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Willingness to use eHealth in the Manchester Triage System in Emergency Departments in Portugal

Pedro Filipe Teixeira da Silva

Master's in Management of Services and Technology

Supervisor:
Auxiliar Prof. Teresa Grilo, PhD,
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November 2022

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Acknowledgements

Undoubtedly, the realization of this dissertation represented one of my greatest challenges. But obviously, I did not do it all by myself and, therefore, it would be unfair not to thank all the people who, directly or indirectly, were involved and helped me to carry out this project.

Firstly, I must thank my parents and brother for all the love, affection, support, and special patience not only now but always. Looking back, I think it was worth the many "headaches" I gave you throughout my academic life.

I also must thank my girlfriend who accompanied me throughout my university journey, who always listened to my grievances, and irritations and was always by my side giving me unconditional and incomparable support even so many kilometers away.

A huge thanks to my supervisors, in special to Professor Teresa Grilo. For having accepted so early the challenge of guiding me, for having given me the motivation to continue to carry out this thesis, and for making me believe that this thesis is destined for something greater than simply being a final master's thesis.

I would like to thank all the doctors, nurses, and medical and nursing students who helped me a lot to complete this thesis, especially Dr Pearls for the great help in divulging the questionnaire; without him, all this work would be in vain.

Finally, a special thanks to my Bábá. For all her affection, for all her wise words. and for teaching me not to turn my back on challenges and problems, even when they seem impossible to overcome. And, of course, for all the candles she lit for me.

Abstract

The triage process in the hospital emergency department (ED) plays a fundamental role in their proper functioning.

Therefore, this process must be in constant improvement, and for that, it is necessary to mitigate its limitations. This study addresses the Willingness to Use of a technological system to support the Triage System in the ED to complete the Manchester Triage System (MTS) by current and future health professionals - doctors, nurses, medical and nursing students.

To study the Willingness to Use, a model was developed using some dimensions of the Technology Acceptance Model (TAM) and the Innovation Diffusion Theory (IDT) together with a set of characteristics that could influence the Willingness to Use of current and future health professionals. Data were collected through an online questionnaire, and these served to obtain answers on the various dimensions under analysis.

The results of the study led to the conclusion that the vast majority of health professionals are Willing to Use and adopt a technological system to support the Triage System in the ED and that some variables may partly influence this Willingness to Use, however, the possibility remains open that the features do not have as much impact since the consensus on use and adoption is high.

Keywords: Willingness to Use; Triage System; Health Professionals

JEL Classification:

I110 - Health: General

Y40 - Dissertations

Resumo

O processo de triagem no departamento de urgências hospitalares tem um papel fundamental para o bom funcionamento destas.

Assim, é necessário que o processo de triagem esteja em constante melhoramento, pelo que, será primordial combater as suas limitações. Este estudo aborda a Willingness to Use de um sistema tecnológico que suporte o processo de triagem nas urgências hospitalares de modo a completar o Sistema de Triagem de Manchester (MTS) por parte dos atuais e futuros profissionais de saúde - médicos, enfermeiros, estudantes de medicina e de enfermagem.

Para estudar a Willingness to Use, foi desenvolvido um modelo usando algumas dimensões do Technology Acceptance Model (TAM) e do Innovation Diffusion Theory (IDT) juntamente com um conjunto de características que poderiam influenciar a Willingness to Use dos atuais e futuros profissionais de saúde.

Os dados foram recolhidos através de um questionário online de modo a se obter respostas sobre as várias dimensões em analise.

Os resultados do estudo permitiram concluir que uma vasta maioria dos atuais e futuros profissionais de saúde estão dispostos a usar e adotar um sistema tecnológico que vise suportar o MTS e que algumas características destes podem influenciar em parte a sua Willingness to Use.

Contudo fica em aberto a possibilidade de que as características não têm tanto impacto como era esperado uma vez que o consenso no uso e adoção de um sistema tecnológico que vise suportar o MTS é predominante.

Palavras-chave: Willingness to Use; Sistema de Triagem; Profissionais de Saúde

Classificação JEL:

I110 - Health: General

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Abbreviations List

BIU- Behavioral Intention to Use

ED - Emergency Department

IDT - Innovation Diffusion Theory

MTS - Manchester Triage System

PC – Perceived Compatibility

PEOU - Perceived Ease of Use

PU - Perceived Usefulness

TAM - Technology Acceptance Model

1. Introduction

The introduction aims to contextualise the research conducted. The purpose that leaded to the realization of this dissertation, the general and specific objectives that come with them, as well as the research questions. Furthermore, the methodology to be used will also be described, concluding with a brief description of the structure of the document.

