scores are the only proof rather someone deserves a good job or not. Starting from elementary schools, educational system is rough, children are loaded with homework, interactive games and dialogues are seen as a waste of time and writing is most important because there are no oral exams and written exams are seen as a preparation for entry exams for next educational level. This explains a lack of leadership and managerial skills among Chinese population.

6.5.2 Power distance

Power distance is an indicator which shows how far people allow being influenced by upper levels of hierarchy¹⁴¹.

In high power distances societies, hierarchy is necessary in order to bring and sustain organization. People on top of hierarchy are expected to be treated differently than their employees, respectful and with flatter¹⁴².

In societies with low power distance hierarchy is flatter and thus more decentralized, high positioned people in hierarchy are supposed to be leaders instead of bosses, everyone participates in decision making, not only instance. The salary gap between employees and instances is rather small than large¹⁴³.

Austria scored 11, which makes it a country with very **low power distance**¹⁴⁴. Employees are rather independent and control over someone is not favoured. People in top parts of hierarchy are only needed if necessary and mostly seen as equals to their employees. Different opinions are wanted and respected, critiques are seen as a way to improve oneself, despite being an employee or leader.

Clear differences can be seen with **China**, which **scored with 80**, emphasizing the **power of hierarchy**¹⁴⁵. Person which is on the top of hierarchy is a boss, not a

¹⁴¹ Hofstede et al., 2010, p.50

¹⁴² Hofstede, 2009, p.570

¹⁴³ Srite et al, 2006, p.682

¹⁴⁴ Hofstede's insights, source: www.hofstede-insights.com

¹⁴⁵ www.hofstede-insights.com

leader. This is strongly connected with governmental system, communistic regime and educational system. All employees are supposed to listen to the one above them, they are not allowed to give any opinion, critiques are more experienced as an insult.

This situation leads to bad or total loss of communication, especially when Chinese need to deal with foreign employees. Not only language barriers but attitude is seen as something rude. If an Austrian employee gives an advice or suggestion, not to mention a critique they admire his/her attitude and courage but if a Chinese did that we are certain that they would lose their position, because they are not supposed and even not allowed to communicate that way.

6.5.3 Uncertainty avoidance

The less innovative the country, the more it is supposed to think that uncertainty avoidance is high. Societies with high uncertainty avoidance tend to be careful regarding everyday activities and prefer routine. They love the feeling of security, avoid risks and thus never expose themselves to things which they find risky¹⁴⁶ unless they need to, in order to, paradoxically lower the real risk or threat. Such people tend to be anxious regarding every new experience and only trust reliable sources¹⁴⁷. Uncertainty is scary and unavoidable. They need to work in order to secure their existence many years in advance¹⁴⁸. Example countries: Belgium, Greece, Guatemala.

Countries with low uncertainty avoidance are more open to anything new and find new things exciting and worth having a try. They tend to live more freely and are less under pressure than the previous ones. They do not like or follow the rules if rules effect their life in a negative way. Such rules need to be changed. Uncertainty is welcome, embraced and unavoidable¹⁴⁹.

¹⁴⁶ Venaik, 2010, p.1296

¹⁴⁷ Srite et al., 2006, p.682

¹⁴⁸ Hofstede et al., 2010, p.51

¹⁴⁹ Hofstede, 2009, p.570

Austria scored with 70, which means that it is characterized by **high uncertainty avoidance**¹⁵⁰. This means that its people are less risk taking and open for new opportunities and experiences. They still use the obsolete technology and are among late majority when it comes to new experiences, e.g. technology, medicine.

In comparison not only to Austria but to many other countries, **China** is a country which ranks **low in uncertainty avoidance (ranking with 30)**¹⁵¹ meaning that society is more open to innovativeness, and thus new experiences (e.g. technology, medicine etc. Especially if a new good or fad is forced to be used by government, they accept it because they see as there is no other option than acceptance. This explains high power distance (scored 80).

Regarding religion, most of Chinese are either Atheists or believers of Buddhism, which is correlated with low uncertainty avoidance¹⁵².

Uncertainty avoidance is a dimension which takes more time to eventually change since this is rooted deeply in one's culture¹⁵³.

6.5.4 Time Orientation

Time orientation refers to the extent in which country's society plans everything either in short term or long term. It also refers to Confucius teaching which had a deep impact on many cultures worldwide and is still intensified in China where individual's behaviour toward their family and government plays an important role in individuals' life¹⁵⁴.

Time orientation is bounded to Chinese culture¹⁵⁵ thanks to (Bond and Chi, 1997; Chinese Culture Connection, 1987) and thus helps this paper to analyse deeper Chinese culture. Countries with long-term orientation are more detailed and careful toward future and thus thrifty. They would rather invest in future e.g.

¹⁵⁰ Hofstede's insights, source: www.hofstede-insights.com

¹⁵¹ Hofstede's insights, source: www.hofstede-insights.com

¹⁵² Tang et al., 2008, p.1049

¹⁵³ Tang et al., 2008, p.1045

¹⁵⁴ Yeh et al., 1995, p.656

¹⁵⁵ Javidan et al., 2006, p.898

buying a house than enjoy moments in life without care, e.g. travel the world. Society acts collectivistic.

