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DIGITAL TRANSFORMATION IN GOVERNMENT: CHATBOT FOR COMMUNICATING TAX EXEMPTION AMONG SELECTED USERS IN THE PHILIPPINES

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This paper prepared by **JENNIFER DE LEON CRUZ** with the title: **"DIGITAL TRANSFORMATION IN GOVERNMENT: CHATBOT FOR COMMUNICATING TAX EXEMPTION AMONG SELECTED USERS IN THE PHILIPPINES"** is hereby accepted by the Faculty of Information and Communication Studies, U.P. Open University, in partial fulfillment of the requirements for the degree Program.

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Biographical Sketch

Jennifer Cruz was born in Calaca, Batangas, and moved to Manila at 15 years old to pursue educational and employment opportunities. She graduated with a Bachelor's Degree in Journalism from the Polytechnic University of the Philippines. Her career began as an Executive Assistant to the President of a real estate company, after which she became a writer and editorial coordinator for a local newspaper. She then served as an Operations Manager for a multinational logistics company for 14 years and as a Project Manager for a foreign embassy.

In 2010, Jennifer entered government service as the Head Executive Assistant to the Commissioner of the Bureau of Customs. After a year and a half, she transitioned to the Department of Finance as a Tax Exemption Analyst. In 2017, she was promoted to Fiscal Intelligence Officer V, a position she currently holds. She has been serving in the Department for 13 years. In 2020, Jennifer received the Australian Awards Scholarship and studied Business Intelligence and Data Analytics at Carnegie Mellon University – Australia.

Jennifer began her Professional Master's Studies in Development Communication in 2003 and earned 27 units in the program. However, due to work demands and her responsibilities as a mother, she was unable to complete her Special Problem during her final term. Despite these challenges, she remained determined to fulfill her lifelong dream of graduating and is grateful for the opportunity to return to her studies at the age of 50.

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To my DOF officemates, Joanne and Walter, thank you for always believing that I can finish this academic thesis.

Dedication

I would like to dedicate this study to my family, whose encouragement and support helped me finish my dream of completing further studies. To my daughter, you always remind me the importance of perseverance. This fueled my drive to complete this thesis. To my husband, your understanding and belief in me have pushed me during the times I wanted to give up. To my brother, you always inspire me to strive for greatness.

Lastly, I would like to dedicate this study to my late parents, Benjamin and Cristina. Although neither of them was able to finish college, they instilled in me the importance of education. Finishing this study, for me, is winning a battle my parents didn't have the opportunity to win. I am fulfilled and grateful.

TABLE OF CONTENTS

List of Tables

List of Figures

Abstract

This is an exploratory descriptive study on the use of the Department of Finance's (DOF) TESA Chatbot to communicate tax exemption to selected diplomatic community members and international organisations using the DOF's Enhanced Tax Exemption System-Lite (TESlite). The TESA Chatbot aims to streamline the tax exemption process and contribute to DOF's digital transformation plan.

Guided by the principles of Cybernetics theory, data were collected through key informant interviews with two industry experts and focus group discussions with seven TESA chatbot users. Before the deployment of the chatbot, communication difficulties included long waiting times, strict office hours, and health concerns during the pandemic. Through the chatbot, the users enjoyed the convenience of 24/7 availability, instant responses, and getting answers to their basic inquiries. However, challenges persist, such as the chatbot's limitations in handling complex queries and providing outdated information. Hence, the participants cited these opportunities for improvement: continuous updating of the system, incorporation of various languages, and expanding the chatbot's scope. Overall, the pilot TESA Chabot can be a supplement but not a replacement for human interaction and communication in applying for tax exemption online. The chatbot can be the first step for basic inquiries, but human intervention is still deemed highly important and preferred by applicants for special cases or complex queries. Suggestions to improve the pilot implementation are given.

Keywords**:** e-government; online governance; tax exemptions; TESA chatbot, diplomatic community, Department of Foreign Affairs-Philippines

Chapter I

INTRODUCTION

Background of the Study

Chatbots have opened up new avenues for communication within the Philippine government and private organizations, facilitating easier access to essential services. Entities nationwide have started embracing chatbot technology to streamline the dissemination of information regarding their services, particularly concerning procedures, requirements, and educational materials.

In this digital period, the number of companies that have integrated chatbots into their websites has increased significantly. The common intention of organizations is to support their customers 24/7 through human-like chatbots because of the challenges brought by digitalization. The so-called “new customers” expect business to be continuously available. Thus, they expect to reach companies all day long. Chatbots have been considered a very effective instrument for responding to the demands of the ever-evolving and growing digital world.

Chatbots can be developed using a range of technologies, including natural language processing (NLP), machine learning, and artificial intelligence (AI). Some studies suggest that NLP-based chatbots can effectively handle simple tasks, while AI-based chatbots can handle more complex tasks (Adamopoulou & Moussiades, 2020).

The first ever chatbot, Eliza, was introduced in 1966. Joseph Weizenbaum developed it at the Massachusetts Institute of Technology (Jarow, 2023). At that time, it was called a chatterbox but was later shortened to chatbots. Eliza was also known as a Chatbot Therapist because she mocked Rogers' Technique of Psychotherapy. To encourage conversations, pattern-matching algorithms and substitution methods

were used. The words users enter into the computers will be processed by matching them to a list of possible script responses. The script mimics a psychotherapist. For this reason, what was initially intended to be a mere caricature, Eliza became an instant hit to users. Weizenbaum was surprised to discover that users were entrusting their most deep-feeling secrets or even private matters to ELIZA.

Since Eliza, chatbots have been changing the way businesses conduct their communications to respond to the needs of their clients and understand their customers' behavior. Aside from growing brands, chatbots can provide customer service by assisting customers in purchasing a product, tracking and tracing the status of their orders, and even processing exchange or return products. Some studies show that this kind of service can cut the customer service cost of a certain company by 30%. In the United States alone, the potential savings of brands by using chatbots are estimated to reach $23 billion.

Studies have shown that ChatGPT is commonly used in a range of business intelligence jobs, carrying out research for market intelligence, predicting consumer behavior, and gathering other significant market research. It is also being used in providing round-the-clock customer support enabling the brands/companies to stay connected with customers through customized interactions and active responses.

In the government sector, chatbot technology may automate regular work, offer public information and services, and improve communication between government agencies and individuals. According to Kothakapu (2023), the chatbots in government can be utilized to aid in handling simple tasks that can aid the employees like attending to frequently asked questions, proving updates on the different government services, and processing the requests and applications of the citizens. To be more accessible,

these chatbots are preferably available in various platforms, websites, and messaging apps.

Chatbot Initiatives in the Philippines

In the Philippines, a group of young change-makers called GoodGovPH, a non-partisan and non-government organization produced a chatbot called Bantay during the 2020 Covid-19 pandemic. Bantay aims to address eligibility concerns and other concerns surrounding the Social Amelioration Program (SAP) and the social pensions of senior citizens. Bantay is a welfare assistance chatbot that is available on Facebook that's why a lot of Filipinos can access it. It is a 24/7 platform that aims to bridge the information gap between social welfare programs and their recipients. It also offers free public legal consultations (Dizon, 2021), For its impact and contribution to social development during the pandemic, Bantay bagged the #DigitalAgainstCovid19Innovation Challenge award from the Asian Development Bank.

The Department of Finance (DOF) is also streamlining its processes through an online application system Enhanced Tax Exemption System-Lite (TES^{lite}) Online Application (e-filing) and Tax Exemption Assistant (TESA)[1] Chatbot to facilitate faster communication between the Revenue Officer and the applicants. This innovation is designed to assist the transacting public in their online inquiries including Frequently Asked Questions (FAQs) on their tax exemption applications, as well as providing

[1] **Notice of Non-Affiliation and Disclaimer**: **TESA** is not affiliated , associated or in any way officially connected with the artificial intelligence tool named **TESSA** which provides weight-loss advice. TESA chatbot can be found at the official website of the Department of Finance (https://teslite.dof.gov.ph/)

basic guidelines to first-time applicants (i.e., one-time registration, providing documentary requirements, etc.).

The TESA Chatbot was approved for implementation on June 27, 2022 by Department Order No. 041-2022 signed by then Sec. Carlos G. Dominguez, in line with the launching of the enhanced tax exemption system-lite. Meanwhile, the chatbot was successfully launched to the public on August 09, 2022. [see Chapter 2 for documentation of its development].

Developing the Chatbot for DOF addresses many goals and challenges. First, it aligns with the Philippine Development Plan 2023-2028 which mandates digitalization for governance and development.[2]

Second, it streamlines processes to be more effective. The final output, which is an enhanced online application platform with Chatbot aims to make the process of filing for tax exemptions more time and cost-efficient for the applicants as well as to reduce erroneous entries. With the ISO certification of the RO, the department is revising its commitment to the Anti-Red Tape Authority (ARTA) to make the processing time shorter – from 3 working days to 1 working day for International Organizations and from 5 working days to 3 working days for the Diplomatic Community.

The said office processes thousands of applications a year and numerous daily inquiries. In 2023 alone 28,450 applications were processed while in 2022, 21,265 Tax Exemption Indorsements (TEIs) were processed. Figures continue to rise yearly. The ideal processing time for each application is 3 working days for International

[2] The DOF is the Philippines' steward of sound fiscal policies and processes tax exemptions for economic development. This process supports specific sectors like educational institutions and Overseas Foreign Workers (OFWs), helps vulnerable populations like indigenous communities, attracts investors as part of their fiscal incentives, and complies with international agreements and diplomatic missions.

