SOCIAL ACCEPTABILITY OF HUMAN-MACHINE INTERACTION IN LEBANON.

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Résumé

Dans cet article, nous abordons l'acceptabilité sociale (culturelle/ psychologique) au Liban qui connaît des défis et des opportunités similaires à ceux que rencontrent d'autres pays arabes dans leur acceptation ou leur rejet de l'interaction homme-machine et les raisons de leur attitude. À cette fin, un questionnaire a été distribué à 805 participants libanais travaillant dans différentes entreprises pour recueillir des données pour cette recherche. Une série d'analyses de variance a été réalisée pour tester les quatre hypothèses du modèle concernant l'âge et la culture des répondants, leurs attitudes d'évitement de la technologie / souci de confidentialité, et enfin l'effet de la langue utilisée par l'assistant virtuel et le dialecte de l'utilisateur.

Mots-clés

Agent assistant virtuel – Chatbot – Intelligence artificielle – Interaction homme-machine – Évitement de la technologie.

Abstract

In this article, we will tackle social acceptability (cultural/psychological) in Lebanon because it experiences similar challenges and opportunities that other Arab countries encounter in their acceptance or rejection of human-machine interaction (Dajani, 2016) and the reasons behind their attitude. For this purpose, a questionnaire was distributed to 805 Lebanese participants working in different fields and companies to collect required data for this research. A series of analyses of variance were performed to test four hypotheses of the model concerning age and culture of the respondents, their technology avoidance attitudes/ privacy concerns, and finally the effect of the language used by the virtual assistant and the dialect of the user.

Keywords

Virtual assistant agent – Chatbot – Artificial intelligence – Human-machine interaction – Technology avoidance.

1. Introduction

Technology is evolving to make our lives easier and more productive (Tetard and Collan 2009). With the introduction of the most advanced artificial intelligence (AI) agents, computers and smartphones are becoming essential tools for business, leisure, education, and services. In this paper, we consider two types of artificial intelligent (AI) agents: Virtual Assistants (VA) and Chatbots.

VA is a software agent that allows the user to speak to people in a natural human speech and answer back via auditory synthesized voices. VA can answer questions where data is exchanged via the internet, as they are able to perform a multitude of tasks, such as scheduling reminders, playing music, announcing the weather, and giving directions. For instance, the release of the Apple IPhone 4S in 2011 unleashed the potential for voice control (Moorthy 2013). In addition to their availability on smartphones, a rise of standalone VA devices is taking place at a rapid pace, such as the Echo "Alexa" range, the devices developed by Amazon.

Chatbots, on the other hand, are conversational software agents that can interpret natural language in the form of voice, text or both. They can answer questions when activated, and if commanded, can sometimes execute tasks. Although Chatbot technologies have existed since the 1980s, Chatbots are now easier to train and implement. Many other terms are used as synonyms of Chatbot, such as conversational avatar, artificial conversational entity, artificial intelligent agent, intellectual agent, virtual people, dialogue system... Al Ghadban and Al-Twairesh (2020) define a Chatbot as a system that "seeks to mimic conversation rather than understand it", making them entertaining in a large variety of conversations about any topic. Currently, the number of Chatbot continues to increase on many existing platforms specialized in developing such systems. Chatbots are becoming very popular: In February 2015, Pandora-bots hosting service declared having more than 225,000 bot-masters (people in charge of creating/maintaining the Chatbot), which have built more than 250,000 Chatbots, resulting in more than 3 billion interactions (Chaykowski, 2016).

With the introduction of artificial intelligent (AI) agents, some with machine learning capabilities, computers are now able to learn from themselves in addition to human guidance. However, despite their usefulness and the many advantages of human-machine interactions, people can be reluctant to use this technology and exhibit avoidance behaviour towards virtual assistants (VA) agents for many reasons. In this article, we tackle the social acceptability (cultural/psychological) in Lebanon of human-machine interaction and attempt to evaluate the acceptance or rejection of this technology by Lebanese people belonging to different social groups and to study the reasons behind their attitude.

Lightner et al. (2002) underlined the importance of using IT systems effectively across cultural boundaries especially with the globalization and the increased use of e-commerce. The world nowadays is a global market nowadays where information, products, and services are exchanged between developed and developing countries. This is why it is important to understand the drivers behind technology acceptance/ rejection in developing countries in order to help the firms compete in the global market (Elbeltagi et al., 2005).

After exposing the literature review, the first part of the paper will talk about internet banking in Lebanon, and the avoidance attitudes towards virtual assistants (VA), while the second part will discuss the research hypothesis, the case study, its results and analysis, and in the final part will cover the conclusion and limitations of the study.

2. Literature Review

In a cross-cultural world, the adoption of the latest IT technology has become a necessity for developing countries to develop their economies as is the case in the Arab world and in Lebanon specifically. Bowonder et al. (1993) agreed on the need of the developing countries to understand the consequences of not keeping pace with rapid changes in technology occurring in the developed countries. Arab countries experience similar challenges and opportunities in their technology acceptance as they share a similar culture especially Lebanon, Syria and Jordan (Dajani, 2016). Limited studies were found concerning the technology adoption in the Middle East/Arab countries although the practice of e-commerce has become an essential in business practice. Dajani conducted a study on 313 travel agencies in Amman, the capital of Jordan, using surveys and interviews with the owners and top managers (Dajani, 2016). He studied the Acceptance and Use of Technology to explain E-commerce Acceptance by Jordanian Travel Agencies using the Unified Theory of Acceptance and Use of Technology (UTAUT). The UTAUT theory was developed by Venkatesh et al. (2003) indicated that performance expectancy (the degree to which an individual believes that using Internet banking will help him/her achieve their goals), effort expectancy (the degree of ease associated with using Internet banking), social influence (the degree to which an individual perceives that important others believe he or she should use Internet banking), competitive pressure and facilitating conditions had a positive impact on intention to use e-commerce as shown in the following Table:

Table 1: Results of Significant Variables

Predictor Variables	Standardized-Coefficients-Beta (behaviour inter e-commerce) to use	Sig (intended actual use)
Performance-Expectancy	.287	.000
Effort- Expectancy	.170	.004
Social- Influence	.159	.001
Competitive Pressure.	.322	.000
Facilitating conditions	.116	.010

[Dajani, D. (2016). Using the Unified Theory of Acceptance
and Use of Technology to Explain E-commerce
Acceptance by Jordanian Travel Agencies.
Journal of Comparative International Management, 19(1)]

In contrast, perceived risk, government support and compatibility had insignificant relationship with behavioural intention (Table 2):

Table 2: Results of Insignificant Variables

Predictor Variables	Standardized Coefficients Beta	Sig
Perceived Risk	.019	.702
Government Support	-.066	.144
Compatibility	.046	.277

[Dajani, D. (2016). Using the Unified Theory of Acceptance
and Use of Technology to Explain E-commerce
Acceptance by Jordanian Travel Agencies.
Journal of Comparative International Management, 19(1)]

Furthermore, the results of this study pointed out that age and gender does not affect performance expectancy, perceived risk and behavioural intention (Dajani, 2016). Jordan was used as a case study because it experiences similar challenges and opportunities that other Arab countries encounter in their technology acceptance.

Only two studies used the UTAUT model in the Arab World, namely the work of Al-Gahtani et al. (2007) and Abu Shanab et al. (2010). Furthermore, there is no single study that examines technology acceptance in the tourism industry

in the Arab World (Dajani, D., 2016). Considering the results of this study, the authors concluded that the same model that was originally proposed and tested in developed countries, can also explain e-commerce adoption in Arab countries, such as Jordan and Lebanon in this case. Additionally, this model (UTAUT) takes into consideration the cultural differences between western countries and Middle Eastern ones (such as Lebanon). The result suggests that as per the hierarchical managerial form in the Arab countries in general, only few people in top management are the decision makers concerning the acceptance or use of a new innovation or technology in their organizations. This result is consistent with the work of Hofstede (2005), who suggested that subordinates expect to be told what to perform in a hierarchical culture, such as in Lebanon. Furthermore, the language and the instruction of browsing should be easy to understand in the use of e-commerce websites (Kim et al., 2009; Huh et al., 2009).

Consequently, this study suggests the development of software and programmes that have bi-lingual interface (Arabic and English) to be used and understood by all the employees in Arab organizations.

On the other hand, in the Western countries, the travel, tourism and hospitality sector is heavily using artificial intelligence. Robots, artificial intelligent agents and service automation (RAISA) are now adopted in service systems (Ferreira et al., 2017). Cultural characteristics of both customers and service providers may influence the way RAISA (Robotic, Artificial Intelligence and Service Automation) is perceived and used (Lee, Trimi & Kim, 2013). Societies in Japan, South Korea, USA, or UK are more used to and receptive to new technologies than Bulgaria, Nigeria, Columbia or India (ranking of countries in World Economic Forum (2017)'s Global Information Technology Reports, or in Cornell University, INSEAD, and the World Intellectual Property Organization (2017)'s Global Innovation Index), hence travel, tourism and hospitality companies in them might find it easier to adopt RAISA than companies from other countries. Customers' readiness and willingness to be served by a robot must be studied and taken into consideration before adopting it in the hospitality sector, as clients may resist being served by a robot or serve themselves via a kiosk, and prefer a human employee (Garenko, 2017).

2.1. A comparative case of the e-Banking sector between Lebanon and Jordan

To better understand the effect of language, culture, and age on the technology acceptance in the Middle East and Lebanon, our research moves to the banking sector since Arab countries have developed their internet banking services (since 2001) before other services/sectors. In addition to that we chose the banking sector since it is one of the main services sectors that was studied and we were able to seek credible information and studies in that sector. In that context we will have an overview of the internet banking in Lebanon and compare it to the

e-banking in Jordan to draw conclusions and observations.

2.1.1. Internet banking in Lebanon

Banks in Lebanon started to implement AI services (Bank Audi, Bank of Beirut), being among the first sectors in Lebanon using modern technologies. This sector has shown a stable and active occurrence in both local and international economies. It is characterized by the openness and commitment to meet international standards, in addition to the absence of restrictions on capital flows and foreign exchange transactions (Abou Ali, 2016). AbuShanab (2010) suggests that the growth of Internet usage has created many new opportunities for Middle Eastern firms to provide services and products. Customers are no more limited to conducting their financial transactions at the bank's premises or within a specific time, but can now at the comfort of their homes, twenty-four over seven and 365 days a year, behind the connected screen benefit from a large selections of internet banking services (AbuShanab et al., 2010). Another reason for this technology adoption is that financial institutions can significantly be saving costs. A typical Internet-based banking transaction costs about $0.01, while transactions at a physical bank location or through an ATM costs $1.07 and $0.27, respectively. Additionally, the use of online banking reduces the time necessary for customer transactions to occur (Karjaluoto et al., 2003).