On the other hand, countries which are characterized by short-term orientation are more past and present oriented and believe more in what happens now and that the future is defined by present. They prefer enjoying moments in life rather than save for the future. Society acts individualistic¹⁵⁶.

Austria is characterized by **mix of short and long-term orientation (score of 60)**¹⁵⁷. People tend to think about future and thus think about their investments but it is also a hedonistic society which enjoys the present and will invest hence spend time and money on leisure time, e.g. traveling, celebrations.

China scored very high (87) which is characterized by **long-term orientation**¹⁵⁸. The future is in their hands and they are able to adapt their cultures to different environments. Chinese society always chooses to save money for the future and invest it properly instead of enjoying leisure time, which is by their means time loss.

6.5.5 Individualism vs Collectivism

Collectivistic societies are similar to femininity and are living not only for themselves but for the society¹⁵⁹ by living with them, helping each other hence support each other and get support from others. Such societies live by the rule “we” and “us” not “me” and “I” and that’s the only way which makes sense and is worth living for¹⁶⁰ e.g. Guatemala, Balkan countries, UAE.

Individualistic countries are the ones in which societies think and act for themselves. They have individual goals and think rather for themselves than for a group or their society. They are driven by the situation in which “me” and “I” is more important for their own sake rather than “we” and “us”¹⁶¹.

¹⁵⁶ Hofstede et al., 2010, p.51

¹⁵⁷ Hofstede’s insights, source: www.hofstede-insights.com

¹⁵⁸ Hofstede’s insights, www.hofstede-insights.com

¹⁵⁹ Srite et al, 2006, p.682

¹⁶⁰ Hofstede, 2009, p.570

¹⁶¹ Brewer et al., 2011, p.438

Austria is a slightly individualistic country with a **score of 55**¹⁶². Society is expected to have individualistic sights of their own activities and consequences. Employer and employee have a relationship based on a contract and there is not much empathy for each other.

China is highly **collectivistic** and scores with only **20 on an individualistic scale** country where individuals act for the others and everyone benefits. They prefer friendships and talking about feelings, even in companies rather than being bound only through a contract. If workers are good, contract can be hidden under the carpet and everything can be done through conversation and making verbal deals.

Language seems to be important in indicating high or low individualism. Most countries which speak Asian languages, i.e. a pro-drop language seem to have low individualism¹⁶³. In high collectivistic cultures people tend to have high power distance¹⁶⁴.

Individualism and Confucian dynamism are interconnected which indicates to showing an economic growth but other factor are needed to fully illustrate economic growth¹⁶⁵.

The sixth dimension was added because Chinese population is specific for being restrained society.

6.5.6 Indulgence vs Restraint

Indulgent countries are the ones in which society has freedom of speech and is not or little controlled by instances and political influence. Such societies prefer social events where they can express themselves without any negative consequences and have freedom, e.g. gay pride, demonstrations, Woodstock.

Restrained societies do not have this kind of freedom and are under influence of someone's force, e.g. political influence and propaganda. Such society is careful with their freedom (of speech) because they might face sanctions for their acts.

¹⁶² Hofstede's insights, source: www.hofstede-insights.com

¹⁶³ Tang et al., 2008, p.1049

¹⁶⁴ Euwema et al., 2007, p.1040

¹⁶⁵ Yeh et al., 1995, p.667

Not only governmental issues but also parental can influence rather an individual will be indulgent or restrained.

Austria is an **indulgent** country with a **score of 63**¹⁶⁶. Developing individual's own opinion is more than welcome and is a sign of a strong character and attitude. Such societies tend to be more positive by having and making their own choices on how to live life, how to spend their own money and rather to follow the majority or have their own style, i.e. freedom of choice. They enjoy leisure time and have opinion that they need to work in order to afford and enjoy their free time.

China is clearly a restrained country hence society (**score of 24**)¹⁶⁷ in which everyone is influenced by social and restricted norms. Individuals have the opinion that they need to follow the rules, have no opinion about anything and be passive. There is no time for leisure, and even when there is, one feels obligated to work and be silent, leisure time is for lazy people. Example: Many people in China work 7 days a week, and that's ok for them, otherwise other people will think that there are lazy. Children do homework until 1am in the morning, parents do not like the educational system but they force their children to do their homework because teachers will think that their kids are lazy. Kids go to piano classes, guitar classes, sand painting on weekends and on Sundays go to private schools to do their homework for public school. And they accept it. They would never speak against it because it is said by the rule creator and they follow the rules.

¹⁶⁶ Hofstede's insights, source: www.hofstede-insights.com

¹⁶⁷ Hofstede's insights, source: www.hofstede-insights.com

Here is a comparison graph of both countries:



Figure 12: Comparison cultural differences based on Hofstede's cultural dimensions, Source: Hofstede insights (<https://www.hofstede-insights.com/product/compare-countries/>)

7 Research and Interpretation of results

The research question is based on technology acceptance of two nations: Austria and China and whether nationality plays important role in making decision about whether to accept or reject a new technology, i.e. openness to digital advising.

We cannot predict exactly the future of AI, their branches and particles such as digital assistants¹⁶⁸. That's when statistics jump in and show approximate predictions to see how future will probably look like and how potential and future consumers will react to such changes. We can see from the results that cultural differences differ according to their cultural background, so results from Austrians as well as from Chinese citizens are showing different opinions, although digital advising slowly but surely is becoming globally accepted.