Organizations like Asian Development Bank (ADB) and for 5 working days for Foreign Embassies or for the members of the diplomatic community. However, due to lack of requirements and errors in the application process, some applications have to be returned for compliance on lacking requirements and other clarifications from the review team of the RO.[3]

Third, human contact can also be minimized not just because of the pandemic but also to reduce face-to-face encounters of the applicants with the Revenue Officers.' For the longest time, applicants have to call on telephone lines and even have to go out of their way to go to the Department Finance office in Manila physically to talk to a Revenue officer. Given the volume of inquiries, telephone lines become extremely busy and lines continue to get longer in the office which hampers the communication process and makes the process longer.

The study is a personal interest because in February 2020, I was one of the two personnel from the Department of Finance-Revenue Office (DOF-RO) who received a scholarship to undergo the Business Intelligence and Data Analytic Course (BIDA) by Carnegie Mellon University-Australia through the Australia Awards Scholarship Program.

This proposal for an online tax exemption processing system using a chatbot was an offshoot of the requirements for a re-entry plan that would lead to the digital transformation plan of the DOF. The implementation of the TES^{lite} Online Application (e-filing) was envisioned to benefit applicants working from home and those who are living outside Metro Manila – a targeted 18,000 clients per annum or a 50% increase from the client base of 12,000 clients.

[3] The Revenue Office (RO), one of the divisions of the Department of Finance, is responsible for the processing of applications for exemption from payment of taxes and duties on importations based on existing laws, rules, and regulations.

While some of the existing clients have slowed down their operations due to the pandemic such as airline companies, DOF has seen growth in the number of Tax Exemption Indorsement (TEI) applications during and post-pandemic period.

Statement of the Problem

Some studies have already been made about the relationship between chatbots and overall customer satisfaction among commercial clients of private firms/companies, (Balasudarsun, Sathish, and Gowtham, 2018; Johannsen, Leist, Konadl, Basche, 2018). However, there is limited research on the use of chatbots as a tool for customer service of a national government agency like the DOF.

Moreover, given the developments in chatbot technology, the introduction of the TESA chatbot was envisioned to streamline the communication of the tax exemption process in the Department of Finance. Since the said chatbot was only recently introduced in 2022 this study can give insights on how the chatbot affects the communication process and the overall experience of applicants.

H ow does the use of chatbots affect the communication process of financial transactions in a government agency?

Specific Research Questions:

1. How was the pilot online tax exemption system at the DOF developed?
2. How is the use of chatbot enhancing or constraining the communication processes in the financial transactions on tax exemption among users of the DOF TESA chatbot?
3. How can the use of a chatbot be improved in communicating the DOF's tax exemption process?

Significance of the Study

Since there is limited research on the use of chatbots as a tool for customer service of a national government agency, this research explored how chatbots can respond to the changing needs of today's customers from public service (DOF).

Moreover, since the use of the TESA chatbot was just recently implemented, a study is crucial in exploring the opportunities and challenges in communicating the tax exemption process to the diplomatic community and international organizations.

This can also add to the body of knowledge on the growing digitalization of communication processes for government procedures and governance.

Chapter II

REVIEW OF RELATED LITERATURE

This literature review aims to explore the landscape of chatbots in the Philippines and abroad. It will first discuss the development of chatbots in the Philippines, their practical applications, and empirical findings surrounding their deployment. It will also tackle the potential and limitations of using this solution in different industries. By synthesizing the existing literature, the review seeks to inform readers about the chatbot industry in the Philippines, explore the benefits of this technology, and inform practitioners about the limitations of using chatbots for communication purposes.

Development of the Chatbots in the Philippines

In recent years, the utilization of chatbots has garnered increasing attention as a promising solution in businesses, governments, and different services globally.

One of the government agencies that adopted a chatbot for communications is the Banko Sentral ng Pilipinas (BSP). According to a study by Di Casttri, Grasser, and Kulenkampff (2020) on the chatbot application in BSP, the consumer complaints system at their agency had several limitations, which left BSP staff overburdened. These challenges include outdated communication channels, an incomplete database of customer complaints, reliance on manual processing, few analytics tools, low visibility of the Metro Manila Area, and little consideration for customer experience.

Through a collaboration with R2A and Sinitic, the BSP launched a chatbot solution that allows Filipinos to file complaints easily via an app or SMS. The organization also worked on using the chatbot to process issues and generate insights from all the complaints they received. The chatbot addresses queries and complaints, manages the structure and flow of automated conversation based on expertise and

historical data, and uses the data and insights gathered for oversight and policy development.

This solution reduced employee workload and response time by delegating simpler routine tasks to the chatbot. Moreover, it amplify consumers' voices about their experience. Continuous support of the system will support BSP’s effort to provide consumers with an effective complaint system.

In the Philippines, it was also explored how chatbots could be beneficial during the pandemic. COVID-19 has taken a heavy toll on the Philippine economy. One of the major impacts of the pandemic is the loss of income and job opportunities, leaving millions of Filipinos unemployed in mid-2020. To mitigate the impact of the pandemic on marginalized and low-income families, the government provided emergency subsidies under the Social Amelioration Program (SAP).

The program is supposed to cover 70% of the population, including the 4.4 million households registered in the Pantawid Pamilyang Pilipino Program (4Ps) and the other informal workers who were rendered jobless during the crisis.

These people, together with other vulnerable populations, are entitled to receive eight thousand pesos (P8,000) in financial assistance from the national government through SAP, but many negative stories came out of these sectors. Allegedly, they were made to wait because their papers were still being processed, but weeks and months passed, and they did not receive anything.

On its part, the Department of Social Welfare and Development (DSWD) admitted its shortcomings in the distribution of SAP, blaming the Local Government Units (LGUs) for providing a complete list of target beneficiaries. Above all, there were also some corruption allegations on the distribution of SAP.

According to Dizon (2021), a group of young change-makers called GoodGovPH, a non-partisan and non-government organization, produced a chatbot called Bantay. It aims to address eligibility concerns and other concerns surrounding SAP and the social pensions of senior citizens. Bantay is a welfare assistance chatbot available on Facebook, and that's why a lot of Filipinos can access it. It is a 24/7 platform that aims to bridge the information gap between social welfare programs and their recipients. It also offers free public legal consultations. For its impact and contribution to social development during the pandemic, Bantay bagged the #DigitalAgainstCovid19Innovation Challenge award from the Asian Development Bank.

Figure 1

Instructions for Bantay Chatbot

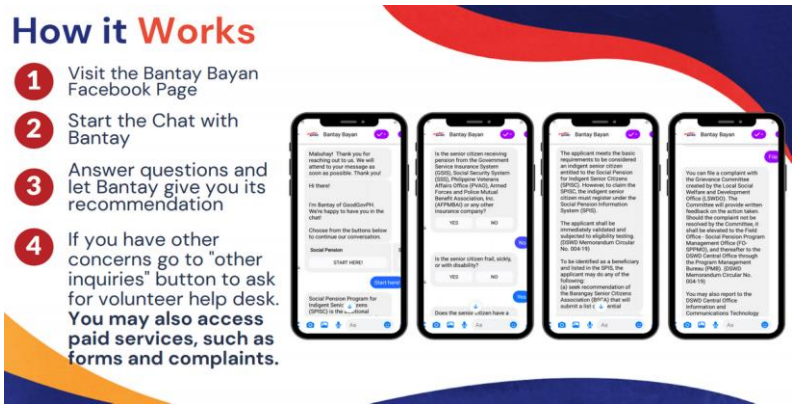


Photo Credits: Faustina Dizon

Meanwhile, the Philippines also uses different languages and dialects across the country. For business, English and Filipino are the most used including their code-switching variant, Taglish. With that said, some developers have considered expanding the language coverage of their chatbots.

One example is detailed in the study of Catapang, Solano, and Oco (2020), in which researchers proposed a bilingual retail chatbot that could handle Filipino,

English, and Taglish. This was suggested as relevant for Business Processing Outsourcing, which is among the Philippines' top foreign exchange earners aside from overseas Filipino workers' (OFWs) remittances. Incorporating more languages can make conversation easier and more efficient in countries like the Philippines, which utilizes several languages and dialects.

There are also several cases in other countries where chatbots can be revolutionary for government work. According to a study by Tisland & Sodefjed (2022), in Norway, several local government units have already implemented chatbots for government service communication and delivery. This study investigated how information, systems, and quality of chatbots affected citizens' empowerment and trusting beliefs when using e-government chatbots. To collect data, they utilized a questionnaire and follow-up interviews of 105 citizens or permanent residents of Norway who used e-government chatbots.

The findings indicate that information and service quality influence citizens' trusting beliefs when using chatbots. Trusting beliefs and empowerment affect the degree of satisfaction with the e-government chatbot, while satisfaction affects intention to use it. Based on these findings, it was suggested that a comprehensive model that brings together empowerment, quality, and trust should be developed to explain citizens' satisfaction with e-government chatbot use. It also shows that if government units provide a higher degree of information communicated and a higher level of service quality, more citizens will feel empowered to use e-government chatbots.

Advantages of Chatbots

Potentials for Customer Service

With chatbots changing the way businesses conduct their communications to respond to their clients' needs and understand their customers' behavior, there is much potential for chatbots in the foreseeable future.

Chatbots can provide customer service by assisting customers in purchasing a product, tracking and tracing the status of their orders, and even processing exchange or return products. Besides purchase assistance, a chatbot is also considered helpful in the context of problem solving. Chatbots excel in addressing various client concerns, with 37% specifically designed to tackle common issues users face (Ashfaq et al., 2020). Some studies show that this kind of service can cut the customer service cost of a certain company by 30%. In the United States alone, the potential savings of brands by using chatbots are estimated to reach $23 billion.