Like other technologies, its success depends on its adoption rate. Studies were limited concerning customer adoption in developing countries like Lebanon and the Middle East (AbuShanab et al., 2010), while results have been inconsistent in instances where these models have been tested in developing countries (Bandyopadhyay and Fraccastoro, 2007; Lin and Bhattacherjee, 2008). As per those authors, this might be a result of the difference in culture between the Middle Eastern countries and the Western ones and between developed countries and developing ones as the results of Hofstede's dimensions of culture have shown in a comparative study between India and USA. The Technology Acceptance Model (TAM) was analysed as well while studying the trust effect in the adoption of online recommendation agents when purchasing a digital camera. Additionally, gender and age were found to be moderators in technology adoption (AbuShanab et al., 2010).

Chung and Paynter (2002) conducted a research where customer age, education level, previous experience using touch-tone telephone technology for banking transactions, and the perceived simplicity of conducting transactions were all key factors influencing customers' willingness to adopt web-based banking services.

The types of services offered by online banking are similar between developing Arab countries and Western countries, but the rate at which these services are provided appears to lag (Al Sukkar and Hasan, 2005) due to the limited internet usage in the Middle East in addition to lack of top management support, security

and privacy concerns (Guru at al., 2003) in addition to marketing and technology cost, and a general lack of investment in e-commerce.

Furthermore, internet services have been shown to have a direct and positive effect on customers' satisfaction (Kassim and Souiden, 2007), and satisfaction has been proved to have a positive and direct impact on customers' retention in the Middle East (Al Sukkar and Hasan, 2005), and is the most essential factor for gaining and maintaining market share.

Lebanese government departments adopted in 1993, the goal of improving IT infrastructures and services. Lebanon's e-government vision revolves around the accomplishment of several strategic objectives that undertake citizen-centric and business-centric approaches. These objectives are backed by institutional and legal frameworks and are made possible through facilitating the role of information and communication technologies (ICT). Formal efforts to integrate ICT in Lebanon following the civil War were initiated under the National Administration Reform Program (Bankmed, 2014). The Office of the Minister of State for Administrative Reform (OMSAR) was established in 1993 to lead Lebanese e-government efforts in implementing its strategy. In October 2003, the United Nations Development Program (UNDP) and OMSAR developed the National e-Strategy and e-Readiness Report aiming at "moving the economy and society of Lebanon towards a Knowledge-Based Society in the shortest possible time while at the same time addressing related challenges and opportunities that Lebanon is facing." In 2010, Lebanon finally implemented some e-government projects such as "Water Evaluation and Planning System" (providing water forecast in order to better plan water distribution and usage), and "e-Taxation" Service (settling taxes and fees via the Ministry of Finance website).

Lebanon's IT services reached a value of USD 93 million in 2013, accounting for one-fourth of the total information and communication technologies (ICT) market and growing by an average annual rate of 10% over the period 2008-2013 (Bankmed, 2014).

The expansion witnessed in this sub-sector comes as a direct result of the rising spending on e-services by businesses, telecom companies, and government agencies. Furthermore, higher growth is expected to be driven by improved infrastructure and cloud services (Bankmed, 2014).

Over the past years, Lebanon has achieved major enhancements on several ICT indicators. Yet, the country still has a long way to go to develop its ICT sector to catch up with countries in the region. Lebanon has recorded IDI[1] value of 5.37 and has ranked 52nd (worldwide) in the ICT. Lebanon was the country with the highest increase in IDI value of 0.75 points during 2012. Regionally, Lebanon ranked 5th following Qatar (31st worldwide), UAE (33rd worldwide), Bahrain (39th worldwide), and Saudi Arabia (50th worldwide).

In the E-government development index, Lebanon scored 0.514 points in 2012, up from a score of 0.439 in 2010. As such, Lebanon's ranking improved from 93rd position in 2010 to 87th position in 2012 (worldwide). Regionally, Lebanon ranked right behind Oman (64th worldwide) and right ahead of Jordan (98th worldwide). Therefore, we can consider such studies on Jordanian e-banking similar to the Lebanese ones.

2.1.2. E-Banking in Jordan

A study conducted by AbuShanab et al. (2010) on e-banking in Jordan analysed the gender role in performance expectancy, effort expectancy and social influence. Results indicated that performance expectancy had a stronger effect in the case of males, and social influence and effort expectancy had a stronger effect in the case of females. These results were expected; as suggested by Al-Gahtani et al. (2007), Arab women tend to be limited in social roles and professional opportunities where they would be more unlikely to use computers in general and might consider adopting Internet banking to be more difficult than would Arab males.

These results are also coherent with the culture scores suggested for Arab countries by Hofstede (2004) where individuals in Arab countries tend to be more affected by the opinion of others more than individuals from Western countries. Similarly, individuals in the Arab countries with more masculine tendencies would probably be more likely to adopt or employ recent technologies such as E-banking to accomplish their personal or professional goals (AbuShanab at al., 2010). As per the age factor analysis concerning performance expectancy, effort expectancy and social influence, results indicated significant interaction terms for both performance expectancy and effort expectancy when moderated by age. Older customers (age = >30) showed stronger effect in the case of performance expectancy, but younger customers (age < 30) showed a stronger effect in the case of effort expectancy. On the other hand, social influence was not alleviated by age (AbuShanab at al., 2010).