1.1 Contextualization

According to the Portuguese General Direction of Health, we can define emergencies as *"all clinical situations of sudden onset, in which there is established or imminent impairment of one or more vital functions"* (Direção-Geral da Saúde, 2001). Emergency Departments (EDs) represent the gateway to health care and to the National Health Service, being responsible for preventing, diagnosing, and managing any medical emergency that a patient may incur (Totten & Bellou, 2013), (Direção-Geral da Saúde, 2001).

The triage process plays a key role in ED as it ensures that there is "*clinical justice*" in patient care but also the correct assignment of limited resources to unlimited medical needs (FitzGerald, Jelinek, Scott & Gerdtz, 2010). If in a normal situation there is already a need to have a good Triage System, in order to correctly allocate these scarce resources, during a pandemic, like the one we are experiencing, this need increases substantially to avoid overcrowding and long waiting times in the ED that could lead to possible undesirable outcomes (Sprivulis, Da Silva, Jacobs, Frazer & Jelinek, 2006), (Sprung, Joynt, Christian, Truog, Rello, & Nates, 2020).

In Portugal, since 2000, it's used the Manchester Triage System (MTS) that prioritizes patients based on 52 specific presentational flow chart diagrams. (Martins, Cuña, & Freitas, 2009) (Fernandes, Tanabe, Gilboy, Johnson, McNair, Rosenau, Sawchuk, P., Thompson, Travers, Bonalumi & Suter, 2005). Even though it has been validated by several studies, it is possible to point out some limitations of this system, such as the lack of adaptability to new situations, the need to always have a health professional to perform triage, and the lack of assessment and monitorization of vital signs after triage. (Alhaidari, Almuhaideb, Alsunaidi, Ibrahim, Aslam, Khan, Shaikh, Alshahrani, Alharthi, Alsenbel, Alalharith, 2021).

The MTS belongs to the group of triage systems with five levels, such as the Australasian Triage Scale, the Canadian Triage Acuity Scale, and the Emergency Severity Index. Although these are the most widely used systems due to their reliability and greater sensitivity in discrimination, when compared to systems with fewer levels, they present the same limitations that are pointed out to the MTS.

In an increasingly digital world where digital technologies for health, eHealth, are increasingly present in the daily lives of healthcare professionals through technologies that give support to their activities (World Health Organization, 2017), applying eHealth to the Triage System, creating an electronic triage, would enable it to be more responsive in normal and in particular situations, such as the pandemic caused by COVID-19.

According to Alhaidari, et al, (2021), the application of eHealth in the MTS may lead to the mitigation of the limitations presented by this system, as it allows the system to be adaptable, fewer resources to be spent, and allows constant monitoring of the patient's vital signs, thus contributing to an improvement in their capacity and effectiveness.

The advantages, benefits, and potential of eHealth are globally recognized and applied in several countries (Dillingham, R., et al, 2018, as cited in Thapa, Nielsen, Aldahmash, Qadri & Leppin, 2021). However, the implementation of a digital health system, such as an electronic Triage System, entails some difficulties and possible obstacles. Generally, these interventions entail high costs, thus creating a financial barrier, which is complicated thanks to the financial difficulties that exist due to the COVID-19 pandemic (Ibn-Mohammed, Mustapha, Godsell, Adamu, Babatunde, Akintade, Acquaye, Fujii, Ndiaye, Yamoah & Koh, 2021). Another major obstacle is the possible lack of acceptance, adaptation, and/or formation by healthcare professionals (Boeldt, et al, 2015; Konttila, et al, 2019, as cited in Thapa, et al, 2021), (Tam, Chung & Lou, 2018).

In order to assess the acceptance and willingness to use by current and future healthcare professionals, it is possible to highlight the Technology Acceptance Model (TAM) and the Innovation Diffusion Theory (IDT). *"TAM has evolved to become a key model in understanding predictors of human behaviour toward potential acceptance or rejection of the technology."* (Marangunić & Granić, 2015) and ITD is used in several areas and analyses whether an innovation is accepted or rejected by the user, considering the "*beliefs that they form about the innovation*" (Agarwal, 2000, p. 90, as cited in Lee, Hsieh & Hsu, 2011).