¹⁶⁸ Gurkaynak, 2016, p.750

The current chapter will present the results established from the analysis of data obtained from 359 consumers major from China and Austria. The analysis was conducted to examine the difference in consumer openness to digital advising between Chinese and Austrian consumers. The analysis sought to establish whether Chinese consumers are more open to digital advising than Austrian consumers. The analysis further examined whether there is a significant relationship between a consumer's nationality and their level of openness to digital advising. The first section of the analysis chapter discusses the response rate results based on the total number of participants sampled to provide information for the study. The second section of the analysis chapter presents the reliability results that examine the internal consistency and reliability of the survey instrument items in measuring the dependent variable, openness to digital advising. The third section of the analysis chapter presents the descriptive results of the study variables. Variables considered in the descriptive analysis includes the demographic variables as well as the variable openness to digital advising. The demographic variables considered include: nationality, age, gender, education level, country one spent most years schooling and the frequency of shopping online. The forth section of the analysis chapter presents the inferential results.

7.1 Response Rate

A total of 359 participants were sampled to provide data for the research study. Some of the participants did not meet the inclusion criteria, therefore they were excluded from the study and were not able to complete the survey. Those who did not meet the inclusion criteria were those participants who had not received digital advising within the past 12 months of the conduction of the current research. Those who had meet the inclusion criteria were required to completely fill the online survey questionnaire instrument developed for the study. The data obtained from the questionnaires was reviewed for completeness and accuracy. Some of the participants did not fully complete filling the questionnaires. The data obtained was cleaned for all inconsistencies before being used for analysis. Table 1 below presents the response rate of the study based on the sampled participants who meet the inclusion criteria and fully answered the online questionnaire instruments. The response rate results indicate that 219 of the sampled

participants out of the 359 initial sampled participants meet the inclusion criteria and fully filled and submitted back the information they provided through the online survey. This represented a 61% response rate which is a good rate.

Questionnaires				Percentage %
Fully completed the survey	219			61%
Did not complete the survey	140			39%
Total	359			100%

Table 1: Response rate among the study participants (N=359)

Reliability Analysis

The researcher examined the reliability of the survey instrument item in measuring the dependent variable openness to digital advising. The reliability results that were established are presented in table 2 below. The Cronbach's Alpha (α) statistic was established to be reliable ($\alpha=.862$). The value of the statistic indicated a high level of internal consistency of the Likert scale items within the specific sample used. The Likert scale items measuring openness to digital advising are therefore reliable meaning that survey scale instrument (questionnaire) is reliable. Hence the data that was obtained by the online survey questionnaire instrument on openness to digital advising was reliable and valid and had a very good representation of the scores obtained for the variable openness to digital advising.

Cronbach's Alpha	N of Items
.862	20

Table 2: Reliability Statistics Report (N = 219)

7.2 Descriptive Analysis

Demographic Results

The online survey questionnaire was able to capture the demographic characteristic of the study sampled participants. The demographic variables were descriptively analyzed. Demographic variables descriptively analyzed included: nationality, age, gender, education level, country one spent most years schooling and the frequency of shopping online. The descriptive statistics used to describe the demographic variables were the frequency and percentages. The results established from the descriptive analysis of the demographic variables are presented in table 3 below. The total number of participants analyzed for results was 219. Based on the results presented, most of the participants who provided information for the study were men representing 43.8% of the study participants while 56.2% of the study participants were female. The age group with the highest percentage were those between the ages of 26 to 35 years representing 36.2% of the study participants. The age group with the lowest percentage were those above the age of 65 years representing 1.8% of the study participants. Most of the participants in the study were of Chinese nationality representing 53.3% of the study participants. Participants from Austria represented 43.4% of the study participants while participants from other countries represented 1.4% of study participants. Other countries nationalities that were represented included: Serbia, Russia, and Ukraine. Most of the participants spent most of their school years in China representing 55% of the study participants while those who spend most of their school years in Austria represented 43.1% of the study participants. Only 1.8 % of the participants spent most of their school years in other countries that include Serbia, Russia, Mexico and Ukraine.

When considering the education level, most of the participants had a bachelor level of education representing 29.8% of the study participants followed by those who had a college level of education represented 24.8% of the study participants. Those who had a master level of education represented 20.25 of the study participants, high school level of education represented 14.2% of the study participants, elementary level of education represented 7.8% level of education

while those with the highest level of education (doctorate) were represented by 3.2% of the study participants. Most of the study participants shopped and ordered services online at least once every month representing 31.9% of the study participants. Those who shopped at least once every year were similar in proportion to those who shopped at least once every three months with both groups representing 24.1% of the study participants. Those who shopped at least once every week represent 19.4% of the study participants while those who never shopped or ordered services online represented 0.5% of the study participants.