In the study of Hwang and Kim (2021), an AI chatbot was used in banking financial products and bank policy changes based on the Active Roles Service (ARS) data of leading banks. Findings showed that when banks utilize chatbots for long-existing products, it can positively affect the bank profits. Customers tend to process simple and small banking transactions through chatbot systems, which can save transaction and management costs and positively impact the profit of a company.

The study of Misischia, Poecze, and Strauss (2022) likewise stressed the positive opportunities of chatbots for customer experience being interactive, convenient and unique alternative to customer service. One of its best features is that it is available 24/7 — customers can get in touch any time to receive assistance. Moreover, it remains unbiased as its mood remains unaltered, which is far from the stressful and tired human feeling that may sometimes affect a person's service.

In addition, chatbot can aid business in identifying patterns of customer behavior as this technology has the ability to record a conversation history they can refer back to using the artificial memory (Murtarelli, Gregory and Romenti, 2021). These historical data can be used by the bot and the company to give more satisfying and tailored responses and services.

According to Kaplan and Haenlein (2019), these chatbot's database can be updated after every use, which can help solve customer's future problems in detail. Being able to aggregate the customer data on a large scale can support the businesses to understand better the customers' mindset, habits, and patterns of behaviors to adjust their decision making processes. Being able to know customers on a deeper level can result in a more personalized service.

According to the study of Misischia, Poecza, and Strauss (2022), the more personalized the service of the chatbot, the more likely the customer will perceive it as high quality which then converts to brand loyalty. One example is the Bank of America which launched its own chatbot called Erica, which gives financial tips tailored to the spending habits of its customers. This chatbot was able to meet customer expectations and improve overall experience (Cui et al., 2017).

Hence, there are two distinct sets of outcomes resulting from the integration of chatbots within companies. First, chatbots alter the manner in which companies engage and interact with their customers. Second, they can significantly impact and transform internal communication among company stakeholders (Hundertmark & Zumstein, 2017).

Omni-channel Response System

Chatbots are also able to respond to customers across all the channels from a single platform. This capability is called an omni-channel response system. When customers interact with a brand on varying platforms, they are often asked to provide the same information over and over again.

According to Smith (2024), 33% of customers find it frustrating to replicate what they say to various customer service representatives. With the introduction of the chatbot omni-channel, there will be no more redundancy or duplication of information. Customers using an omni-channel chatbot can expect a fast retrieval of customer information from one app to another thereby allowing a quick resolution of the queries.

Aside from taking away the nuisance of having to re-explain issues, the capacity of an omnichannel Chatbot to offer sensible and quick solutions improves customer experience using a chatbot. This enriching customer experience can result in a greater level of satisfaction for clients. With all that is said, it can widen sales leads and is a revenue boost strategy.

Potentials of ChatGPT

According to Haleem, Javaid, and Singh (2022), ChatGPT was introduced in November 2022 and it is based on the Generative Pretrained Transformer model language that is trained in large amounts of text data. Due to its language understanding capabilities, it can give responses, similar to that of a human. Its human-like writing style is creating a buzz not only in the workplace but also in the halls of the academy. The unprecedented level of popularity of this chatbot has shaken the world of tech workers, office workers, paralegals, and even students.

One of the unique features of the ChatGPT is the ability to provide legal advice. This chatbot can carry out legal research and help users understand legal terms and information in more basic terms. Some practicing lawyers are using ChatGPT to come up with quick legal advice for their clients, cutting the time-consuming tasks of research and writing. The capability of ChatGPT to generate summaries and draft document content gives more time for lawyers to concentrate on the legal aspects of their cases. The AI-powered technology can also help legal practitioners to remain compliant with professional ethics and codes of conduct by using the latest features which is the " Dude" Chat GPT panelist. Considered innovative in the intersection of AI and the legal industry, "Dude" allows lawyers to stay informed and up to date with current legal trends.

In the area of education, this buzzy chatbot has made many educators feel threatened because of this bot's capability to write essays and solve math and science problems. Teachers and school administrators are in panic mode because students are using this tool in essay writing and problem-solving homework and passing them as their own. Another area of concern is the propensity of ChatGPT to provide wrong and misleading answers to the questions thrown at ChatGPT by the students.

According to Hughes (2023), considered a cheating tool, some schools in the US have banned GPT from the classroom. Public schools in New York and Seattle have blocked ChatGPT on school devices in December 2022 just a month after its launching. Jenna Lyle (n.d., as cited in Hughes, 2023), a spokesperson for NYC's Department of Education mentioned that the reason for the ban would be "negative impacts on student learning and issues on the accuracy and safety of the content.

Professor Pasek (n.d., as cited in Abramson, 2023) defends the use of ChatGPT in education. She requires her honor students to utilize ChatGPT in their writings by using it in the first draft and editing it with their own critiques for the final version. She also emphasize that this new tool can enable students to ask better questions which can later on help them be real scientist. Therefore, ChatGPT can be helpful to spark meaningful discussions both in classrooms and in laboratories.

Limitations of Chatbots

Lack of Authenticity

According to a study by Juniper Research (2022), by 2040, around $140,000 billion will be spent worldwide through chatbots. Chatbots/Artificial Intelligence can also be used in content creation to connect with a target audience.

It is noteworthy to note, however, that content creation itself is a more blended and compounded marketing strategy that cannot be relied solely on Artificial Intelligence. Chatbots can be an excellent tool in content marketing, but in general, they still lack the customer's perspective in building authentic content. With all that said, it is safe to say that Chatbots can be used on many platforms, but they have their limitations.

Artificial Intelligence and chatbots cannot replace a creative writer to come up with powerful content. Chatbots can have difficulty answering complex questions, leading to executing incorrect commands. AI/Chatbots need to overcome issues with sentence construction in different languages and comprehend informal phrases or slang words used by local groups or regional communities only.

Limitations in Language Styles

These limitations have been affirmed by the study of Raval and Parkh (2020), which highlighted that some conversations with these chatbots lack flow and may still

fail to resolve primary issues. Different people may have their way of typing a message, so the chatbot may have difficulties understanding different messaging styles. Moreover, there are also challenges when words of the local language or slang are mixed in the vocabulary.

Furthermore, multiple algorithms and techniques can be used for the development of chabots. NLP (Natural Language Processing), LSTM (Long-Short-Term Memory), NLU (Natural Language Understanding), and Artificial Neural Networks can be useful both in text and voice assist. By combining these techniques, one can build the chatbot by overcoming all limitations (Raval & Parkh, 2020).

Cannot Replace Human Intervention

The study by Nguyen (2019) also stressed that the potential of chatbots should not be overestimated, especially in customer support, because it still cannot fully replace human intervention. It was emphasized that chatbots should only handle simple enough tasks and leave the more complex and trickier ones to humans. Developers must also remember that launching a chatbot requires thorough resource planning because it will not just need support for initial development but also for the later stages of analyzing and turning conversations of chatbots.

The results of the study are further strengthened by the work of Hwang and Kim (2021), who highlighted that when a company is introducing a new product or service, human expertise may still be needed for customer service. Customer adaptation and acceptance require more time and public relations. That's why if a chatbot is used to process these services or introduce a product, it may cause internal friction, affect short-term profits, and even lead to economic opportunity losses. Later on, it was stressed that companies must be able to know the right time to make technological investments like the chatbot.

Misinterpretation of Resources

Some studies warn users to be wary of using information from AI chatbots especially when it comes to crucial information like health. The study of Whiles et al. (2023) assessed if ChatGPT can provide accurate information regarding urological healthcare advice queries. The study showed the said chatbot was only able to get 60% of the answers correct. It can easily misinterpret clinical care guidelines and dismiss important information. Since references when it comes to health are also important, ChatGPT also has an issue with this as it conceals its sources and may sometimes provide inappropriate information. This suggests that users must be cautious when interpreting healthcare-related advice from existing AI chatbot models.

Digital Privacy Concerns

Besides the technical limitations of a chatbot, another issue some customers may have when utilizing the chatbot is digital privacy issues. Studies by Flew (2018), Degirmenci (2020), and Følstad et al. (2021) highlighted that over the past decade, there has been an increase in consumer skepticism about how companies obtain information about them. This phenomenon is also observed with the emergence of chatbots, as consumers may have to share data to utilize it fully.

Although early adopters enjoy the newness of this innovation, others are worried about the privacy concerns of this technology (Brandtzaeg & Folstad, 2017). Aguirre et al. (2015) and Nyugen and Khoa (2019) explained several perceived risks from the consumer's perspective about sharing their personal information online. The fear is heightened due to news reports on data breaches, like when Facebook shared their user's data without consent (Flew, 2018). This privacy concern triggers their engagement with the service, which may compromise its effectiveness. The

personalization-privacy trade-off becomes important in different online services like chatbots because organizations would be connecting with consumers in the following decades (Kaczorowska-Spychalska, 2019; Zumstein & Hundertmark, 2017).

Given these challenges, the global artificial intelligence industry is ensuring that chatbots will live up to the customers' expectations by building natural language processing (NLP). With the NLP, chatbots can interrogate the data using natural language text or voice. Dr. Michelle Zhou (2022, as cited in Csutoras, 2022), co-founder and CEO of JUJI, Inc. and the inventor of IBM Watson Personality Insights, said that chatbots continue to advance, offering tailored information based on conversational context. It seems that the use of NLP will help chatbots to have a good grasp of the conversation and will be able to interact more precisely with users (Csutoras, 2022),

Ethical and Social Implications of ChatGPT

Researchers have explored the ethical and social implications of ChatGPT, particularly in the context of its potential use in automated customer service, legal industry, and education. Concerns have been raised about the potential for ChatGPt to perpetuate biases and stereotypes in its responses, as well as its potential to deceive or mislead users.