By conducting a questionnaire using a combination of TAM and IDT, it's possible to study the Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Behavioral Intention to Use (BIU), and Perceived Compatibility (PC).

In spite of this, after an extensive search of the existing literature, it is possible to confirm that there are no studies that assess the willingness to use or the acceptance of technology in the Triage System, by current and future healthcare professionals, in Portugal.

1.2 General Objective

Taking into consideration what was previously mentioned, there is a research gap that can be identified. As so, the main objective of this dissertation is to evaluate the Willingness to Use on behalf of the healthcare professionals of a technological system to support the Triage System in the ED as a complement of the MTS.

1.3 Specific Objectives

To address the main objective of the dissertation it is necessary to define and perform some specific objectives:

- Evaluate the impact of the Health Professional's Characteristics in the application of a new technological system.
- Measure and assess the impact of the Perceived Compatibility of the application of a new technological system.
- Evaluate Perceived Usefulness, Perceived Ease of Use and Behavioral Intention to Use from the perspective of the healthcare professionals.
- Measure and assess the impact of the Health Professional's Characteristics on the Perceived Usefulness, Perceived Ease of Use and Behavioral Intention to Use of the application of a new technological system

All these specific objectives are inserted in the application of a technological system to complement the MTS in the EDs in Portugal.

1.4 Research Question

According to the objectives previously defined, it is possible to formulate the research question:

Q1: What is the healthcare professionals' willingness to use a technological system to support the Triage System in the ED as a complement to the MTS?

Q2: How is the health professionals' Behavioral Intention to Use impacted by their characteristics, Perceived Usefulness, Perceived Ease of Use and Perceived Compatibility?

1.5 Research Methodology

In order to investigate the research questions presented and the relationship between the constructs presented - Health Professional's Characteristics, Perceived Usefulness, Perceived Ease of Use, Perceived Compatibility, and Behavioral Intention to Use - which influence the willingness to use a technological system to support the Triage System in EDs, a questionnaire was designed and conducted among health professionals.

When researching the existing literature on willingness to use, or the interest in applying new technology, it is possible to see that the most used and tested instruments are the Technology Acceptance Model (TAM) and the Innovation Diffusion Theory (IDT). Both instruments have been subject to some changes and updates, which are aimed both at a better analysis and perception of consumer acceptance of new technologies and innovations, as well as a better adaptation to current times and new and different contexts and realities.

Given the literature's positive argumentation of its suitability for use in measuring and assessing the Willingness to Use a technological system, it will be used in this study three constructions that belong to TAM2, Perceived Usefulness, Perceived Ease of Use and Behavioral Intention to Use, in conjunction with the construct Perceived Compatibility of IDT and the independent construct Health Professional's Characteristics. These constructs have been already tested and studied before; in the literature, it is possible to find studies that address these individually as well as together, as they will be used in this study. As so, each one will be measured with the already existing scales used in the preview's studies.

While developing the questionnaire (Appendix A), 22 items were used to assess the characterization of the respondent - Health Professional's Characteristics -, Perceived Usefulness, Perceived Ease of Use, Behavioral Intention to Use, and Perceived Compatibility

For the measure of Perceived Usefulness, Perceived Ease of Use, Behavioral Intention to Use and Perceived Compatibility, a five-point Likert scale (-2 = "Strongly disagree", -1 = "Partly Disagree", 0= "No opinion/ Do not agree or disagree", 1= "Partly Agree", 2= "Strongly agree") was used.

The processing, treatment and analysis of the collected data were carried out through the use of IBM Statistical Package for the Social Science (SPSS) software, version 28 of 2021, along with the Macro PROCESS v3.5 for SPSS, developed by Andrew F. Hayes.

1.6 Scope

One of the essential steps in conducting a study and thus achieving the proposed objectives is to establish its limits. This study aims to assess the Willingness to Use a technological system to support the Triage System in the ED as a complement to the MTS, by current and future health professionals in Portugal.

Considering the target public of this study, the most appropriate way to operationalize data collection is through the completion of an online questionnaire in order to collect as many answers as possible from different geographical areas.

It will be limited to doctors, nurses, medical and nursing students, with the first two representing current health professionals and the others representing future ones, who are working or studying in Portugal.

The online questionnaire aims to obtain the maximum number of responses from all the groups under study and thus avoid a possible focus on a certain group and geographical area of Portugal, which would lead to less precise conclusions.

1.7 Global Structure

The present research will be structured into five main chapters.