In a comparison with the Western countries, studies revealed that the incorporation of some earlier RAISA technologies such as the Automated Teller Machines ATM may have radically changed the way the customer experiences the banking industry and changed the workforce of banking. A study published in The International Journal of Information Management (Liao, Shao, Wang, Chen, Bank, Kong, 1999) entitled "the adoption of virtual banking: an empirical study" defined Virtual banking as the provision of banking services via means other than traditional physical branches. Understanding people's adoption intention of virtual banking can help financial institutions to formulate appropriate marketing strategies for new forms of banking. Theory of Planned Behavior (TPB) and innovation diffusion were used to study the adoption intention of virtual banking in a well-developed international financial city. The study finds

that the relationships were found only partially explained by the TPB. This was maybe due to the absence of the physical interaction that might have affected the components of the TPB mainly the subjective norms and control beliefs. This could be explained since the study was done 1999 whereby the adoption of ATMs was quite new and people had to establish trust with the machine which actually represented a big leap towards the unknown. In short, the importance of human machine interaction has increased, and the facilities that VA can provide are expanding, whether in the service field, the educational or the entertainment fields as well as the healthcare. Nonetheless, the adaptation to this technology is not as simple as it looks; there are avoidance attitudes towards VA, with some of them related to anxiety, culture and technology adoption. Furthermore, the Theory of Planned Behavior (TPB) explored the avoidance attitude differences to VAs, dependent on owning a Virtual Assistant and age. The results show that those that did not own or use a VA had scored lower on their perceived social acceptability of VAs. This suggested a higher social acceptability of devices for people that owned a VA. The study also found that people aged 38 and above had a significantly lower mean score on their perceived VA ease-of-use, signifying attitudes determined by control difficulty between age groups. (Avoidance Attitudes towards Virtual Assistants, Thesis, April 2018, Sandeep Chowdhury Coventry University).

This research tries to understand why society is apprehensive to speaking to artificial intelligence agents, drawing upon the components of Ajzen and Fishbein (1975) Theory of Planned Behavior (TPB). Thus, the literature review has suggested that age group, language, adoption of the device and cultural differences are differentiating factors between attitudes towards VAs in Lebanon.

3. Research Context

3.1. Research hypothesis

The TPB can be further evaluated for whether it is an appropriate model for the

Human-Computer interaction (HCI). The findings have the potential to bridge a psychological theory to the area of HCI, an era-sensitive discipline that demands constant studying due to rapid technology advancement. This research can investigate differences in attitudes towards virtual assistants, an ostensibly understudied area, and with consideration for the literature and findings, it was hypothesized that;
1. People aged 40 and above will score lower on their perceived behavioural beliefs compared to those aged below 40.
2. Avoidance attitudes towards virtual assistants are related to the user's culture (geographical distribution, educational level).
3. Social acceptance of the VAs in Lebanon is still primitive due to privacy concerns and technology avoidance.

4. Language used during human machine communication affects the quality of the interaction and the time spent using it.

3.2. Research methodology

In order to investigate avoidance attitudes towards VAs in Lebanon, we collected our primary data through a cross-sectional questionnaire based on the Theory of Planned Behaviour (TPB) belief components as its subscales, which can appropriately assess attitudes towards VAs

1. To what extent is the avoidance attitude among Lebanese related to cultural reasons?
2. Are there any differences in avoidance attitudes between age group and culture (geographical distribution), based on differences in scores on each subscale?

3.3. The sample

To test the research hypothesis, we distributed a survey to 805 Lebanese participants working in different fields and companies, such as the automotive industry (where participants were chosen randomly from all departments, as the garage, the sales and the directory), the banking sector, NGOs and university students and professors. The sample size is considered adequate since in Business research a sample of more than 500 participants are adequate for a market research (Malhotra et al., 2017). Furthermore we can say that the sample is quite dispersed in terms of geographical location and educational level and age range, thus giving the sample a versatile and broad range of participants that was covered. Participants were randomly chosen from both genders (51% aged between 26 and 35 years old) (Table 4). Participants have different educational levels (36.3% with a bachelor degree, 36.9% with master's degree, 1.2% with no degree at all, and 13.7% with a technical degree) (Table 5). Geographically, they were distributed between all Lebanese regions but the majority as we can notice are from Mount Lebanon due to the use of convenience sampling technique and due to the physical proximity between the researcher and the geographical location of the participants (with 55% from Mount Lebanon, 20% from Greater Beirut, 8.1% from North Lebanon, and the others from the remaining regions such as the Bekaa and the South and others living abroad) (Table 3). The questionnaire was administered to participants via WhatsApp for employees of the banking sector, and for the NGOs' employees and university students and teachers; same as for the employees of the automotive sector who have no emails such as the employees at the garage. Additionally, it was administered via email to the employees from the automotive sector who have a work email address. At last, it was also administered personally to participants met randomly on the streets or at big events.