Variables	Frequency	Percentage %
Gender		
Male	95	43.8
Female	122	56.2
Total	219	100.0
Age		
<18	7	3.2
18-25	61	28.0
26-35	79	36.2
36-49	41	18.8
50-65	26	11.9
>65	5	1.8
Total	219	100.0
Nationality		
Austria	95	43.4
China	121	55.3
Other	3	1.4
Total	219	100.0
Country spent most years in school		
Austria	94	43.1
China	120	55.0
Other	5	1.8

Total	219	100.0
<hr/>		
Education		
Elementary school	17	7.8
High school	31	14.2
College	54	24.8
Bachelor	65	29.8
Master	44	20.2
Doctrate	7	3.2
Total	219	100.0
<hr/>		
Frequency of online shopping		
Never do	1	0.5
At least once every year	52	24.1
At least once every three months	52	24.1
At least once every month	69	31.9
At least once every weak	42	19.4
Total	219	100.0
<hr/>		

Table 3: Descriptive Summary of Study Participants Demographic Characteristics (N=219)

Descriptive Analysis of the Dependent Variable

The researcher further conducted the descriptive analysis of the dependent variables of study, openness to digital advising. The mode, median, mean, standard deviation, skewness and kurtosis statistics were used to describe the dependent variable. The results established from the descriptive analysis are presented in Table 4.

	N	Minimum	Maximum	<i>Mdn</i>	<i>M</i>	<i>SD</i>	<i>s</i> ²	Skewness	Kurtosis
General	219	42	99	69	69.54	9.53	90.86	.048	.486
Austria	95	42	89	67	67.77	9.96	99.27	-.257	.178
China	121	49	99	71	71.15	8.92	79.62	.478	.404
Other	3	54	66	62	60.67	6.11	37.33	-.935	0

Table 4: Descriptive Report of the Dependent Variable: Openness to Digital Advising (N=219)

Based on the results presented in Table 4, the dependent variable, openness to digital advising, had a mean of 69.54 with a standard deviation of 9.53. This means that the consumers from the different nations considered in the study had an average score level of 69.54 of openness to digital advising which means they had a medium level of openness to digital advising. The highest mean of openness to digital advising among the two different nations examined in the research was for China ($M = 71.15$, $SD = 8.92$) while Austria ($M = 67.77$, $SD = 9.96$) had the lowest mean between the two nations. This means that China performed better in openness to digital advising than Austria; China had a better level of openness to digital advising than Austria. The lower standard deviation portrayed by consumers from China means that the score values of openness to digital advising were closer to the mean value as compared to those of Austria. This also shows that consumers from China were better in their level of openness to digital advising.

Skewness and Kurtosis are considered as measures of normality and distribution. Considering the skewness statistics presented in Table 4, the data was positively skewed for the dependent variable openness to digital advising indicating a positively skewed distribution. This shows that most of the consumers who were sampled had lower than the mean value level of openness to digital advising. This also applies to China (.478) which had a positively skewed distribution on openness to digital advising. The results of the descriptive analysis on the

dependent variable indicate a symmetrical distribution as the skewness statistic value of openness to digital advising (.048) is closer to 0. For positively skewed variables the mean value is a better indicator of average statistics.

Austria (-.257) had a negatively skewed distribution of openness to digital advising. This means that most of the consumers sampled from Austria had higher than the mean value level of openness to digital advising. The median is considered a better indicator of average statistics for negatively skewed variables. The kurtosis statistics presented in Table 4 indicate that the score levels of Austrian consumers were more normally distributed than the score levels of Chinese consumers. This is because the kurtosis statistic of Austria (.178) level of openness to digital advising was closer to 0 than that of China (.404). Figure 14 below graphically represents the distribution of openness to digital advising. The figure illustrates that openness to digital advising is normally distributed.

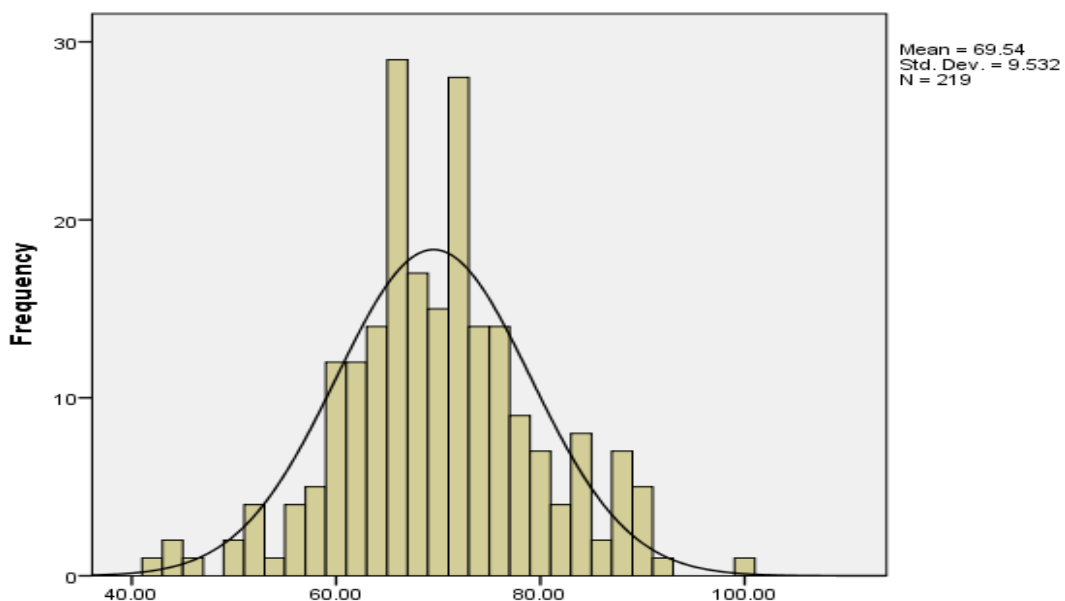


Figure 14. Openness to digital advising scores, Source: SPSS outputs

The levels of openness to digital advising were categorized based on the individual consumer score that each consumer attained. Those consumers who had attained a score of 0-39 were categorized as having a low level of openness to digital advising. Those consumers who has attained a score of 40-69 were categorized as having a medium level of openness to digital advising while those consumers who

had attained a score of 70-100 were categorized as having a high level of openness to digital advising.