1. **Introduction:** This introductory chapter presents the foundations of the study, the context that originated it and the motivations that led to its realization. Through this chapter, it is possible to understand the specific and main objectives, the research questions, the methodology and the scope of the study.

2. **Literature Review:** This chapter provides an analysis of the theoretical background and of the existing literature that supports the theme of the present study. Initially, the concept, types, models, and limitations of triage will be addressed. Next, the TAM and IDT models will be analyzed in order to evaluate the perception and willingness to use a technological system by a future user.

3. **Methodology:** This will present the method of data collection, the independent variables that will be used, and the measurable items of each variable from the conceptual model. The Population and Sample and the data analysis tools will also be identified and presented.

4. **Results:** This fourth chapter will present and discuss the results obtained from the collected data.

5. **Conclusion:** Finally, this final chapter draws the main conclusions from this study, as well as the answers to the research questions that were asked earlier. It will also be presented the limitations that were encountered while conducting the research and possible suggestions and recommendations for future research.

2. Literature Review

The Literature Review is a crucial chapter of the dissertation since it presents the Literature review process, which is a set of "*sequential steps to collect, know, comprehend, apply, analyze, synthesize, and evaluate quality literature in order to provide a firm foundation to a topic and research method*" (Levy et al, 2006, as cited in Juntunen & Lehenkari, 2021).

Firstly, the concept of triage, its connection to the hospital environment, the existing types and models used and employed will be addressed. Then will be followed by a discussion about the limitations of the triage system that is applied in Portugal and the willingness to use an eHealth System in the triage. To finalize, the TAM and IDT models and their respective measures will be examined.

The measurement of the Willingness to Use comes from a base of previous studies that analyze the application of these instruments, creating a bridge between the perception and willingness to use a technological system by a future user.

2.1 Triage Systems

The concept of triage comes from the French word "*trier*" which means to separate. While this was originally used to describe the separation of agricultural products, it is now used to refer to the distribution of medical resources to patients in different healthcare situations (Wislow, 1982, as cited in Iserson & Moskop, 2007).

The use of Triage Systems is not something new, since there are records of systems that helped military surgeons in the 18th century. The practice of health-related triage emerged from armed conflicts where not all wounded soldiers could receive medical care (Iserson & Moskop, 2007). As time went by, the concept and the way of performing triage changed until it was no longer exclusively associated with war and began to be applied to the general population (Iserson & Moskop, 2007).

The COVID-19 pandemic has shown that the world population is always susceptible to possible disasters and tragedies that can have an impact on its health, and it has also highlighted how easily health resources can run out when faced with an unusual wave of need (Bazyar, Farrokhi, Salari & Khankeh, 2020).

It is due to this relative ease of depletion of health resources, thanks to the disproportion between needs and resources, that there is the necessity of existing Triage Systems since they *"are designed to serve the value of human life and health with fairness and the efficient use of resource"* (FitzGerald, et al, 2010). Triage Systems aim to optimize the waiting time of patients according to the

severity of their medical condition, to treat first the most serious medical conditions and to reduce the negative impact on the prognosis of a prolonged delay before treatment (Farrohknia, Castrén, Ehrenberg, Lind, Oredsson, Jonsson, Asplund & Göransson, 2011).

Triage Systems can be divided into two types: pre-hospital and hospital (Lidal, Holte & Vist, 2013). The main characteristic that differentiates them is the environment in which they are applied, being the pre-hospital triage applied outside the hospital and the hospital triage at the entrance of the ED.

2.1.1 Pre-Hospital Triage Systems

Pre-hospital Triage Systems represent all victim triage performed in an out-of-hospital environment. Performing triage outside the hospital environment is always a challenge since the environment may not be controlled, it could be hostile, the information incomplete and the rescue capacity limited. Therefore, it is necessary to have an approach in the pre-hospital environment that allows saving the maximum number of lives and ensures the best delivery of care, taking into account the existing resources. (Oliveira, Meira & Valente, 2012).

The pre-hospital triage in Portugal is divided into two different moments, primary triage, and secondary triage. (Oliveira, Meira & Valente, 2012).

2.1.2 Hospital Triage Systems

The Hospital Triage System is the triage process that occurs at the entrance of the ED, being *"the first encounter between healthcare providers and patients"* (Dolan, 2013, as cited at Tam, et al 2018). Since the ED is the provider of immediate support to patients who present clinical conditions that require urgent attention and care (Tam, et al, 2018), their workload is increasing substantially in recent years, leading to their overcrowding.