Below are the Tables that provide descriptive statistics for the sample:

Table 3: Geographical distribution of the participants
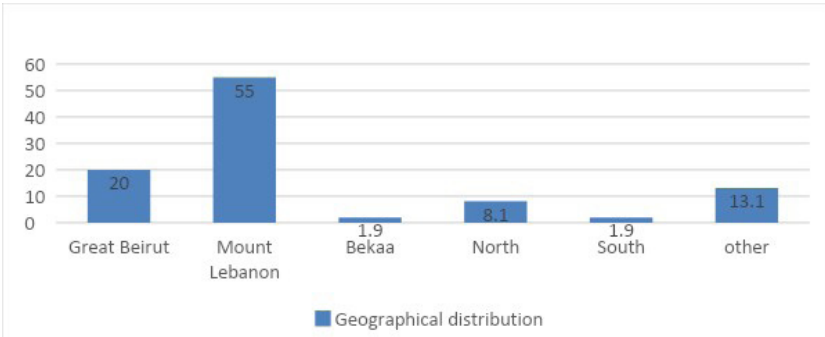
* Other's category represents the participants who live outside Lebanon

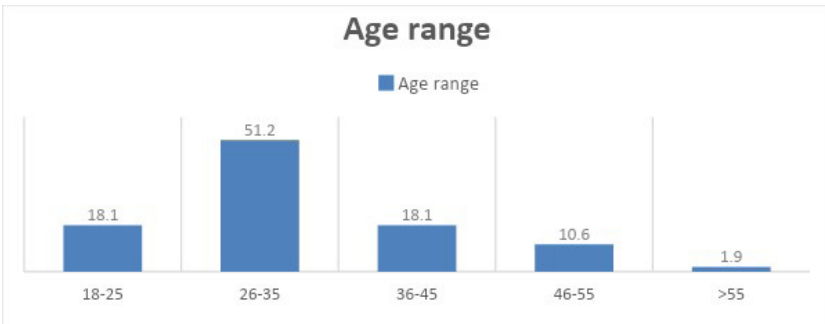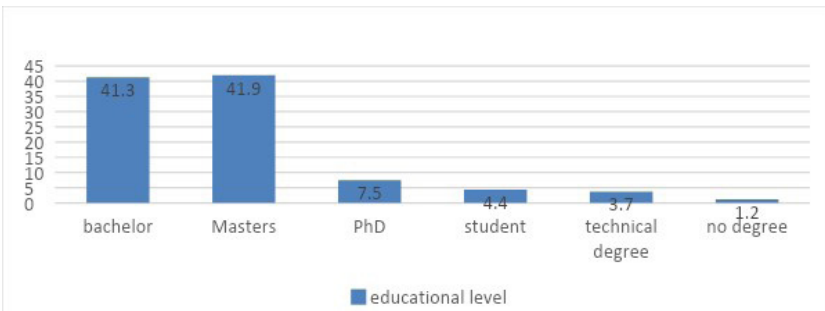**Table 4: Age range of the participants**

Table 5: Education level distribution of the participants


3.3.1. Measurement scales

The survey questions were constructed based on previous questionnaires and on the literature review on virtual assistants. To measure trust in the virtual assistant, it was based on the TPB (Theory of Planned Behavior) (Ajzen, 1991). The use and/or acceptance of virtual assistants was measured with TAM (Technology Acceptance Model) (Davis, 1989; Bagozzi, Davis and Warshaw, 1992).

Respondents reported their responses for each statement on five-point Likert-scale statements.

4. Results of the study

The results of the collected data were analyzed through different variance tests that were performed to test the four hypotheses of the model concerning the age and culture of the respondents, their technology avoidance attitudes/ privacy concerns, and finally the effect of the language used by the virtual assistant and the dialect of the user. Table 6 shows the usage of virtual assistants by brand name on smartphones, we can notice that SIRI Takes the lead with 58% followed by Google Assistants while the other brands represent a negligible percentage of usage.

Table 6: The percentage of virtual assistants' use on smartphones
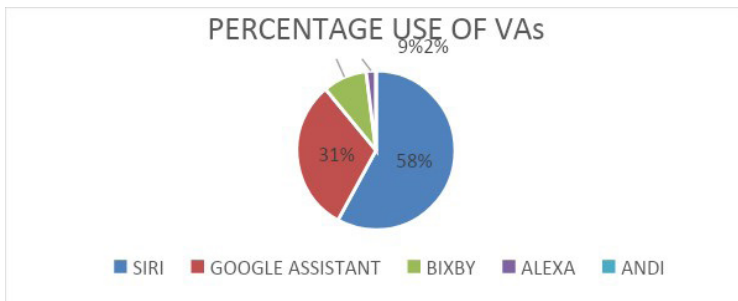
The results showed that the user's age has a significant effect on using the virtual assistants. A respondent aged under 40 tried at least once to use a virtual assistant, while respondents who did never use this technology are mostly above 40.

Hypothesis H1 (People aged 40 and above will score lower on their perceived behavioural beliefs compared to those aged below 40) is thus confirmed.

Table 7 and 8 represent the percentage of people above 40 using VA
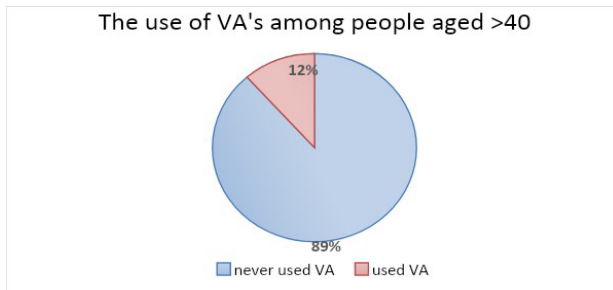
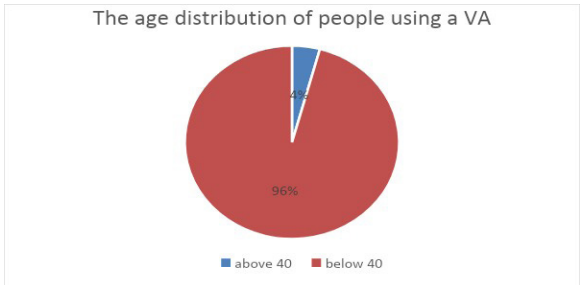**Table 7: The use of VAs among people aged >40**