Categories of openness to digital advising:

1= 0-39 Low level of openness to digital advising

2= 40 - 69 Open/ Medium Level of openness to digital advising

3= 70 -100 Highly open to digital advising

Based on the descriptive analysis examining these categories, the results established indicated that 52.5% of the consumers who participated in the study had a medium level of openness to digital advising. Additionally, 47.5% of the participants who participated in the study had a high level of openness to digital advising and were considered to be highly open to digital advising. None of the participants who participated in the current research had a low level of openness to digital advising. The results established are presented in Table 5 below. Besides, the results are graphically represented in Figure 15 below.

Variables	Frequency	Percentage %
Level of openness to digital advising		
Medium Level	115	52.5
Highly Open	104	47.5
Total	219	100.0

Table 5: Descriptive Summary of the Dependent variable: Level of Openness to Digital Advising (N=219)

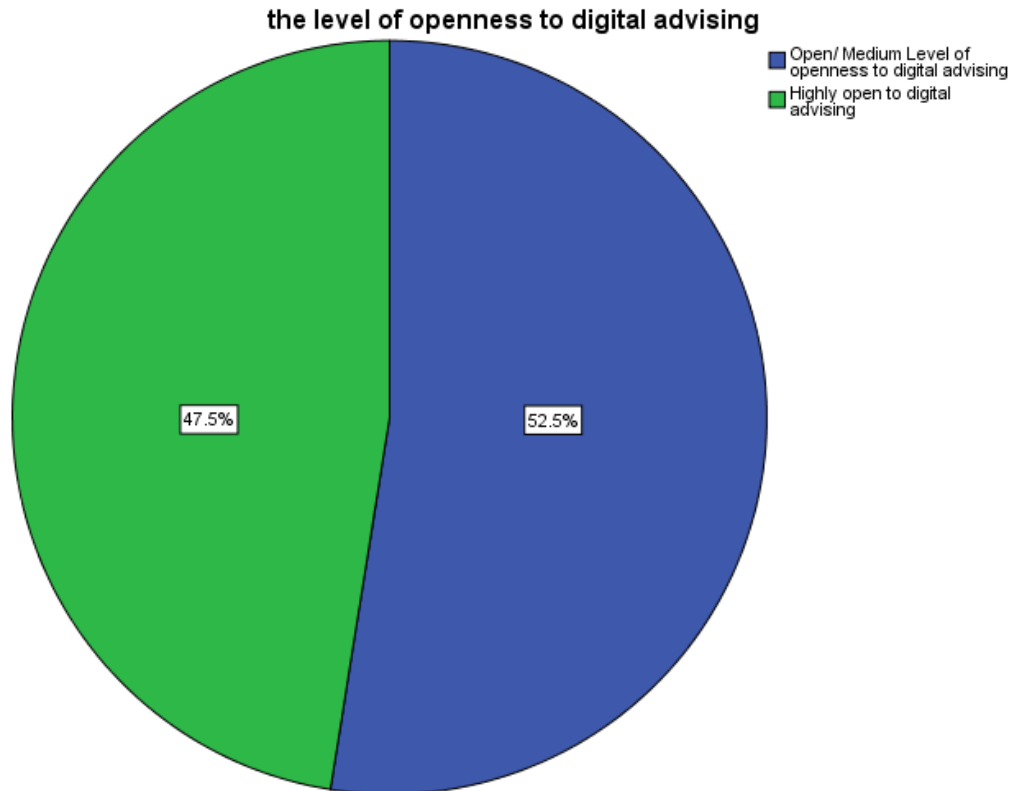


Figure 15: Level of Openness to Digital Advising. Source: SPSS outputs

Inferential Analysis

The researcher conducted inferential analysis using various statistical test to examine the validity of the research hypothesis that were formulated for the research study. Results obtained from inferential analysis make inferences regarding the population based on the sample data. Inferential results estimate the characteristics of the population and test hypothesis about population parameters based on the sample data collected. The validation of the hypothesis formulated enabled the researcher to answer the research questions and fulfil the objective of the study. To validate the use of parametric tests in the current research, a test of normality on the dependent variable of the study was performed, openness to digital advising, which was the only variable measured in interval scale.

Test of Normality

Before conducting the inferential analysis tests, the researcher conducted a test of normality to validate the application of parametric tests in the validation of the study hypothesis. The normality test was performed on the dependent variables of the study; openness to digital advising. When performing normality test, researchers usually test the null hypothesis that data is normally distributed. Shapiro-Wilk statistic (W) was used to assess the assumption of normality of the study variables. The normality test results are presented in Table 6 below.