The Triage System plays a fundamental role in the good functioning of it because it's necessary to prioritize patients since resources, like beds, ventilators, or even human resources, are limited, and medical needs are unlimited. If there is no lack of resources, there is no need to perform any type of triage (Farrohknia, et al, 2011). It also allows the efficient management of patient flow and ensures that those who need immediate medical attention are treated promptly, particularly in a scenery of overcrowding (American Academy of Pediatrics Committee on Pediatric Emergency Medicine, 2004 & NHS England, 2013 cited in Zachariasse, Seiger, Rood, Alves, Freitas, Smit, Roukema & Moll, 2017) (FitzGerald, Jelinek, Scott & Gerdtz, 2010).

Triage Systems are used all over the world (Martins, et al, 2009), and several scales allow triage with different levels of priority, but numerous studies show that the use of those in which people are

classified into five levels of priority of care are more reliable, trustworthy, present greater and more sensitive discrimination compared to systems with 3 and 4 levels. (Travers, Waller, Bowling, Flowers, & Tintinalli, 2002), (Carvalho et al., 2013, as cited at Direção-Geral da Saúde., 2015), (Gilboy, et al, 2005, as cited at Pinto Júnior, Salgado & Chianca, 2012).

Thanks to the reliability and validation that exists around the 5L Screening Systems, these are also the most widely used at an international level, highlighting the Australasian Triage Scale, Canadian Triage Acuity Scale, Emergency Severity Index, and the MTS (Pinto Júnior, et al, 2012).

2.2 Manchester Triage Scale (MTS)

The MTS was developed in 1994 by a group of specialist triage professionals (Pinto Júnior, et al, 2012), and two years later it was introduced in the UK (Martins, et al, 2009). It is now internationally accepted and has been adopted in Norway, Sweden, Holland, Germany, and Portugal (Martins, et al, 2009), (Santos, Freitas & Martins, 2014).

In 2000, MTS was adopted in Portugal, initially only in two hospitals (Pinto Júnior, et al, 2012), by Dr Professor Fernando da Fonseca (Santos, et al, 2014). The MTS works based on symptoms, however, what makes it unique from other Triage Systems is the fact that operates according to the complaints presented by the patient, being the main complaint allocated to one of 52 algorithms (Santos, et al, 2014)

Thanks to several discriminators that are presented in the form of questions in the algorithm (Pinto Júnior, et al, 2012), it is possible to classify the patient into 5 categories with different colours, each colour representing a level of urgency and associated with a maximum waiting time. As such, red represents a situation that requires immediate treatment, orange a very urgent situation, green a standard situation and finally blue represents a non-urgent situation (Pinto Júnior, et al, 2012), (Storm-Versloot, Ubbink, Kappelhof & Luitse, 2011). The target time for the triage for each category is, respectively, 0, 10, 60, 120, and 240 minutes (Pinto Júnior, et al, 2012). This type of triage scale allows patients to be organized in order of priority and ensures that they are not kept waiting longer than is safe (Santos, et al, 2014), (Storm-Versloot, et al, 2011), (Van Veen & Moll, 2009).

MTS does not provide health workers with a diagnosis but with a clinical priority since establishing an accurate diagnosis at the time of triage "*is doomed to failure*" (Pinto Júnior, et al, 2012). Besides classifying patients' risks, can discriminate patients by the probability of death, as well as between those who will remain in the service and those who do not need to be there (Martins, et al, 2009).

2.2.1 Challenges faced by the MTS during the COVID-19 Pandemic

The COVID-19 pandemic had a major impact worldwide, not only because of the death toll it created but also because of the enormous pressure and strain that it placed on health services, causing their resources to become even more scarce and consequently leading to rationing of medical equipment and interventions (Emanuel, Persad, Upshur, Thome, Parker, Glickman, Cathy, Boyle, Smith, & Phillips, 2020).

This lack of resources leads to the lack of capacity to respond to such high demand, leading to overcrowding of the ED. If in a normal context, overcrowding is already a serious concern, in the context of the COVID-19 pandemic this situation is even more worrying because the transmission of the virus occurs through contact between infected people. If there is overcrowding, the probability of contact and consequent infection between people increases substantially (Direção-Geral da Saúde, 2020).

Therefore, in situations such as these, a triage system capable of providing a rapid, accurate and quality response is necessary. Although the MTS has been validated by several authors and is used in several countries (Martins, et al, 2009), (Zachariasse, et al, 2017) (Pinto Júnior, et al, 2012) (Santos, et al, 2014), it has some limitations, which become more visible in situations of greater difficulty and tightness, as was the case of the COVID-19 pandemic.