According to Rose (2023), to address these concerns, researchers have developed techniques such as bias detection and mitigation, as well as transparency and explainability tools, to enable users to understand and question the decision-making processes of ChatGPT. Additionally, researchers have emphasized the need for ongoing dialogue and collaboration between developers, researchers, and stakeholders to ensure that the development and deployment of ChatGPT is aligned with ethical and social values.

Besides the ethical concerns on authorship, the study of Eke and Stahl (2024) uncovers a broader range of ethical issues on ChatGPT. In the study, the ethical issues identified as Anticipatory Technology Ethics, Ethical Impact Assessment, and Ethical Issues of Emerging ICT Applications with AI-specific issues from literature were applied to analyze ChatGPT's capabilities to produce human-like text and interact seamlessly.

Some of the highlighted concerns would be deceptive interactions, such as impersonating humans in telephone conversations, which could be exploited for unethical purposes like data collection for marketing or social engineering. There's also concern about the accuracy and bias of generated content, as well as the potential for misuse in spreading misinformation or influencing opinions. Additionally, there are broader concerns about privacy, consent, and the impact on society's trust in online interactions (Eke & Stahl, 2024).

To sum it up, the literature on ChatGPT highlights the potential of this technology to improve language understanding and generation, as well as the need for ongoing research and development to address ethical and social concerns. As ChatGPT continues to evolve and be applied in a range of contexts, it will be important for researchers to continue exploring its capabilities and limitations.

Theoretical Underpinning of the Study

This research is underpinned by the Cybernetics tradition of communication theory (Craig, 1999). This theory offers a dynamic perspective on communication as it emphasizes the interconnectedness of communication processes and their role in regulating systems. Cybernetics acknowledges that systems can change over time through interactions with environments and systems. This underscores that communication is adaptive and shaped by feedback and learning.

Craig also highlights the role of feedback loops in communication where information is transmitted, received, and responded to, which creates a continuous loop of interaction. These loops enable systems to adapt their behavior and adjust their actions based on the information they receive. Feedback mechanisms allow systems to be able to monitor their performance, detect gaps between the desired and actual situation, and make the necessary adjustments to be able to have a desirable outcome. The said theory also explains that the concept of goals in communication is crucial. Communication is a purposeful activity aimed at achieving a certain outcome.

The cybernetics tradition of communication can be used as a lens of this study as it highlights that the goals of the chatbot should align with the objectives of the government services. In this case, the developers wanted to improve the access of applicants to tax exemption processes, requirements, and policies. They also wanted to aid the overburdened revenue officers who experienced a high volume of inquiries as the number of applicants went higher.

Moreover, feedback integration can also be emphasized through this theory as respondents were asked for their feedback regarding their experience with the chatbot. Other opportunities for feedback are also possible by looking at the statistics on the processing time, the number of queries the revenue officers are accepting, and so on. Further, the chatbot can adapt and improve through the help of developers based on the feedback that can be received from its users. This ability to learn and adjust can ensure that the chatbot becomes more efficient in assisting applicants in the tax exemption process.

This is applicable in this study as it highlights that the chatbot should align with the objectives of government services which are to improve access of applicants to the tax exemption process information and aid the revenue officers who are

overburdened due to the high volume of applicants. Feedback loops from users could guide developers on how to adapt the chatbots based on the goals set by the Department. This ability to learn and adjust can ensure that the chatbot becomes more efficient in assisting applicants in the tax exemption process.

Chapter III

METHODOLOGY

Research Design

Since issues related to Philippine government chatbots have not previously been studied in depth, this study's research design was exploratory descriptive. According to Hunter, McCallum, and Howers (2018), an exploratory descriptive research design aims to describe a phenomenon by exploring it from the participant's perspective. It involves observing and describing data to generate hypotheses or identify findings on generally unexplored topics.

Locale and Period

This study was conducted in the Department of Finance, Manila, where the TESA Chatbot is being used. The site was chosen for this research because it is the only organization that currently utilizes the TESA chatbot. The chatbot's users are well-positioned to provide insights into its use, strengths, and weaknesses.

The schedule for data gathering was as follows:

Focus Group Discussion	September 15, 2023
Key Informant Interview #1	September 18, 2023
Key Informant Interview #2	September 20, 2023

Participants

The participants were selected based on characteristics or experiences that are relevant to the study. The research has the following inclusion and exclusion criteria:

Inclusion Criteria:

1) Either part of the diplomatic community or international organizations in the Philippines

2) Deals with the Department of Finance about tax exemptions

3) Registered users of the (e-TESlite) system and the TESA Chatbot

Exclusion Criteria:

1) Tax exemption applicants using the face-to-face mode of application

2) Non-members of the diplomatic community or international organizations

3) Tax exemption applicants who are using another legal basis

As mentioned earlier, I was one of the two personnel from the Department of Finance who was awarded a scholarship to undergo the Business Intelligence and Data Analytic Course (BIDA) in Carnegie Mellon University, Australia in 2020. The development of the chatbot is part of our re-entry plan to usher the digital transformation plan of the (DOF) through the introduction of an online tax exemption processing system. Hence, I have personal knowledge of developing and deploying the TESA chatbot.

Data Collection Procedure

The data was collected directly from the primary sources via focus group discussion with seven TESA chatbot users. The participants were asked to share their insights and perspectives and identify potential technology opportunities.

Added to these are two key informant interviews with industry experts that provided more insights into the chatbot technology.

Focus Group Discussion

Focus group discussion is a methodology involving groups of individuals with similar characteristics to discuss a specific topic or issue. It involves open-ended questions, typically conducted in a group setting, and is useful for obtaining nuanced

insights. The gathered data is transcribed and analyzed to identify common themes and patterns.

One group of seven respondents who are active users of the TESA chatbot was asked about their experiences using it to learn about the system's strengths and challenges and gain insights on how to improve it further. The discussion was done online via the Zoom platform. There was only one session since it was a comprehensive discussion.

Key Informant Interview

A key informant interview is a research method used to obtain specialized insights from experts on a particular topic. The interview is conducted one-on-one and involves asking open-ended questions. The data gathered is analyzed to identify common themes and patterns.

Two key respondents, one from the Department of Finance and one from the Philippine Deposit Insurance Corporation, were involved in the development of the TESA chatbot. They were asked about new and emerging trends in the industries and potential areas for improvement of the chatbot.

Data Analysis

The data were coded and analyzed through thematic analysis. Johnny Saldaňa's (2013) framework for qualitative data analysis was employed in coding for thematic analysis. This approach includes open coding, where initial concepts are identified without predefined categories; axial coding, which highlights the connections between categories; and thematic coding, which identifies and categorizes recurring patterns or themes within the data.

The data collected from the focus group discussion and key informant interviews were transcribed and analyzed using thematic analysis also using Saldana's framework. In this analysis, recurring patterns or themes were highlighted for a more systematic approach to analyzing the data and uncovering underlying meanings and insights related to the research objectives.

By combining the perspectives of both chatbot users and industry experts, this study provided a comprehensive understanding of the potential, challenges, and opportunities for chatbot technology in a government agency.

Ethical Considerations

In compliance with the research ethical standards, all significant ethical obligations were fulfilled, including voluntary participation, informed consent, anonymity, confidentiality, no harm, and privacy.

Before the interview, participants were briefed on the objectives and procedures, provided with informed consent forms, and allowed to ask questions or voice concerns. They were asked to sign the consent form if they agreed to participate in the study. Each of them was given the freedom to refuse or withdraw from the study. Non-engagement was not taken against them. There was no bribery done to secure involvement.

The respondents were assured that their identity and answers will be kept confidential. The researcher facilitated the discussion and was open to any questions regarding the flow of the discussion. After the discussion, data was thoroughly analyzed to ensure completeness and consistency.

The participants were selected on the basis of the researcher's past exposure to working with the users of the chatbot. They were then contacted via email, phone

call, or text message. The informed consent was sent via their email addresses, and participants affixed their e-signatures.

Security measures were implemented for online interviews using Zoom, including passcodes and waiting rooms to control access, notification of recording, and options for muting audio and disabling video for participant privacy and comfort. The physical interview with the key informant was conducted in a private setting to protect the participant's privacy. Permission was also sought before any audio recording took place.

Participants were offered both direct and indirect benefits, such as the opportunity to share experiences with the researcher and the developer of the chatbot. As such, their concerns were addressed immediately. An indirect benefit is that they were able to contribute to the knowledge of the local chatbot industry in the government sector and give feedback on how to improve the chatbot.

All the data was stored electronically. The Excel files, zoom recording, audio recording, and transcripts were all kept in the researcher's personal computer, to which only she has access. These data were also uploaded to the researcher's Google Drive for backup. The data will only be stored during the study. Once the study is submitted and published, data will be deleted from personal computers and Google Drive. These will be strictly followed to ensure data will be kept safe and no data breaches will occur.

Chapter IV

RESULTS AND DISCUSSION

In this chapter, the first section highlights the development of the TESA chatbot and how it is currently being used. The second section discusses the communication challenges in the tax exemption process before the introduction of the chatbot at DOF. The third section discusses the advantages of using the chatbot for applying for tax exemption. The fourth section covers the disadvantages of the chatbot. Finally, the discussion culminates with the opportunities for the enhancement of the chatbot.

Development of the Department of Finance's Chatbot

The TESA Chatbot of the Department of Finance (DOF) was approved for implementation on June 27, 2022, in line with the launching of the enhanced tax exemption system-lite. Meanwhile, the chatbot was successfully launched by the Department of Finance to the public on August 09, 2022.