**Table 8: The use of a VA as per participants' age**

On the other hand, no significant effect was found regarding the respondent's culture on trust in the virtual assistant. The geographical distribution of the respondents who were not using virtual assistants was not unique. The distribution of participants on the geographical map of Lebanon was not similar, where we have 55% living in Mount Lebanon, 20% in Beirut and only 2% in the South and Beqaa (as shown previously in Table 3). Therefore, the number of participants avoiding the VAs' technology from each region is not the same but, their percentage as per their number is close (varying between 18.5% and 20%). Hypothesis H2 (avoidance attitudes towards virtual assistants are related to the user's culture) is thus not supported. Tables 9 and 10 show the non-users and their distribution across Lebanon.

Table 9: The distribution of people who did not use a VA in Lebanon
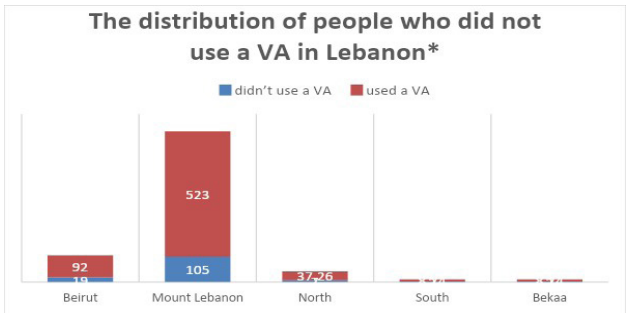
The table excludes the participants who live outside Lebanon indicated as "others" in the questionnaire

Table 10: The percentage of people who did not use a VA according to geographical areas

Table 11: The satisfaction of VAs' users
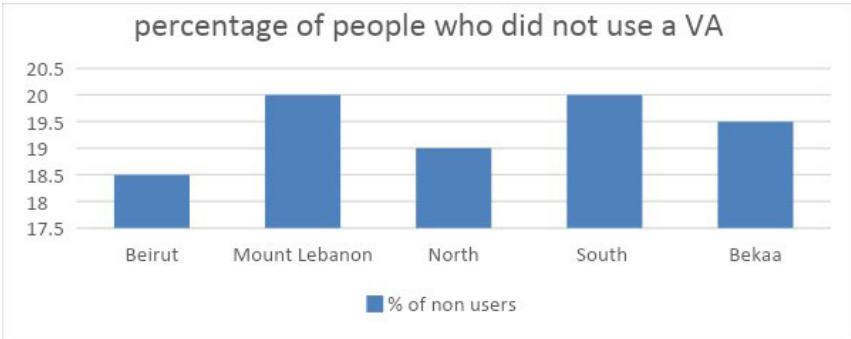
Similarly, privacy concerns had no major effect on trust in virtual assistants and its use. The percentage of the respondents not using the virtual assistants, or showing limitations in its use due to privacy concerns was only 8%. Participants who were unsatisfied using a VA scored 17% and those who presented a neutral reaction scored 27% which is a high score concerning the VAs' use; we suggest that this percentage show that people are reluctant to use new technology and specifically to chat with a robot due to the limited knowledge they have concerning it. Hypothesis H3 (Social acceptance of the VAs in Lebanon is still primitive due to privacy concerns and technology avoidance) is thus not totally supported. Tables 11 and 12 show the satisfaction percentage of users and their limitations.

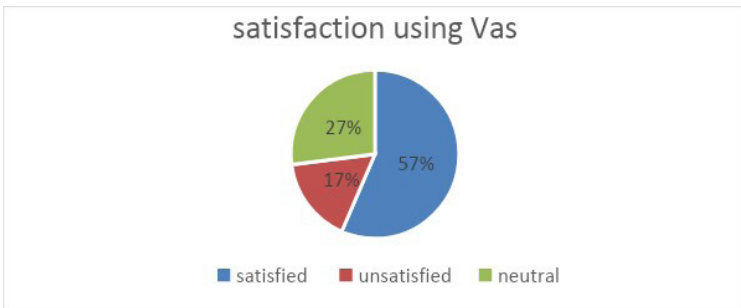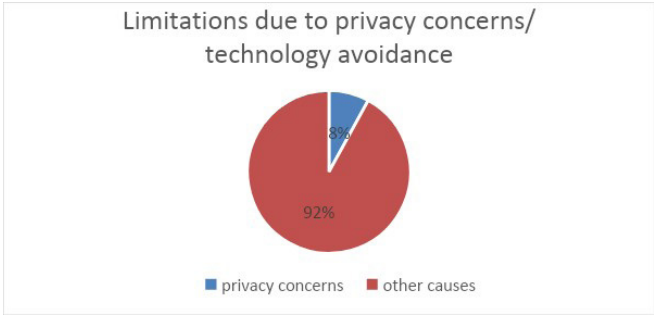**Table 11: The satisfaction of VAs' users**

Table 12: Unsatisfied users' percentage due to privacy concerns/ technology avoidance

Finally, the results reveal a significant effect of the language/accent on users' experience. When the virtual assistant speaks in English with English-educated users, behavioural intentions are stronger than with users having different dialects. 97% of the users are students and university-graduates, and 95% speak English but not as a first or a native language. Additionally, user's avoidance behaviour is directly affected by the absence of Arabic speaking agents especially for those who do not speak English at all (4.9%). Hypothesis H4 (language used during human machine communication affects the quality of the interaction and the time spent using it) is therefore supported.