2.2.2 Limitations of the MTS

The existing Triage Systems are prepared for day-to-day and punctual catastrophes; however, the COVID-19 pandemic appeared and became a "catastrophe" that has already lasted for two years. As such, the Triage Systems, in general, have limitations, and when facing a pandemic, these become more noticeable, and the MTS is no exception.

According to Alhaidari, et al, (2021), some parameters are important to consider when recommending improvements to a Triage System such as waiting time, simplicity, validity, and adaptability. As so, it is possible to recognize some aspects of the MTS that can be improved thanks to these parameters:

- The adaptability of the system, the fact that the MTS is not adaptable to new situations like was the case of the pandemic, can cause an increase in triage times causing overcrowding.
- The need to have a health professional to perform triage, in a situation where human resources are scarce, could lead to an increase in waiting times and may cause overcrowding.
- The lack of collection of vital signs and crucial information in a consistent manner could lead to cases of undertriage.

The implementation of eHealth would lead to the mitigation of these limitations. Sousa (2020) created a prototype of a wristband that would allow a greater monitoring of vital signs and a constant collection of information; would make the process to be more adaptable, since it is possible to constantly update and adapt a technological system, and it would allow for a reduction of the personal responsable for triage since it would provide quick answers and allow a better discovery of the problem that led the patient to go to the emergency department and possible false emergencies.

However, implementing an eHealth system can help mitigate these limitations and may lead to a reduction in overcrowding situations in EDs (Alhaidari, et al, 2021), (Dong, et al, 2007, as cited in Martins, et al, 2009).

2.3 eHealth in the Triage System

"eHealth has an enormous potential to improve healthcare cost, effectiveness, and quality of care" (Granja, Janssen, & Johansen, 2018). "*Patient-physician portals, telemedicine, electronic medical records, smartphone and tablet apps, or remote monitoring devices*" (Singh, et al., 2016, as cited at Thapa, et al, 2021) are all considered examples of technological systems adopted by healthcare, the so-called eHealth.

The implementation of eHealth in the Triage System makes the triage process an eTriage. The use of eTriage would lead to the mitigation of certain limitations by reducing waiting time in the ED, minimizing the overheads costs, optimizing the use of healthcare resources, and adding greater flexibility to the Triage System when facing a new and differential situation (Alhaidari, et al, 2021).

However, several factors can affect, positively and negatively, the implementation of an eHealth system (Granja, et al, 2018)., with emphasis on the acceptance, the Willingness to Use, by healthcare professionals (Thapa, et al, 2021).

In an increasingly technological world, it is natural that various theories address how a given population makes decisions about the use of technological applications like an eHealth System. These theories make it possible to understand whether the implementation of a new technological system will succeed or fail when implemented. Among the various theories, the Technology Acceptance Model (TAM) and the Innovation Diffusion Theory (IDT) stand out.

2.4 Technology Acceptance Model and Innovation Diffusion Theory

There is a wide variety of models that "*incorporate attitudinal, social, and control factors*" to explain the acceptance and implementation of technology. (Taylor & Todd, 1995) (Venkatesh & Davis, 2000).

TAM is the most widely used theory, and it has become a dominant model in investigating factors affecting users' acceptance of the technology thanks to its simplicity and ease of application.

This model was adapted from the Theory of Reasoned Action and the Theory of Perceived Behavioral, the first one *"looks at the behavioral intentions rather than the attitudes as the main predictors of behaviour"* while the second, was used to address the inadequacies that were had identified in the TRA, "*in particular the model's inability to deal with behaviours over which individuals have incomplete volitional control*" (Marangunić & Granić, 2015).

"*The original TAM consisted of perceived ease of use (PEOU), perceived usefulness (PU), attitude toward using (ATU), behavioral intention to use (BI), and actual system use (AU). PU and PEOU are the two most important determinants for system use. The ATU directly predicts users' BI which determines AU"*. (Wu, J. H., & Wang, S. C., 2005). Both, PU and PEOU are *"directly influenced by the system design characteristics*" (Marangunić & Granić, 2015).

Over the years, the model has evolved since researchers suggested that TAM needed *"additional factors and variables"* (Marangunić & Granić, 2015), so the TAM2 model was created using TAM as the starting point. This extension included "*social influence processes and cognitive instrumental processes, but it omitted ATU due to weak predictors of either BI or AU"* (Wu & Wang, 2005), (Venkatesh & Davis, 2000).