In February 2020, two personnel from the Department of Finance -Revenue Office (RO), namely: one Division Chief and one Supervising Tax Specialist, plus one personnel from its attached agency, the Philippine Deposit Insurance (PDIC), received a scholarship to represent the Department of Finance to the Business Intelligence and Data Analytic Course (BIDA) being offered by Carnegie Mellon University-Australia to deserving Philippine government employees through the Australia Awards Scholarship Program.

One of the requirements of the scholarship is for the employees to come up with a Re-Entry Action Plan (REAP), which they can apply when they return to their respective work. The two scholars from the Department of Finance (DOF) manifested

that they wanted to contribute to the digital transformation plan of the (DOF) through the introduction of an online tax exemption processing system.

According to the REAP, applicants for tax exemption who are working from home and those who are living outside Metro Manila will directly benefit from the implementation of the REAP Project. The REAP initially targeted 18,000 clients per annum or a 50% increase from the client base of 12,000 clients. While some of the existing clients have slowed down their operations due to the pandemic such as airline companies, DOF has seen growth in the number of Tax Exemption Indorsement (TEI) applications.

The signing into law of the “Bayanihan to Heal as One” (BAHO) Act and “Bayanihan to Recover as One" (BARO) Act, which were the government's response to such urgent needs for masks, personal protective equipment (PPEs) and other medical supplies contributed to the sudden increase in the number of tax exemption applications. These Acts provided exemptions from payment of duties and taxes on the importation of these items.

During the effectiveness of the laws, the applications for TEI were being done manually, meaning the applicants or their authorized representatives had to go personally to the RO Office. With this in mind, we, two DOF scholars, decided to develop an online application system wherein the applicants would be given an option to process their TEI in the comfort of their homes or respective offices.

While the business needs or the required time to complete the process set by the Ease of Doing Business Act were being met, the DOF scholars believed that the process could still be shortened or even enhanced to respond to the changing needs of the business environment. As everyone's lives faced upheavals brought on by

COVID-19, there was a sudden paradigm shift in doing business. Online and paperless transactions have become the new normal globally.

The chatbot was expected to offer a more efficient way of processing tax exemption applications. It would be more accessible on the DOF website than manual applications, which needed to be submitted physically to the Revenue Office. Applications could be filed from anywhere, provided they have an Internet connection. A lesser processing time was likewise expected, considering that the applicants themselves would encode all the necessary information and would just require validation on the part of the Revenue Officer. This would minimize, if not eradicate, encoding errors normally being experienced on manual applications.

The scholars' main goal was to ensure that the impact of their re-entry project continued even beyond its implementation period. One strategy to ensure that the project's gains would be institutionalized and sustained was to communicate the project's sustainability—that it could be used continuously to improve the data and expand its usage to other departments' services.

To sell the Capstone Project to the Department of Finance, the first step that we scholars did was to reach out to the Corporate Information Management Office (CMIO) - IT Team of the Department. We discussed in detail the benefits of the REAP/Capstone Project, including the budget and the resources needed. Since it would just be an enhancement of the current Tax Exemption System (TES), the IT Team expressed and committed their support to the scholars. Coincidentally, the Director for Revenue Operations Group (ROG) also conducted an online meeting between the ROG management and the IT Group to discuss a recent instruction from then Finance Secretary Carlos Dominguez for a Department-wide online initiative in

response to the social distancing measures brought by the Covid 19 pandemic starting 2021.

The IT Team was quick to suggest that instead of developing another program, our Capstone Project could be used (subject to some enhancements if there is a need) for tax exemption applications.The final output was an enhanced online application platform with Chatbot which was called Enhanced Tax Exemption System-Lite (eTES-Lite). The REAP/Capstone Project was expected to contribute to the digitalization goal of the Department of Finance using the following:

1) Time and cost efficiency on the part of the applicants due to accessibility of the module from the website of the Department while maintaining the “No Contact Policy” and while adhering to the “Quarantine and Social Distancing Measures”.

2) Reduction of erroneous entries in the application form and Tax Exemption Indorsement (TEI) since the applicant will be the one to encode the required information.

Initially, we planned to offer the digital application to some individuals and groups with inherent vulnerabilities, like older persons, women, persons with disabilities, and Indigenous people. However, due to system limitations and time constraints to conduct a town hall/training for all tax exemption applicants, the management decided it would not cover all legal bases of Tax Exemption Indorsement (TEI).

Initially, the chatbot was launched on 9 August 2022 for the diplomatic community in the Philippines, including the Asian Development Bank and international organizations in the Philippines. Due to the time-sensitivity of the commodities, the RO management decided to cover COVID-19 response importations under the

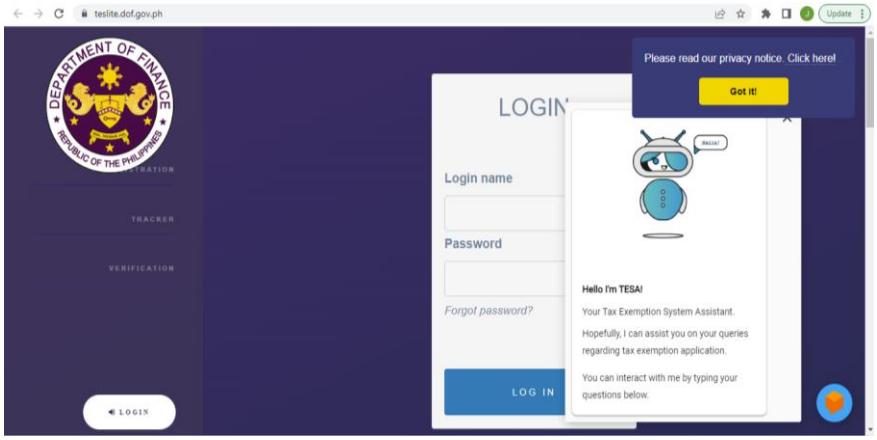
Vaccination Program Act, Create Law, and Relief Consignment under Sec. 120-121 of the Customs Modernization and Tariff Act (CMTA). The RO manual, however, states that other applications would be covered when the necessary enhancements in the system have been put in place.

The Enhanced Tax Exemption System-Lite (eTESlite) Online Application (e-filing) and Tax Exemption Assistant (TESA) Chatbot was approved for implementation last 27 June 2022 by Department Order No. 041-2022 signed by then Secretary Carlos G. Dominguez.

TESA Chatbot, How it Works

Figure 2.

Screenshot of TESA Chatbot



The Chatbot named as Tax Exemption System Assistant (TESA) provides interactive communication about the requirements, legal basis, and procedures, and answers some problems regularly encountered by applicants through the Frequently Asked Questions (FAQs) Module. The Chatbot which is a knowledge-based module is also expected to provide the importers/applicants with the basic knowledge on importations.

The applicants can interact with TESA by typing questions at the bottom where the “Ask something” is written. For inquiries that TESA cannot answer, the applicant

is provided an option to inquire by just clicking the email address under the ”need for help” box.

The chatbot does not contain sensitive data nor is it connected to a secured database. It merely discloses information that is public like legal bases, requirements, and frequently asked questions so that a data breach would be unlikely

Communication Difficulties in Tax Exemption Process Before the Chatbot

Before the COVID-19 pandemic started in 2021, the tax exemption process within the Department of Finance relied heavily on effective face-to-face communication. Applicants actively engaged with revenue officers to inquire about the intricacies of legal requirements, application procedures, and evolving regulations, which often vary on a case-by-case basis. Further, continuous updates and changes to regulations, such as filing fees, administrative orders, and legal frameworks, necessitated ongoing communication with revenue officers, as these changes could impact the application process. As some participants said: *“So I usually inquire about the basic procedural steps and documentary requirements when I have a specific application. I also inquire about the legal basis of my shipments.” – F.D.*

> *“I inquire about the legal basis of a particular shipment. It’s important for us know if that particular importation or ship is qualified for the grant of tax exemption. – Y.D.*

The personal or face to face engagements especially with the impending lockdown made it difficult to transact with the DOF. The customers experiences long waiting time, limited consulting hours, and long distance to travel (Table 1). These are explained in the next sections.

Long waiting time

The increasing number of applicants each year has led to significant communication challenges. With face-to-face interactions and telephone calls being the primary channels for communication with revenue officers, applicants often experienced prolonged waiting times in office queues and busy telephone lines. The applicants had to wait even just for basic inquiries which then prolonged the whole tax exemption process. As they attested:

> "I used to wait in busy telephone lines. The officers may not be always available or are attending to other applicants." – T.P.
>
> *"Sometimes it takes too much time to wait in the office. Sometimes there's a line." – J.R.*

Limited consulting hours

The government offices adhered strictly to designated office hours (Monday to Friday, 8 am-5 pm) for addressing applicant queries and concerns. Individuals who had inquiries outside of the office hours especially at night or during weekends or holidays were often challenged as they usually could not reach out to revenue officers anymore. This left applicants with unresolved concerns or questions that could not be addressed until the next available office hours, which could cause frustration and delays in the application process.

> *"There are times that I can't call and go on certain hours, especially beyond office hours." – J.R.*
>
> *"When I call or go to the office. Sometimes it takes too much time and I can't call and go on certain hours." – T.P.*

Long distance to travel

During the pandemic, the challenges with face-to-face communication were amplified. Revenue officers continued to report to the office physically as applicants still went to inquire about their applications – especially because there were increased applications on COVID-19 vaccines and paraphernalia. However, applicants had worries regarding their health and safety.

At that time, despite an ideal processing time of 7 hours, there were instances where applications must be returned for some verifications, clarifications, and compliance of lacking documents. This caused further delays, resulting in prolonged back-and-forth communication and hindering the overall process efficiency.

"During the pandemic, it was dangerous to go out. It is a challenge when we have to inquire and still have to go to the office face-to-face." – E.D.