Table 13 shows the percentage of unsatisfied users due to the language/accent differences.

Table 13: Unsatisfied users' percentage due to English language limitation
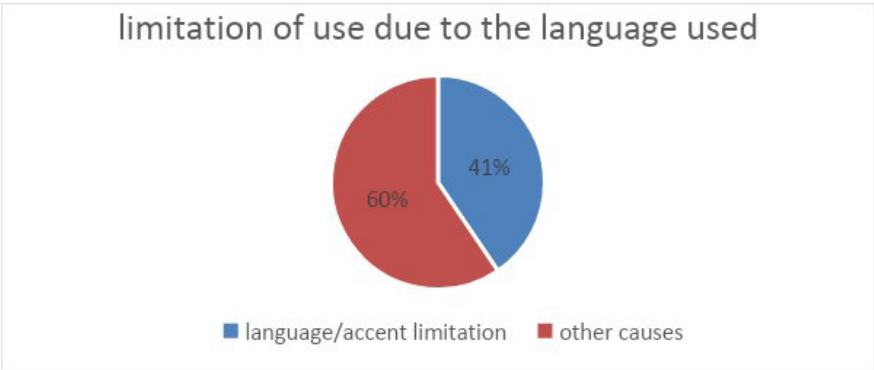
5. Analysis and Discussion of the Results

Since the use of ANDI, the chatbot of Bank Audi, measured a negligible result compared to the use of the other virtual assistants via the phone in Lebanon (0% use), it was excluded from the analysis (Table 6).

As 22.5% of the respondents were aged 40 and above and 87.6% among them did not use the virtual assistants, we can confirm the simple mediating effect of age in the perceived behavioural beliefs. Similarly, in a study on the relation between age and adoption of smartphones and innovative technology in Taiwan (Shih et al., 2018) it was suggested that older people may not be as inclined as younger people to learn new things and develop new skills. Furthermore, results of their study suggest that people born before 1980 (aged 40 and above) tend not to learn or develop new skills on an ongoing basis like the ones born after 1980 (aged below 40). Additionally, people born before 1980 were called "the digital immigrants" as they were born in a paper-based tasks period and had experienced interacting with computers through the command line interface; people aged below 40 (born after 1980) were called "the digital natives" because they were born in a world of computers and predominant internet period (Crampton and Hodge, 2011). This study allows us to conclude that age plays a significant effect on behavioural intention concerning the use of modern technology even in diverse cultures.

On the other hand, comparing our results with the literature studies, we can point that the Jordanian study where the results pointed out that age and gender did not affect the behavioural intention (Dajani, 2016) do not support our results. Contrarily, the study of AbuShanab (2010), where results indicated significant interaction terms for both performance expectancy and effort expectancy when moderated by age supports our study results.

Since in our study, there was a direct effect of age on behavioural intentions, we can include other omitted mediating variables in the theoretical models. Exploring the multiple mediation of trust in the virtual assistant and in its use is of a great interest. The 39.4% coefficient of higher education' respondents (Masters and PhD degrees) corresponding to the users aged 40 and above, did not have any significant effect on the use of virtual assistants. Hypothesis H1 is therefore supported.

Thinking geographically is fundamentally important to any effort to make sense of people, places and cultures (Fouberg, 2019). Similarly, findings indicate that TAM functions well across cross-cultural boundaries but in their current form, it is impossible to test the impact of the individual culture dimensions on the relationships in the technology acceptance model (McCoy S. et al., 2014). Contrarily, Endrass et al. conducted a study on the effect of culture on chatting with a VA between German and Japanese (2009); the results of this

study depicted that culture plays a significant role and has a profound influence on the conversation style. Further, researchers revealed a relation between the culture of a specific country and the type of technology adopted (Abu Shanab et al., 2010). Furthermore, Cassel et al. conducted a study on the human-human interaction where it was observed that minor acts such as leaning on each other, laughing, telling jokes, the choice of words and interrupting each other is different from one culture to another, and is greatly dependent of the environment, the culture, and the traditions (2007). As per our literature findings, studies were limited concerning customer adoption in developing countries like Lebanon and the Middle East (AbuShanab et al.,2010) and the results have been inconsistent in instances where these models have been tested in developing countries (Bandyopadhyay and Fraccastoro, 2007; Lin and Bhattacherjee, 2008). These studies suggest a difference in culture between the Middle Eastern countries and the Western ones and between developed countries and developing ones as the results of Hofstede's dimensions of culture have shown in a comparative study between India and USA. Additionally, gender played a vital role in the e-banking adoption in the Middle Eastern countries (Abushanab et al., 2010; Al Ghahtani et al., 2007). Therefore, these results are also coherent with the culture scores suggested for Arab countries by Hofstede (2004).

On the other hand, our results show that the relation between the geographical distribution of respondents is related to their culture and their avoidance attitudes towards virtual assistants was found to be insignificant. Hence, there was no difference between participants using SIRI in Beirut and those in the North. Additionally, participants struggling with the use of VAs in Beirut compared to those in Mount Lebanon did neither show differences in their percentage nor in the factors of their satisfaction; therefore, hypothesis H2 was not supported.