Ho: The data is normally distributed

Ha: The data is not normally distributed

	Shapiro-Wilk		
	Statistic	Df	Sig.
Return on Equity	.988	219	.056

* $p < .05$

Table 6: Tests of Normality Report (N=219)

Based on the results presented in Table 6, the dependent variable openness to digital advising had a statistically insignificant ($p > 0.05$) p-value ($p = 0.056$). Hence, we have enough evidence not to reject the null hypothesis of normality. We therefore conclude that the dependent variable of the study, openness to digital advising, is normally distributed. Besides, Figure 14 above which is a graphical representation of the distribution of openness to digital advising shows that the data appears to have a normal distribution.

The normality results obtained indicate that since the dependent variables of the study was normality distributed, the researcher can go ahead and conduct the proposed parametric tests to validate the research hypotheses of the study instead of non-parametric tests. Moreover, the normality results of the dependent variables satisfy the assumptions of conducting a t-test and correlation analysis. This assumption states that the dependent variable should be normality

distributed. The results obtained from these tests was valid to make statistical inference on the population based on the sample information provided.

Hypothesis Testing

The research hypotheses formulated were validated using statistical inferential methods that include; t-test and correlation analysis. A t-test was conducted to examine whether a difference exist on openness to digital advising between consumers from the two different countries.

Following research hypotheses formulated were evaluated in the current research study:

Ho: Chinese consumers are not more open to digital advising than Austrian consumers.

Ha: Chinese consumers are more open to digital advising than Austrian consumers.

Correlation Analysis

A bivariate correlation analysis was conducted to examine the relationship that exist between the study variables. Correlation analysis tests the nature of the relationship that exists between any two variables in terms of strength and direction. The results established from the correlation analysis are presented in table 7 below. Based on correlation results, nationality had an insignificantly weak positive correlation with openness to digital advising, $r = .131, p > .05$. However, the results establish suggest that a consumer's country is not significantly related with the consumer's level of openness to digital advising.

Additionally, the results established showed that openness to digital advising had an insignificant weak positive correlation with; Gender ($r = .018, p > .05$) and the country one spent most of their school years ($r = .107, p > .05$). Besides, openness to digital advising had an insignificant weak negative correlation with; age ($r = -.011, p > .05$) and the frequency one shops or orders services online ($r = -.044, p > .05$). The results generally suggest that gender, age, country one spends most of their school years, and frequency of shopping or ordering services online, are not significantly related with the level of openness to digital advising.

However, based on the results established, openness to digital advising had a significant weak negative correlation with education, $r = -.158, p < .05$. This means

that openness to digital advising is negatively related with a consumer's level of education. As such, there is a significant relationship between a consumer's level of education and their level of openness to digital advising.

	1	2	3	4	5	6	7
1. Nationality	-						
2. Country spent most years of schooling	.958*	-					
3. Gender	.112	.109	-				
4. Age	-.105	-.117	.046	-			
5. Education	.007	.015	-.031	-	-		
				.136*			
6. Frequency of online shopping/services	.293*	.305*	.019	-	.126	-	
				.193*			
7. Openness to digital advising	.131	.107	.018	-.011	-	-.044	-
					.158		
					*		

* $p < .05$.

Table 7: Correlation Summary of Study Variables (N=219)

T-Test

A two-independent sample mean test (t-test) was conducted to assess the second hypotheses of the study and determine whether Chinese consumers are more open to digital advising than Austrian consumers. The independent variable considered in this test was nationality while the dependent variable considered was openness to digital advising. The researcher tested the null hypothesis that Chinese consumers are not more open to digital advising than Austrian consumers. The results of the analysis are presented in Table 8 and 9 below.

Gender	N	Mean	SD	SE Mean
China	121	71.15	8.92	.811
Austria	95	67.77	9.96	1.022

Table 8: Group Statistics: Openness to Digital Advising (N=219)

	T	Df	Sig.	Mean Difference	95% Interval of the Difference	Lower	Upper
Openness to digital advising	2.625	214	.009	3.380	.842		5.919

Table 9: Results of two Independent Sample Test (N = 219)

Based on descriptive results in Table 8 above, Chinese consumer had a mean score level of openness to digital advising of 71.15 with a standard deviation of 8.92 while Austrian consumers had a mean score level of openness to digital advising of 67.77 with a standard deviation of 9.96. The results indicate that Chinese consumers had a better level of openness to digital advising than Austrian consumers. Considering the results presented in Table 9 where equality of variance was assumed, the t-value was established to be significant, $t(214) = 2.625, p < .05$. The results suggest that there is a significant difference in the level of openness to digital advising between Chinese ($M = 71.15, SD = 8.92$) and Austrian consumer ($M = 67.77, SD = 9.96$). The one-tailed t-value was also significant, $t = 2.625, p < .025$. Therefore, we have sufficient evidence to reject the second null hypothesis and conclude that Chinese consumers are more open to digital advising than Austrian consumers.

8 Conclusion and recommendations

The results established from the current research study quantified the level of openness to digital advising between Chinese and Austrian consumers. The results obtained, were based on a sample of 219 consumers. Based on the various analysis conducted, several important findings were presented. It was established that there was no significant relationship between a consumer's nationality and their level of openness to digital advising. The study further established that Chinese consumers are more open to digital advising than Austrian consumers. This chapter discusses results that were established from the analysis of primary data gathered from 219 research participants majorly from China and Austria. The findings that were established through the analysis are critically evaluated, interpreted and discussed in the context of previous literature and existing knowledge on the topic of digital advising. The main purpose of the research was to examine whether Chinese consumers are more open to digital advising than Austrian consumers.