These challenges are similar to those in the Bangko Sentral ng Pilipinas specified in the study of Di Casttri, Grasser, and Kulenkampff (2020). BSP's consumer complaint system faced challenges due to its reliance on manual processing, few analytics tools, low visibility of the Metro Manila Area, and little consideration for customer experience. These have also caused a burden to their staff similar to what the Department of Finance Revenue officers were experiencing.

Table 1.

Communication Difficulties in Tax Exemption Process Before the Chatbox

Open codes (from quotes)	Axial Codes	Themes
Long lines in the office	High volumes of applicants	Long waiting time
Officers not easily available	Officers attending to other applicants	

Could not connect easily due to busy lines	Busy telephone lines	
Can only consult during office hours	Strict office hours	Limited consulting hours
Could not contact officers beyond office hours especially at night or during weekends/holidays	Can't inquire beyond office hours	
Fear about going to the office to to inquire during the pandemic	Health concerns going to the office physically during the pandemic	Long distance to travel
More time spent going to the office just to inquire	Going to the office to inquire takes too much time	

Advantages of Using the TESA Chatbot

Given the communication challenges experienced by the applicants, the TESA chatbot was introduced in 2022 to the transacting public in the DOF. The main objective of the chatbot was to assist the transacting public with their inquiries on tax exemption and provide basic guidelines and legal information, especially for first-time applicants.

The findings show that the TESA chatbot has contributed to basic assistance and queries for the diplomatic community and international organizations. Applicants highlighted its convenience and user-friendliness, saying that it was accessible, faster, facilitative, and easy to navigate (Table 2).

Accessible

The current users appreciate the access and convenience of the chatbot since they can inquire anywhere they are and it is available 24/7. This was something they could not do before since they had to go to the office physically just to inquire, they

had to wait for busy telephone lines, and they could not inquire during non-office hours. They said:

"I like that it's very accessible. There was also no hassle of encountering a busy telephone line. I could also inquire even during non-office hours." – J.F.

“Great that it's available 24/7. I can get instant reply to questions anytime wherever I am." –B.A.

Faster

Moreover, they also emphasized that the chatbot helps streamline the tax exemption process since it provides answers to their most basic inquiries instantly. It helps that the chatbot gives access to regulated resources like manuals and issuances by the Department that are easily downloadable and printable.

Back then, applicants had to search for these resources individually and had to find which were relevant to their case. Since the chatbot now provides them with these issues instantly, the resources help them receive updates and know the whole processes and policies better. They explained:

“One of the good things about this is that it redirects overall topics to access documents, guidelines, or manuals that are helpful for the inquiry or the application.” –F.D.

“The chatbot can help in making my application process faster since it shares policies and manuals issued by the Department.” –E.D.

“The information, documents, and manuals are ready right away and I can easily print it.” –J.F.

Facilitative

The users also expressed appreciation for the chatbot's ability to comprehend single-word keywords, swiftly providing relevant answers and information based on the input. These keywords also provide them access to relevant manuals or resources related to their inquiries.

> "I like the fact that I can just put in keywords and then I can already get relevant information." **–** T.A.
>
> *"It is user-friendly for people using laptops because using search words will directly point to the RO Manual relevant to the needed information." – T.A*

Easy to navigate

Respondents value the user-friendly nature of the chatbot, finding its ease of use instrumental in facilitating effective communication. They say it is intuitive and does not require much technical skills to use. Further, they say that it is easy to use and navigate – without requiring many instructions or steps to activate.

> *"The chatbot is easy to use and navigate. It is friendly, especially for those who are already used to online platforms." – J.F.*

Table 2.

Advantages/Benefits of Using the TESA Chatbot

Open codes (from quotes)	Axial Codes	Themes
No need to wait in physical long lines or busy telephone lines Gets instant reply with a few clicks	Accessible No hassle	Accessible
Can answer anytime anywhere	Available 24/7 Can Inquire off off-hours	

Can get replies even at night or on weekends/holidays		
Easily shares policies or manuals issued by the Department of Finance Can inquire faster without the added step of calling or waiting in line Resources are easily available and printable	Redirects to access Makes transactions faster Manual readily printable	Faster
Can get information through keywords Keywords point to relevant manuals or resources	Keywords can direct to information sources like manuals	Facilitative
Does not require multiple steps or instruction Easy to use especially for those used to online platforms	Chatbot easy to navigate Friendly to online users	Easy to navigate

Continuing Challenges in Using the TESA Chatbot

While the TESA chatbot is appreciated for various aspects, it still has some drawbacks that can hamper efficient communication in the tax exemption process.

These challenges include addressing specific inquiries, updating information and dealing with technical or design glitches (Table 3).

Handles simple and not complex queries

Although the respondents appreciate the chatbot's ability to aid them in basic communication, TESA is reported to lack flexibility when addressing complex questions or inquiries. There are times when more complex inquiries could not be answered by the chatbot like legal bases that may differ from a case to case scenario or a need for the computation on the duties and taxes.

For specific inquiries, it tends to give general or vague answers which fail to provide helpful information for applicants and can further prolong the communication process. This corroborates the findings of Raval and Parkh (2020) that some chatbots still may still lack flow and may not be able to handle complex issues. The participants pointed out:

"Sometimes it vaguely answers my questions. It tends to give general answers to a specific question." –F.D.

"The chatbot is not flexible. When the situation or question is complex. It is much better to talk to a revenue officer who can answer all possible questions and scenarios." – B.A.

"It felt like I was limited to whatever information there was available in the chatbox. If I had a special case or out-of-the-box inquiry, I may not be able to find the answer or assistance I am looking for." –J.R.

"So when my queries are already outside the scope of what the bot can help it, it cannot help much na rin." – T.P.

Outdated information

Effective communication is hampered when the data provided by the chatbot becomes outdated. The failure to constantly update the chatbot can prove detrimental in a tax exemption process where regulation, legal basis, requirements, and procedures are constantly changing. In the process, it is imperative for applicants to remain abreast of the latest developments.

Providing outdated information not only risks introducing errors into the process but may also result in the rejection of applications and subsequent delays. Thus, ensuring the chatbot's data remains current is essential to facilitating smooth and efficient interactions within the tax exemption process.

"But I guess my concern is that sometimes, I feel like the information is outdated. When I confirmed something to the revenue officer, one of the information given to me by the chatbot is no longer relevant. So how will we know if something is correct or no longer applicable right?" – E.D.

"We also received negative feedback, some users were able to encounter outdated information. The immediate improvement that the TESA chatbot needs is to update all the data stored therein so that it can divulge information accurately." – M.S., Expert

Manual-based inquiry

Moreover, users have also expressed disappointment when they have specific questions but the chatbot gives them a whole Revenue Office manual to check for answers. For them, this will take too much of their item instead of just being given the particular answer they are looking for. Some even hope they at least get the relevant page of the manual that can directly answer their questions. To add to that, it is quite a hassle to continuously download these manuals as these require storage in their devices which can be an issue for those laptops/phones will only a limited space left.

"I had a negative experience accessing TESA using my cellphone. I was required to download the whole RO Manual and my phone doesn't have storage space. I wish I was given at least just the relevant page that can answer my question specifically." –T.A.

"If I had to go through a whole manual to find the answer, then it is more time-consuming to just seek human assistance that can give a specific answer." – F.D.

"We also received negative feedbac that some users encounter outdated information. The immediate improvement that the TESA chatbot needs is to

update all the data stored therein so that it can divulge information accurately." – M.S., Expert

Design/Technical glitches

The design and technical aspects of the Chabot can affect communication as well as shape accessibility, engagement, and clarity. The clear design and reliable technical aspects can convey the message more effectively and instill more trust in the users. However, users have mentioned multiple design and functionality concerns that at times confuse them and dampen their interest in the chatbot.

In terms of visual and technical aspects, participants have expressed a unanimous sentiment that the TESA chatbot requires significant improvements. They highlighted that the design and icon of the chatbot are barely noticeable, with some indicating that they only became aware of its existence through word-of-mouth recommendations.

Some perceived the current design as basic and unappealing, lacking the engaging visual elements that could enhance user experience. Several participants suggested that the chatbot's visibility could be substantially improved by employing a more eye-catching and visually appealing design, thereby increasing its accessibility and encouraging greater user engagement.

"The design and icon are barely noticeable. It lacks eye-catching icons and design. Most often a chatbot should easily get the attention of the end user to remind that it is readily available whenever needed. TESA has to promote itself once the user opens the eTEsLite website" –F.D.

"Honestly, the TESA is something you will not notice right away. I hope it could be bigger so it can be more eye-catching." –B.A.

“The basics in a chatbot design are there but it is not very attractive. It needs improvement in making the design more engaging to attract users.” –E.D.

Furthermore, users have identified several technical limitations that they hope will be addressed. One notable issue is the disappearing welcome message, making it challenging for users to grasp initial instructions and guidelines for initiating conversations with TESA. In fact, it has become one of the factors as to why some applicants have lost interest in the chatbot.

The "Welcome" message easily disappears, it hardly stays so it is one of the factors why I lost interest in using TESA. I did not get the initial message or instructions from the chatbot.” --E.D.

Preference for human assistance

Even if the users were able to highlight the benefits of using the chatbot, in general, they still have a higher regard for human assistance over the TESA chatbot. They highlighted that the chatbot falls short of replicating the nuanced understanding and the personalized support that human interaction offers.

For the users, it is still human assistance that can provide direct, context-specific responses, especially in complex or unique scenarios. This is the finding of Nguyen (2019) which stressed that the chatbot cannot yet replace human intervention when it comes to customer support due to its limitations. Hence, Nguyen recommended that simple tasks can be carried out in chatbots but more complex ones still need humans.