Privacy concerns and a lack of trust have been shown to reduce consumer's willingness to perform an online trade. Therefore, firms are searching for methods to reduce consumer privacy concerns and increase trust. On the other hand, the countless provided services by the VAs positively influence trust in those virtual assistants and behavioural intentions towards them. Trust in the virtual assistant in turn positively influences behavioural intentions. On a study conducted in the unique setting of Lebanon, results show that by developing trustworthiness, citizens will increase their behavioural intention to use the services provided to them (Fakhoury and Aubert, 2015); in our study results show that privacy concerns had no major effect on trust in virtual assistants and its use contrarily to the results of previous studies (Bélanger and Crossler 2011; Muscanell and Guadagno 2012; Saffarizadeh 2018) where privacy concerns were an essential factor in avoiding interaction with new technology. Are these results still relevant today with the problems related for example to WhatsApp and Facebook. Chattaraman suggests that anxiety has an important effect on technology avoidance as the users fear using new technology and

making mistakes, therefore presenting a guideline is essential (Chattaraman et al., 2014). Additionally, a study on the retail websites highlights the importance of a personalized VA to increase trust in that website. Trust in the retail website and its VA results in a behavioural change and it has also been observed to have an influence on the sales resulting in an increase in the customer satisfaction (Holzwarth et al., 2006). In the literature studies as well, results show that security and privacy concerns (Guru at al., 2003) have a major effect on technology avoidance in e-banking specifically. Contrarily to those studies, the results of our research show that the percentage of the respondents not using virtual assistants, or showing limitations in its use due to privacy concerns was only 8%. Therefore, H3 is unsupported.

There was a positive complementary mediation, suggesting the existence of other mediators such as the English accent understanding or the ability of the VA agent to speak Arabic in our region. Additionally, the results of our literature suggest the development of software and programmes that have a bi-lingual interface (Arabic and English) in order to be used and understood by all of the employees in the Arab organizations (Dajani, 2016).

Furthermore, a large number of researchers in human machine interaction agreed on the statement that people treat computers not only as a medium between them and other people, but also as a social actor. Nass and Steuer describe language used by the VA and his/her voice are characteristics that can reinforce the social presence in an online experience. In 2005, Nass and Scott showed that voice interaction allows more natural and effective conversation with machines. From the users' perspective, an oral interaction with the machine is perceived more favourably, it increased the competence, and credibility same as with a human-human interaction (Edlund et al., 2008); therefore, the user and the agent must be able to speak the same language and understand each other's accent. According to the social realism theory, minimal indices of similarity with human interaction are enough to induce users to show social behaviour (Krämer et al., 2013).

Our study results show that 58% of users experienced talking to SIRI (one of the most familiar and popular types of VA that people mainly use), while a negligible coefficient related to the use of Andi was observed (Table 6). A strong feeling of satisfaction (56%) in the virtual assistant results in a strong feeling of trust in the agent, which in turn will positively influence behavioural intentions. Hypothesis H4 is therefore supported.

6. Conclusions, Limitations, and Future Research

In conclusion, people are open to talk to Chatbot/ Artificial Intelligent agents. Although the possibility to start a conversation intentionally with an AI agent was used rather sparingly, a higher number of users were still asking questions

just to fulfil their curiosity about this innovative technology. Unpleasant user's experience was related to many factors, such as the language used by the agent, the accent' difference between the non-native English user and the VA. In addition, the age of the user affected his intention to learn about modern technology, and users' trust in computers in general and their privacy concerns played a role in their avoidance attitudes. However, the user's demographic distribution shared no meaningful relationship with the acceptance of human-machine interaction. This finding raises the hypothesis that the use of the AI by youth and in their native language might have a more observable effect on their experience.

Limitations of the study include a relatively small number of participants as well as their relatively attenuated geographical distribution, as well as their homogeneous educational levels. Although both limitations restrict generalizability, they nevertheless provide an empirical platform for upcoming investigations, where the role of the AI-based features as a base for businesses in all sectors will be further explored. In this study, younger and more intellectually curious users liked talking to AI agents but those with limited English-speaking accent perceived the AI version as less usable. In this regard, respondents revealed that the AI-based agents of Google and Apple were more helpful than Android and Audi's agents. Respondents also communicated various ideas for future development of the Chatbots that expressed the need for an Arabic-speaking agent and a more personalized one or with less limits. Another limitation is the time frame due to Covid-19 pandemic and the bad internet connection in Lebanon that affected the use of online services and the accessing the survey and collecting the results.

It is noteworthy to mention that the time frame of the study which it has been conducted during the Covid-19 pandemic spread and the total lockdown that obliged people to start working online, coupled with security/safety issues and especially the financial crisis in the in Lebanon had probably led to clients and employees in the banking sector increase their usage of machines and computers... knowing that personal relationships with employees and branch managers played an important and decisive role before the whole crisis.

In closing, this study demonstrates that social attitude toward learning and digital skills seem to play a significant role in the acceptance of human-machine interaction, even more than the nature of the technology itself. It follows that technology-enhanced environments should support the culture of the users and their native language by personalizing the bot depending on their nature, use and users' status. The findings offer support for the notion that amending artificial agents' use for optimal knowledge and utilization requires more than providing users with more digitally advanced educational computing environments. Future research contributions should expand exploration of

how the bot language and unlimited/diversified properties can help regulate the use of the bots, especially if combined with specific guidance wherein the potential benefit of AI-agents can have access to different resources, from health to education; to entertainment, and services.

Notes

[1] IDI: a composite index, which combines 11 indicators into one benchmark measure that monitors and compares developments in information and communication technology across countries

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