Digital advising is a new technology advancement on the internet that businesses and companies are embracing to capture the customer needs and offer improved product sales and services. As such, the study was considered due to lack of adequate literature information on the area. Therefore, the study focused on investigating whether cultural differences between consumers from different nationality influence consumers' openness to digital advising. The research study was based on Hofstede's dimensions of cultural differences.

Based on a quantitative methodology which supported the establishment of descriptive and inferential results from conducting various statistical analysis techniques, the study established several important findings.

The study found that Chinese consumers are more open to digital advising than Austrian consumers.

The study concludes that the differences in openness to digital advising that exist between Chinese and Austrian consumers are influenced by the cultural differences between the two countries as explained by the Hofstede's cultural

dimensions¹⁶⁹. Chinese consumers are more open to digital advising than Austrian consumers due to their low level of uncertainty avoidance, high power distance and collectivism societal nature. Future research on the topic can investigate the difference in openness to digital advising between different other countries in Europe and Asia to validate the findings established in the current research. Besides, researchers can investigate whether the age, gender and educational levels influence the level of openness to digital advising between two different countries with perceived cultural differences.

The descriptive results of the study established that China performed better in terms of openness to digital advising than Austria. Inferential results further provided evidence that Chinese consumers are more open to digital advising than Austrian consumers. This means that there is a difference in the level of openness to digital advising between the two nations considered. As such, Chinese consumers can be regarded to be more open to use chatbots more as an advising tool on their online shopping and service ordering, than Austrian consumers. This can be explained and is supported by the uncertainty avoidance dimension of Hofstede's cultural model. Austria unlike China is characterized by high uncertainty avoidance with a rate of 70 compared to China's rate of 30. Cultural dimensions such as uncertainty avoidance have been linked and interrelated with TA. This means that individuals from Austria perceive risks more in new technology as they are highly uncertain than consumers from China. As such, Austrian consumers are more likely to avoid using new technology to avoid risks associated because of the high uncertainty than individuals from China. The results are supported by the findings of Venaik (2010) who suggest that individuals in society with high uncertainty avoidance tend to be careful regarding everyday activities and prefer routine, they avoid risk and love the feeling of security which makes them not expose themselves to things they find risky. The findings also concur with findings by Srite et al. (2006) who indicate that high uncertainty avoidance individuals are usually anxious regarding new experiences and only trust reliable sources. A new technological experience in our case is use of chatbots and

¹⁶⁹ Hofstede, p.270, 2009

receiving digital advice. Austrian consumers may perceive chatbots as a risky technology that can gain their personal information and interfere with their routines. This explains why Chinese consumers are more open to digital advising and the use of chatbots than Austrian consumers.

Besides, China is a more collectivistic country than Austria. As such individuals from China depend on groups for protection, advice and nurturing than Austria where ties between individuals are loose. The nature of dependency on others and the society explains why Chinese people are more likely to depend and be more open to using chatbots as an assistance online tool and advising technology than consumers from Austria. The findings support the argument by The Hope Institute et al. (2017) that most of the countries are not similar to China in cultural comparison. Besides, Asian culture is radically different and diverse from that of European countries.

The power distance dimension can explain why Chinese are more open to digital advising than Austrian consumers. In China, where power distance rate is high (80), people are expected to listen to once above them without giving any critics. As chatbots show the power of knowledge in advising, Chinese people have the tendency to listen and follow especially where they are directed. This is not the case in countries with low power distance rate such as Austria (11) where the consumers would rather criticize advice from chatbots than follow it as chatbots show superiority in technological intelligence¹⁷⁰.

The fact is that some participants achieved high scores of openness to digital advising in Austria which was also experienced in China. The same applied to participants who achieved medium to low levels of openness to digital advising. The findings support the argument by Juleff (2009) that despite the cultural differences across the globe, technology somehow remains the same in many parts of the world.

Most of the consumers were established to have a medium level of openness to digital advising. Besides a large proportion of participants were also found to be highly open to digital advising. Gender was not found to have a relationship with

¹⁷⁰ Hofstede Insight, 2018, source: www.hofstede-insights.com

openness to digital advising. This can be attributed to the fact that China (66) and Austria (79) have almost the same rate of masculinity and are considered masculine countries based on the Hofstede cultural dimension of Femininity vs. Masculinity¹⁷¹. As such gender differences are almost the same between the two countries. This explains the lack of relationship between gender and openness to digital advising between the Austrian and Chinese consumers.

Consumers are getting more open toward AI and prefer digital communication over HH thus indicating the future's path regarding digital advising and chatbotting.