2.5 eHealth Healthcare professionals' Characteristics and PU, PEOU, and PC

We are in a special time, if before the Covid-19 pandemic we were already in the age of digitalization, the post-Covid-19 phase confirmed that this phenomenon is here to stay and is happening even faster than expected. (Petersen, Baker, Pather & Tucker, 2020)

"*The pandemic has helped accelerate the development of digital infrastructure in many industries* "(Kim, 2020 as cited at Petersen, Baker, Pather & Tucker, 2020). And of course, health is no exception, with "*The Internet and related digital technologies have spawned the burgeoning growth of an information revolution in health care"* (Lee & Lee, 2021)

Several studies have highlighted the benefits of applying eHealth technologies (Alhaidari, et al, 2021), (Granja, et al, 2018) (Thapa, et al, 2021) (Lee & Lee, 2021), however, there are several challenges in implementing and applying these technologies (Lee & Lee, 2021). One of the challenges may be the acceptance and willingness to use by health professionals. However, each professional is a different and unique person, so it is important to analyze what are their sociodemographic characteristics that influence their acceptance and willingness to use a technological system to support the Triage System in the ED as a complement to the MTS.

Aiming at the understanding of "*the acceptance and use of mobile technology in the health care industry*.", Abu-Dalbouh (2013), used "*individual factors such as age, gender and technology*

skills" as external variables to not only characterize the sample but also to understand the influence of these in the acceptance and use of technology in the health care industry. Thapa, et al, (2021) also obtained the same conclusions and used independent variables such as socio-demographic characteristics, *"age, gender, educational background(nursing/medicine), and professional background (nurse/physician/student*)", the "*number of years of direct contact with patients for health care professionals*", and if the health professional ever has "*received a training for digital health use".*

As such, to understand the impact of external variables such as the **actual and future healthcare professionals' characteristics**, such as **age**, **gender**, **educational background**, **professional background**, **number of years of direct contact with patients,** for healthcare professionals, and **if ever received any training about the use of eHealth use**, in the Perceived Usefulness and in the Perceived Ease of Use, and *Behavioral Intention to Use* the following hypothesis were formulated:

H_1: *Healthcare professionals' characteristics has direct influence on Perceived Usefulness*

H_2: *Healthcare professionals' characteristics has direct influence on Perceived Ease of Use*

H_3: *Healthcare professionals' characteristics has direct influence on Behavioral Intention to Use*

"In 1985, Fred Davis proposed the conceptual model for technology acceptance" (Davis, F.D., 1986, as cited at Marangunić & Granić, 2015). The conceptual model presented by him suggested that the Willingness to Use by a user can be explained by three key factors: PEOU, PU, and at the time, Attitude Toward Using, later called BIU. The first two have a positive influence on the last one, so it is possible to see that there is a mediating relationship of PU and PEOU between Healthcare Professionals' Characteristics and BIU. (Tung, Chang & Chou, 2008) (Marangunić & Granić, 2015)

Thus, the following research hypotheses were formulated:

$H_{3.1}$: *Healthcare professionals' characteristics has influence on Behavioral Intention to Use, mediated by Perceived Usefulness*

$H_{3.2}$: *Healthcare professionals' characteristics has influence on Behavioral Intention to Use, mediated by Perceived Ease of Use*

2.6 Perceived Ease of Use and Perceived Usefulness and Behavioral Intention to Use

Davis (1986) and Fenech (1998) used Ajzen and Fishbein's (1980) to describe Perceived Ease of Use as "*the degree to which an individual believes that using a particular system would be free of physical and mental effort*."

PEOU emerged in the creation of the original TAM, and in this one, it appears as *"an instrumental in explaining the variance of the customer's attitude"* (Giovanis, Binioris & Polychronopoulos, 2012). This construct has been maintained during all TAM updates thanks to its reliability as so, has been used in several studies. (Ngai, Poon & Chan, 2007) (Verma, Bhattacharyya & Kumar, 2018) (Akbari, Rezvani, Shahriari, Zúñiga & Pouladian, 2020).

As mentioned earlier, two of the key factors of TAM are PEOU and PU. The same model, both the original and the updates that came from it, states that PEOU is a determining factor of the PU whereby PEOU has a direct influence on PU.