"I honestly still prefer human telephone assistance because nothing can replace a human-guided response. Also when it comes to a telephone call assistance, the applicant can easily convey the real-time difficulty he/she may encounter." – F.D.

"Human phone call assistance can still give more precise information relevant to specific tax exemption requests; maybe the chatbot is just more useful in getting basic information." – T.A.

"In all honesty, I still feel that talking to a revenue officer is more pragmatic in the sense that I believe that no chatbot can replace the human mind. Okay because a revenue officer can provide answers to different scenarios while TESA can only give answers to specific questions only.

For me, I still choose a human telephone to a Revenue Officer over chatbots. I think that nothing can replace a human response in the sense that it gives more understanding to a situation at a given time." – B.A.

Meanwhile, some of these users have already had long relationships with the revenue officers over the years, fostering a sense of rapport and this helps facilitate smoother negotiations and interactions. However, the chatbot is unable to replicate the personalized understanding and empathetic support that human service provides. Users encounter challenges when attempting to make requests or negotiate through the chatbot, as it adheres strictly to predefined rules without the capacity for adaptive and nuanced responses that account for individual circumstances.

"I have worked with some of the revenue officers for a long time already. When I talk to them, they are more flexible, accommodating, and understanding. That connection and empathy cannot be given to me by that chatbot. I also cannot negotiate and ask for requests when I use the chatbot since they are bounded by rules." – H.T.

"For me, I still choose a human telephone to a Revenue Officer over chatbots. I think that nothing can replace a human response in the sense that it gives more understanding and empathy to a situation at a given time." – B.

Table 3.

Challenges in using the TESA Chatbot

Open codes (from quotes)	Axial Codes	Themes
Gives general answers to specific question	Gives vague answers Cannot answer complex questions	Cannot handle complex queries
Can only answer certain questions Unable to adapt to information outside of its usual scope	Limited Information in the chatbox Not flexible	
Users encounter outdated information Information is no longer applicable	Outdated information Data is no longer relevant	Outdated information
Certain inquiries will refer applicants to a whole malleable, unable to identify which section of the manual is relevant Requires downloading whole manual that may occupy large storage space on mobile phones	Have to go through the whole manual/documents to find answers Downloads occupy large storage	Manual-based inquiry
Unable to notice the design unless prompted since icon is too small Design is unattractive	Icon is barely noticeable Lacks eye catching elements Design lacks impact Welcoming message disappears in an instant	Design/Technical glitches
Fear about going to the office to to inquire during the pandemic	Health concerns going to the office physically during the pandemic	Long distance to travel
Humans can give specific information relevant to specific problem Humans are more pragmatic and can understand specific questions	Humans can provide more precise information Humans can give more understanding to a situation at a given time	Preference for human interaction

More comfortable to explain difficulties to humans	It is easier to explain real-time difficulty to a human
Humans are more understanding	Humans are more empathic

Opportunities for Development of TESA Chatbot

There are numerous opportunities for the TESA chatbot to enhance the tax exemption process. Subject matter experts and developers of the chatbot have suggestions and initial plans on how to further improve the DOF's TESA chatbot (Table 4).

Continuously update the system

First of all, experts believe that the department and current developers should continuously update the system to ensure that TESA's information remains consistently up-to-date, thereby enhancing its effectiveness in facilitating the tax exemption process. This suggestion is strongly affirmed by the respondents as the Manuals containing policies, and procedures of the tax exemption are constantly being updated. The experts believe that this should be part of their commitment to communicate updated and relevant information to applicants.

"Current developers of TESA must always keep their systems up-to-date and always adapt to the necessary developments in the environment."-M.B., Expert

"The immediate improvement that TESA chatbot needs is to update all the data stored therein so that it can divulge information accurately." –M.S., Expert

Expand services and coverage

Furthermore, an expert also suggests incorporating various languages or dialects into the chatbot, aimed at catering to a broader range of applicants. As of now, TESA only can understand English, but it is recommended to offer even primary

languages or dialects in the Philippines like Tagalog and Bisaya. This plan is designed not only to enhance understanding of tax exemption queries by overcoming language barriers but also to facilitate more personalized and effective communication with applicants.

> *"Additional features which may be included to TESA chatbot is the incorporation of new languages or dialects like Tagalog and Bisaya which the user may choose on to better understand the answers to their queries." – M.S., Expert*

The DOF is also considering broadening and expanding the scope of the chatbot to not only answer basic queries but also aid in tracking the status of tax exemption and encompass additional subject matters and services offered by the department. This expansion is envisioned to extend beyond tax exemption applications or Revenue Office-related matters. The objective is to transform the chatbot into a versatile tool that not only facilitates communication in tax exemption but also serves as a valuable resource for various services provided by the Department of Finance.

> *"Hope that tracking and tracing of TES applications can be integrated to TESA so that applicants can inquire directly from the chatbot the status of their application." – M.B., Expert*

> "With regards to future development of the TESA chatbot, the Office is planning to *expand the coverage of its topic which will include other subject matters or other services offered by DOF and shall not be limited only to tax exemption applications purposes or for Revenue Office only" – M.S., Expert*

Improve links to specific information.

Moreover, applicants also mentioned a desire for direct and streamlined communication, preferring not having to navigate through an entire manual to find

answers to their queries. They suggest providing direct links to relevant information to save time and avoid burdening their phone storage. Moreover, they propose the implementation of advanced modeling, such as a chatbot that can promptly provide answers within the chat interface, enhancing user experience and communication.

"In our company, we have ADB Travis for business travel questions. Similar to TES, it can also give answers for single search words but it gives answers directly in the chatbox without using links or need to download the manuals. I guess that's its advantage over TESA

"Since I mentioned a while ago, I'm having some problems on phone storage I hope TESA can give answers in chatbox with option to explore more info in links instead of having to download a whole manual. ." – T.A.

Personalize the chatbot

An additional recommendation from an expert is to enhance the chatbot's personalized service by making it more human-like. This kind of communication is already seen in some of the more advanced chatbots like what is used in airlines for bookings or inquiries where answers are more conversational. The suggestion involves altering its language style to be more relatable. This approach aims to create a more engaging and user-friendly interaction, providing a stronger sense of connection and understanding.

"To personalize the chatbot, to make it more human-like, its language style has to be altered. Dapat hindi masyadong techy, dapat relatable (It should not be too techy, it should be relatable)" –M.B., Expert

"I use chatbots of the airlines for bookings and inquiries. Those chatbots feel like you are talking to a person online, words are more conversational however, TESA fell short of that ideal arrangement." – J.F

Table 4

Opportunities for development of the chatbot

Open codes (from quotes)	Axial Codes	Themes
Should update the data especially if there are new releases or changes	Update stored data Adapt to necessary developments	Continuously update the system
Integrate other languages/dialects like Tagalog or Bisaya for easier communication	Incorporate new language or dialects	Expand services and coverage
Enable inquiry of direct tracking and tracing of application in the chatbot	Integrate tracking and tracing of TES application	
Include other subject matters or other services offered by DOF beyond tax exemption applications purposes or for Revenue Office only	Expand coverage of topics and services	Limited consulting hours
Find relevant information via keyword and direct answers instead of a whole manual or resource	One keyword can provide direct answer without having to go through manual	Improve links to specific information.
Provide links to answer as file downloads can cause storage problems	Provide resources via link instead of file download	
Language should not be too technical & should be relatable Words should be more conversational	Make the chatbot language more human-like	Personalize the chatbot

In summary, the TESA chatbot within the enhanced tax exemption system-lite was implemented in 2022 to offer a more efficient way of processing tax exemption. This was a project of three scholars, two from the Department of Finance plus one from the Philippine Deposit Insurance Corporation. The researcher was one of the scholars who helped develop the TESA chatbot, which can be considered as the first part of the study.

The tax exemption process without the Chatbot then relied on physical and telephone consultations. Hence, there were long waiting times; and limited consulting hours as the government adhered strictly to designated office hours which are Monday to Friday, 8 am to 5 pm; and it was hard to travel especially during the pandemic.

With the introduction of the TESA chatbot, the users appreciated the system's accessibility as they can inquire anytime and anywhere, even beyond office hours. Moreover, the chatbot easily shares manuals and resources issued by the Department which makes the process easier and faster. The respondents said that the bot can easily comprehend single keywords and provide information or manuals related to this. It is also considered as user-friendly as it is easy to navigate.

However, there were several challenges that users experienced with the initial deployment of TESA. First, the chatbot had limitations in handling complex queries or very specific questions. There were also times when the information provided was outdated which caused more confusion in the application process. This is why some applicants still prefer human assistance for these unique or nuanced situations – emphasizing that personal support is still irreplaceable. Moreover, the technical aspects – like concerns on visibility and design- was also mentioned. The chatbot seems to be quite small and almost unnoticeable in the satellite website and the design is perceived to be quite basic which is also unappealing to applicants.

Given these limitations, experts and users have provided suggestions on how to improve the chatbot. The department and its current developers should continuously update the system to make sure applicants are given timely and relevant information. It is also suggested to expand its coverage in terms of language and scope of inquiries that could be beyond tax exemption and include other DOF services as well. The links should be able to access specific information such direct answers without having to go through a whole manual and not being required to download resources that take up space on their storage. Lastly, as applicants still long for empathy, they hope that the chatbot will be more personalized and more conversational so TESA can build a stronger connection with its users.

Chapter V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study explored the use of the Department of Finance's TESA Chatbot in communicating the tax exemption to the diplomatic community and international organizations. Specifically, the research objectives are the following: 1) To document the development of the online tax exemption system at the DOF; 2) To analyze the communication difficulties encountered in processing tax exemptions before the chatbot; 3) to discuss the communication advantages and challenges of the TESA chatbot in processing tax exemptions among users; and 4) to discuss opportunities for improvements of TESA chatbot in communicating the tax exemption process.

