

Measuring Chatbot Trust in Times of COVID-19 :
A Survey of Chatbot Usage in Epidemic Health Crises

Masterarbeit

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vorgelegt von

Name: Savadogo



Vorname: Manuel



Prüfer: Prof. Dr. M. H. Breitner

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1. INTRODUCTION

“The need of conversational agents has become acute with the widespread use of personal machines with the wish to communicate and the desire of their makers to provide natural language interfaces”

(Yorick Wilk, 1999)

The use of chatbots as well as research in this area, can be deduced from the present quotation. It has increased very strongly in recent years. One reason for this is the continuity of technical progress. On the other hand, the influence of artificial intelligence (AI), the popularity and importance of which is growing, especially in the technical context. The use of natural language processing (NLP) and human computer interaction (HCI) not only offers added value to consumers of this technology, but is also becoming increasingly attractive to companies that offer it. Especially in the field of e-commerce and customer service, the integration of this technology will be of particular benefit. Both the relief of customer service and the associated costs as well as the increased accessibility for customers are major drivers for the growing popularity of chatbots. As a result, they have been integrated in many areas of life, such as health, finance or insurance (Følstad et al., 2019).

The novel corona virus, also known as COVID-19, has been keeping the world on tenterhooks since the outbreak in December 2019. The health crisis, which has spread around the world in a very short period of time, has resulted to the declaration of a worldwide pandemic. This has led to significant restrictions, lockdowns and economic crisis in many countries. The increasing insecurity, as well as the lack of access to fast and helpful information in a situation that has not existed since World War II forced companies and governments to act. Because of this, the development and implementation of COVID-19 chatbots was accomplished in a very short time. Chatbots have become more and more integrated in the health sector during the last years. The use of virtual therapist as well as for answering rudimentary questions are some of the aspects why this technology provides added value (e.g. Cameron et al., 2019;). The advantages and benefits of chat bots in this context have also been investigated in the research of Ilić and Marković (2016).

COVID-19 chatbots are largely unexplored due to the topicality of the topic. They are used to generate quick information about COVID-19, e.g. the current infection rates, typical and atypical symptoms of the disease or treatment possibilities. Due to the strong similarity to chatbots in the health sector, many chatbots have been developed in a short time. Leading global organizations such as the World Health Organization (WHO), or the Center for Disease and Control and Prevention (CDC) have directly

started to develop chatbots for this purpose. The same has been done by both private companies and governmental working groups. The aim was to provide emotional support to the population and to relieve the sometimes completely overloaded telephone hotlines.

Since this area is still quite unexplored in the present work influencing factors, which influence trust and the intention to use COVID-19 chatbots, are identified and examined. To allow a better understanding of the relations, (i) the influences (effect) of social influence, privacy and humaneness on the trust are investigated. Furthermore, (ii) the impact of trust on the intention to use is examined. The factors perceived ease of use (PEOU) and perceived usefulness (PU), which are described in the TAM named after Davis (1989). These influences were investigated in Russia, Italy, Germany and the USA in order to enable an intercultural comparison. As a consequence, the following two research questions will be pursued in order to investigate the trust in the use of COVID-19 chatbots:

1. What influence do the beliefs of the TAM and the factors humanity, social influence and privacy have on the trust in the use of COVID-19 chatbots?
2. In which of the considered regions is the increased implementation and use of COVID-19 chatbots better suited and in which less?

In the following, we will therefore, examine suitable literature sources on chatbots, especially in the healthcare sector, the trust in their use and the connection to TAM. Subsequently, hypotheses will be derived from this with the help of which a measurement model was created. Following the discussion, the present research concludes with the implications, limitations and outlook.

9. CONCLUSION AND OUTLOOK

In the context of the master thesis the trust in the use of COVID-19 chatbots was examined. Special focus was put on the factors that significantly influence this trust. The basis of the present research is the design science research approach according to Pfeffers. As a result, the developed measurement model was developed. The theoretical basis of the model as well as existing approaches and models were determined with the help of the literature analysis according to Webster and Watson. For the evaluation of the developed measurement model the method of online surveys according to Moore and Benbasat (1991) was used. Finally, the factors influencing trust in the use of this technology were discussed and the resulting implications and recommendations for action were derived.

First, the technical terms derived from the title of the thesis were examined. A special focus was put on the terms chatbot, epidemic health crises and COVID-19. In this context, the various uses of chatbots, such as in the health sector, and the aspects that distinguish a pandemic from an epidemic were discussed in detail. Due to the increasing digitalization and the rapid technical development of the last decades, the use of AI-based technology has increased more and more. This is one of the main drivers in the further development and implementation of chatbots.

Subsequently, existing approaches and models for the investigation of trust in chatbots using the approach according to Webster and Watson were examined and presented. Based on the identified publications, a large amount of relevant literature has emerged. This literature investigates trust in chat bots and the factors that influence it. However, it does not deal with the topic COVID-19, as it is the case in this paper. Based on this, a model was developed, which adapts existing artifacts, but was adapted to the topic investigated in the thesis.

The developed construct was evaluated by means of an online survey according to the method of More and Benbasat (1991) evaluated and modified. Special focus was put on the significant influence of defined factors on trust and intention to use, as can be deduced from the first research question. The aim was to examine the existing significance and the question for which of the investigated regions this technology is more suitable and which not. It turned out that most of the factors that were identified in studies that had already been carried out and published proved to be correct also with regard to COVID-19. For example, the influence of the perceived ease of use on the perceived usefulness or the trust on the intention to use was confirmed. However, it also became clear that the factors humanness, social influence and privacy have different influences depending on the region under consideration. For example, it has

been confirmed that social influence has proven to be an essential and significant influencing factor on trust in all investigated areas. In this respect, privacy has been shown to have a positive as well as a negative influence. It can be deduced from this that although certain behavioral patterns can be derived on a country-specific basis, as can be seen in Section 7.1, this does not apply to all the countries studied.

Finally, the implications derived from the findings were examined. Special focus was put on the conclusions that could be drawn from the work and the question in which of the countries considered the use and increased implementation of this technology is suitable. The conducted study showed that the knowledge about COVID-19 chatbots and the experience already gained with it is relatively low in contrast to chatbots in other areas. Furthermore, it was confirmed that trust is a major factor influencing trust in COVID-19 chatbots. However, trust is influenced by factors whose significance and influence varies by region. Furthermore, it has been shown that this type of chat bots is particularly suitable in Russia, Italy and the USA, whereas in Germany these chat bots are less suitable, which answers the second research question.

Although the developed model was modified for evaluation by online surveys, there is still room for adaptation for future research. A possible extension is possible here by investigating further factors influencing the trust and the intention to use. Furthermore, the regions investigated could be varied or the number increased. Thus, the use of COVID-19 and the aspects that influence trust in it can be investigated and identified in other countries. A further possibility of adaptation is the integration of cultural aspects. Although these were briefly examined in the present work, they are not part of the reference model. This enables an intercultural comparison with reference to already researched cultural dimensions or cultural influencing factors. In conclusion, it can be said that the present research topic has an exciting future ahead of it. The influences on trust and intention to use as well as regional and cultural aspects regarding the use of this technology are still very much unexplored and therefore offer a wide range of new research.