¹⁷¹ Hofstede Insights, 2018, source: www.hofstede-insights.com

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Appendix

Online Survey template

Questionnaire Part 1: Demographic Information

1. What is your Nationality?

Austria ☐

China ☐

Other ☐

2. What is your Gender?

Male ☐ Female ☐

3. List all the countries you have lived in for at least 6 months in last 10 years:

Austria ☐

China ☐

Other [open question]

4. What is your Age?

18-35 ☐ 36-49 ☐ 50-64 ☐ >65 ☐

5. What is the highest level of education you have achieved?

Lower than High School ☐

High School ☐

College ☐

Graduate ☐

Post graduate ☐

6. How often do you shop online, order services or book transportation (Uber)/
accommodation services (AirBnb)?

Never do ☐

At least once every year ☐

At least once every three months ☐

At least once every month ☐

At least once every week ☐

7. Have you received digital advising or online chat assistance in the past 12 months?

Yes ☐

No ☐

Don't Know ☐

Questionnaire Part 2: Openness to Digital Advising (Chatbots)

Statement/Questions	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1. I feel secure when getting online digital advising/online chat assistance services.					
2. I can book an online ticket through online digital chat assistance on an online booking platform.					
3. I can enquire on various offers regarding a particular purchase through online chat assistance/ digital chat advising					
4. I get chat assistance on various online					

websites when I am stuck or have conflicting decisions regarding a particular order					
5. I receive any assistance or everything I want through digital advising/online chat assistance services.					
6. I am very satisfied with my past several weeks/months of digital advising/online chat assistance services.					
7. Digital advising/online chat assistance is friendly and approachable.					
8. Digital advising/online chat assistance provides me with answers to complex questions.					
9. Digital advising/online chat assistance provides me with detailed and expert answers.					
10. I have a fear that online digital					

advising/online chat assistance might steal my personal data or private information that I disclose while seeking assistance.					
11. I prefer face to face advising conversations to digital advising/online chat assistance services.					
12. Digital advising/online chat assistance services is time consuming.					
13. Digital advising/online chat assistance offers don't completely apply to my needs					
14. I feel like am chatting to a robot when receiving digital advising/online chat assistance.					
15. I receive more appealing offers/ guidelines/ clearer information through digital					

advising/online chat assistance.					
16. I feel more confident when I make a purchase decision online when I get digital advising/online chat assistance.					
17. I gain insightful information through digital advising/online chat assistance services.					
18. I gain intelligent information through chatbots/ digital advising/online chat assistance services.					
19. I have a good and smooth conversation while getting assistance through chatbots/ digital advising/online chat assistance services.					
20. I prefer chatbots/ digital advising/online chat assistance services					

because they provide 24 hrs services.					
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Online survey

The survey was done in three languages. Especially because Chinese majority is not familiar with English language, the survey was translated into Chinese language.

Because of simplicity and quantity, not all three language versions were print screened, but only the English version. A preview in Chinese can be seen in second PrtSc.



English



Chinese
(simplified)



German (formal)

1. Which country are you from?

☐ Austria

☐ China

☐ Other

2. In which country did you spend most of your years of school?

☐ Austria

☐ China

☐ Other

3. Please list all countries in which you have lived for a period of at least 6 months during the last 10 years.

☐ China

☐ Austria

☐ Other

4. What is your Gender?

☐ Female

☐ Male

5. What is your Age?

☐ <18

☐ 18-25

☐ 26-35

☐ 36-49

☐ 50-65

☐ >65

6. What is the highest level of education you have achieved?

☐ No school

☐ Elementary school

☐ High school

☐ College

☐ Bachelor

☐ Master

☐ Doctrate

7. How often do you shop online, order services or book transportation or accommodation services ?

- ☐ Never do
- ☐ At least once every year
- ☐ At least once every three months
- ☐ At least once every month
- ☐ At least once every week

8. Have you received digital advising or online chat assistance in the past 12 months?

- ☐ Yes
- ☐ No
- ☐ Don't Know

Next

B.Sc. Sabina Hujdur, Universität Wien – 2018

Information regarding questions from following page

Next page is about your experience with digital advising / Chatbots. Please answer honestly following questions.

Note: Chatbot is a computer program which enables communication with a human. The majority has chatted with a bot and got assistance through such automated answers.

Next

B.Sc. Sabina Hujdur, Universität Wien – 2018

9. Please answer following questions based on your experience with digital assistance/ chatbots

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I feel secure when getting online digital advising/online chat assistance services.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can book an online ticket through online digital chat assistance on an online booking platform.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can enquire on various offers regarding a particular purchase through online chat assistance/ digital chat advising.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get chat assistance on various online websites when I am stuck or have conflicting decisions regarding a particular order.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I receive any assistance or everything I want through digital advising/online chat assistance services.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am very satisfied with my past several weeks/months of digital advising/online chat assistance services.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Digital advising/online chat assistance is friendly and approachable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Digital advising/online chat assistance provides me with answers to complex questions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Digital advising/online chat assistance provides me with detailed and expert answers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a fear that online digital advising/online chat assistance might steal my personal data or private information that I disclose while seeking assistance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I prefer face to face advising conversations to digital advising/online chat assistance services.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Digital advising/online chat assistance services is time consuming.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Digital advising/online chat assistance offers don't completely apply to my needs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I feel like I am chatting to a robot when receiving digital advising/online chat assistance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I receive more appealing offers/ guidelines/ clearer information through digital advising/online chat assistance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel more confident when I make a purchase decision online when I get digital advising/online chat assistance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I gain insightful information through digital advising/online chat assistance services.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I gain intelligent information through chatbots/ digital advising/online chat assistance services.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a good and smooth conversation while getting assistance through chatbots/ digital advising/online chat assistance services.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I prefer chatbots/ digital advising/online chat assistance services because they provide 24 hrs services.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thank you for completing this questionnaire!

I would like to thank you very much for helping.

Your answers were transmitted, you may close the browser window or tab now.