The research is guided by the cybernetics tradition of communication theory (Craig, 1999). This theory highlights that communication is a purposeful activity that aims to achieve a certain goal and communication can be adaptive through constant feedback and learning.

This exploratory descriptive study was conducted at the Department of Finance in Manila where the TESA chatbot is being used. The participants chosen are either part of the diplomatic community or International Organizations in the Philippines who are users of the TESA chatbot. Experts who developed the chatbot were also interviewed.

The data was collected through a focus group discussion with seven TESA chatbot users to gain an understanding of their experience and identify challenges and opportunities for this technology. Two key informant interviews were also conducted with industry experts to identify opportunities for the chatbot.

Highlights of the findings are the following:

Development of the DOF Online Tax Exemption System

The TESA chatbot, which is part of the Enhanced Tax Exemption System-Lite, was approved for implementation in 2022. This was a capstone project of two scholars of the Department of Finance and one scholar of the Philippine Deposit Insurance Corporation who attended a Business Intelligence and Data Analytics course at Carnegie Mellon University.

Their re-entry plan was to streamline the tax exemption process online through the use of chatbot, especially amid the pandemic. Their goal was to contribute to the digital transformation plan of the Department of Finance. This was especially relevant when the number of tax exemption applicants kept rising and there was a need for more efficient ways to handle growing inquiries.

We had to sell the idea of the Capstone Project to the Department, hence, we first reached out to the Corporate Information Management Office (CMIO) - the IT Team. Since the chatbot would just be an enhancement of the current Tax Exemption System (TES), the IT Team expressed and committed their support to the project. The IT Team was quick to suggest that instead of developing another program, the Capstone Project of the scholars would be used for tax exemption applications

Coincidentally, there was instruction from then Finance Secretary, Carlos Dominguez for a Department-wide online initiative in response to the social distancing measures brought by the pandemic.

The final output was an enhanced online application platform with Chatbot which was called Enhanced Tax Exemption System-Lite. The system was expected to contribute to the digitalization goal of the Department of Finance using the following: time and cost efficiency on the part of the applicants due to accessibility of the module

from the website of the Department while maintaining the “No Contact Policy” and while adhering to the “Quarantine and Social Distancing Measures”. It was also expected that erroneous entries in the application form and Tax Exemption Indorsement (TEI) would be reduced since the applicant would be the one to encode the required information.

Communication Challenges in Processing Tax Exemptions Before the Chatbot

The department's tax exemption process was highly reliant on constant face-to-face communication, as applicants had unique cases and the procedures/policies were constantly being updated. Without the Chatbot at the DOF, the tax exemption process relied heavily on physical and telephone consultations. Before the chatbot, applicants had to go to the office physically or deal with busy telephone lines only during office hours.

Hence, there were long waiting times and limited consulting hours as the government adhered strictly to designated office hours which are Monday to Friday, 8 am to 5 pm; and it was hard to travel especially during the pandemic.

Communication Advantages of the TESA Chatbot In Processing Tax Exemptions

To alleviate these challenges, the TESA chatbot was introduced. Several benefits were highlighted, like the facilitation of enhanced access for basic communication or inquiries on tax exemption. Through the chatbot, the diplomatic community and international organizations enjoyed the convenience of 24/7 availability, instant responses, and answers to their basic inquiries at their fingertips. The user-friendly interface that can comprehend single-word keywords added to the positive experience. Furthermore, they were able to access resources such as manuals and policies regulated by the Department.

Continuing Challenges of the TESA Chatbot

Despite its strengths, the participants highlighted that TESA still has several limitations. After all, the chatbot is a pilot test or in its initial stages of implementation.

First, it is only able to handle basic inquiries and cannot fully address complex questions. Second, some of the information provided by the chatbot is outdated and may lead to erroneous procedures. Third, although the participants appreciate having access to resources, they have also expressed disappointment when they have specific questions. The chatbot provides them with a full revenue office manual for them to look for answers. They value access to materials upon their request, but it causes a strain when they ask very specific questions and a whole manual is given. For these specific questions, they would rather have specific answers. Lastly, there are also design and technical aspects that hamper the use of TESA. Others could not discover TESA as its icon is too small and quite unattractive. Because of these challenges, the participants said that they would still prefer human assistance over the TESA chatbot as humans can provide more precise information, can give more understanding, and are more emphatic.

Improvement Opportunities of the TESA Chatbot

Given the current limitations of the TESA, experts and users highlighted opportunities for improvement of the chatbot.

First of all, experts believe that the Department and current developers should continuously update the system to ensure that TESA's information remains consistently up-to-date, thereby enhancing its effectiveness in facilitating the tax exemption process.

An expert also suggests incorporating various languages or dialects into the chatbot, aimed at catering to a broader range of applicants. The DOF is also

considering broadening and expanding the scope of the chatbot to not only answer basic queries but also aid in tracking the status of tax exemption and encompass additional subject matters and services offered by the department. This expansion is envisioned to extend beyond tax exemption applications or Revenue Office-related matters.

Moreover, direct and streamlined communication is preferred so that they don't have to navigate through an entire manual to find answers to their queries.

Lastly, it was also recommended to enhance the chatbot's personalized service by making it more human-like where answers are more conversational. This approach aims to create a more engaging and user-friendly interaction, providing a stronger sense of connection and understanding.

Conclusion

Based on this exploratory study of the pilot or initial implementation of the TESA Chabot at the DOF, the chatbot appears to supplement but not yet replace human interaction communication in the tax exemption application process. The chatbot falls short of fully replicating the depth of a face-to-face interaction. It cannot yet provide specific answers for very specific and complicated questions or queries.

Hence, for special cases or complex queries, human intervention is still deemed highly important to be able to communicate the tax exemption process properly. This underscores the need to retain face-to-face interactions with revenue officers to handle more intricate inquiries or special cases. In its current form, the chatbot can serve as a complementary tool to existing communication modes with revenue officers. The chatbot can be the first step for basic inquiries or frequently asked questions,

especially for new applicants. This can help filter out the queries so there will be a lesser volume of applicants who would call or go to the office personally.

Enriching the chatbot's conversational abilities and human-like qualities is suggested so it can establish rapport and foster a connection with the users. Personalized responses tailored to specific inquiries are essential for expediting communication and enhancing efficiency as opposed to providing generic responses or comprehensive manuals.

Recommendations

Based on the findings and conclusions of this research, several key recommendations emerge to current developers of the TESA chatbot to enhance its effectiveness in facilitating communication on tax exemptions.

- Key factors that contribute to the success of chatbots include the design of the user interface, the use of personalization and customization, and the availability of support resources.
- In addition, some studies have shown that chatbots are most effective when they are integrated into larger digital ecosystems, such as mobile apps or websites.
- First, a continuous system update is crucial to ensuring that information, policies, and resources always remain up-to-date, accurate, and relevant for applicants.
- Moreover, it is also recommended that multi-lingual support be provided to cater to more diverse applicants.

- Enhancing personalization features such as refining the language style from technical to more conversational can help develop a stronger connection with users.
- To address limitations in handling specialized queries, it is recommended to incorporate advanced algorithms or machine learning techniques to address nuanced cases.
- Improvements in user interface, addressing technical issues, and proactive education may also be considered to streamline tax exemption communications to applications.

For future researchers

- In exploring chatbot implementations in the government context, study further the user preferences and expectations in public service chatbots.
- Comparative studies with other government chatbot systems can provide valuable insights into the strengths and weaknesses of different models and approaches.
- Explore how chatbots can go beyond basic inquiries in tax exemption – like exploring how tracking or tracing of applications can also be incorporated into its services.
- Lastly, seek continuous feedback from users in future research designs to ensure the development of chatbots in communicating government services to the public.

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Appendices

APPENDIX A

FREE, PRIOR, AND INFORMED CONSENT

You are being invited to voluntarily participate in the research conducted by Mrs. Jennifer De Leon Cruz, MA Development Communication student from the University of the Philippines - OU System. The study is designed to determine the potential and challenges of communicating tax exemption online to the diplomatic community and international organizations (IOs) in the Philippines by using the Tax Exemption System Assistant (TESA) Chatbot of the Department of Finance. Your input in this study will help the Department of Finance improve its chatbot and the overall online tax exemption process.

You may decline participation or withdraw from the study any time and this shall not be taken against you and no one from your community shall be told. Once this informed consent is issued, it will be retrieved from the participant after two days of receipt.

Participation means joining the focus-group discussion to be organized by the researcher from the University of the Philippines-OU system. The discussion will approximately take an hour and will be conducted through the Zoom application. The interviewer shall take notes. The Zoom call will be recorded and will be made available only for data analysis and will not be shared with the public. If you do not want to be recorded, you shall no longer be able to participate in the study. The said application has security features that will be utilized by the researcher (as the host of the call).

Your personal information shall be kept confidential. Uses of records and data should maintain the anonymity of individuals and institutions. You will be given a copy of the results of the study once it is done and you may request for the transcript of the discussion. All the data will be stored electronically. The Zoom recordings and transcripts of the data will be kept in the personal computer of the researcher which only she has access to. To have a backup of the data, all of the mentioned files will also be uploaded to the researcher's Google Drive which only she has access too as well. All the data will be stored only during the duration of the study. Once the study is submitted and published, the data shall be deleted from the researcher's personal computer and Google Drive. All these will be followed to make sure that data will be kept safe and no data breaches will occur.

All questions regarding the study shall be sent to the researcher's email: jdcruz@dof.gov.ph.

_____

Name of Respondent