Several studies have worked out this hypothesis (Marangunić & Granić, 2015) (Wu & Wang, 2005); (Van der Heijden, 2004); (Park, 2009), confirming that "*Perceived ease of use has a causal effect on perceived usefulness."* (Davis, 1986) that *"PEOU is a predictor of PU*" (Venkatesh & Davis, 2000) (Marangunić & Granić, 2015). Based on this, the following hypothesis was formulated:

H_4: *Perceived Ease of Use has direct influence on Perceived Usefulness*

According to the TAM, the external variables have a direct influence on the PU and PEOU, these relationships led to the creation of H1 and H2 respectively. Given this, together with the hypothesis presented above, that PEOU has a direct influence on PU, it is possible to hypothesize the existence of a mediation relationship. (Marangunić & Granić, 2015). Therefore, the following hypothesis was formulated:

$H_{2.1}$: *Healthcare professionals' characteristics has influence on Perceived Usefulness, mediated by Perceived Ease of Use*

In agreement with TAM, and confirmed by several studies (Akbari, Rezvani, Shahriari, Zúñiga, & Pouladian, 2020) (Hernández, Jiménez & Martín, 2008) (Verma, Bhattacharyya & Kumar, 2018) (Wu & Wang, 2005), PEOU, directly and indirectly, influences BIU. Thus, the following research hypothesis is considered:

H_5: *Perceived Ease of Use has direct influence on Behavioral Intention to Use*

2.7 Perceived Usefulness and Behavioral Intention to Use

PU, like PEOU, comes from TAM and this suggests that both are useful "in explaining the variance of the customer's attitude" (Giovanis, Binioris & Polychronopoulos, 2012).

Davis (1986) and Fenech (1998) used Ajzen & Fishbein's (1977) definition in order to describe what Perceived Usefulness is, according to them it's "*the degree to which an individual believes that using a particular system would enhance his or her job performance.*".

The same conceptual model presents a moderation relationship between PEOU-BIU and PU-BIU.

H_6: *Perceived Usefulness has direct influence on Behavioral Intention to Use*

2.8 Perceived Compatibility

TAM, even though, it is a much supported and advocated model is always open to improvement.

The IDT focuses on answering and understanding how, why and at what rate innovative ideas and technologies spread. This theory states that innovations have some characteristics like their relative advantage, compatibility, complexity, trialability, and observability.

"*However, research has suggested that only the relative advantage, compatibility, and complexity are consistently related to innovation adoption"* (Agarwal, 1998, as cited at Wu, & Wang, 2005). While much research supports TAM as an excellent model for explaining the acceptance of technology, it is possible to question whether it can always be well adopted. Therefore, many studies recommend the integration of TAM with other theories such as IDT (Al-Rahmi, Yahaya, Aldraiweesh, Alamri, Aljarboa, Alturki & Aljeraiwi, 2019), (Carter & Bélanger, 2005), (Davis, 1986), (Wu & Wang, 2005). Others claim that TAM and IDT should have some similarities, the relative advantage is similar to perceived usefulness, whereas complexity is similar to perceived ease of use, and that together "*provide an even stronger model than either standing alone."* (Wu & Wang, 2005).

Perceived Compatibility is *"the degree to which an innovation is perceived to be consistent with the adopters' existing values of past experiences and needs"* (Sonnenwald, Maglaughlin & Whitton, 2001) (Moore & Benbasat, 1991). This attribute "*concerns the agreement/differences between the work patterns used and the work patterns required by the innovation"* (Sonnenwald, et al, 2001).

This dissertation will combine TAM2 with the Perceived Compatibility construct of IDT, to *"evaluate and explain consumer behaviour"* (Wu & Wang, 2005). Therefore, the following hypotheses were formulated:

H_7: *Perceived Compatibility has direct influence on Behavioral Intention to Use*

2.9 Conclusion and Conceptual Model

This chapter reviewed the literature on the existing triage systems, focusing in particular on the MTS, since it is the triage system used in ERs in Portugal, the application of technological systems in health through eHealth, and finally, it addressed the theories that allow understanding, assessing, and

measuring of the users' acceptance and willingness to use, in this case, current and future healthcare professionals, in adopting and use an eTriage system that complements the MTS.

After a thorough literature review, it was realized that in order to reach more precise and correct conclusions it would make sense to combine TAM2 with the Perceived Compatibility construct of IDT and add External Variables, Healthcare professionals' characteristics.

To a better understanding of the formulated hypotheses, that were formulated previously, Figure 1 represents the conceptual model obtained from those:

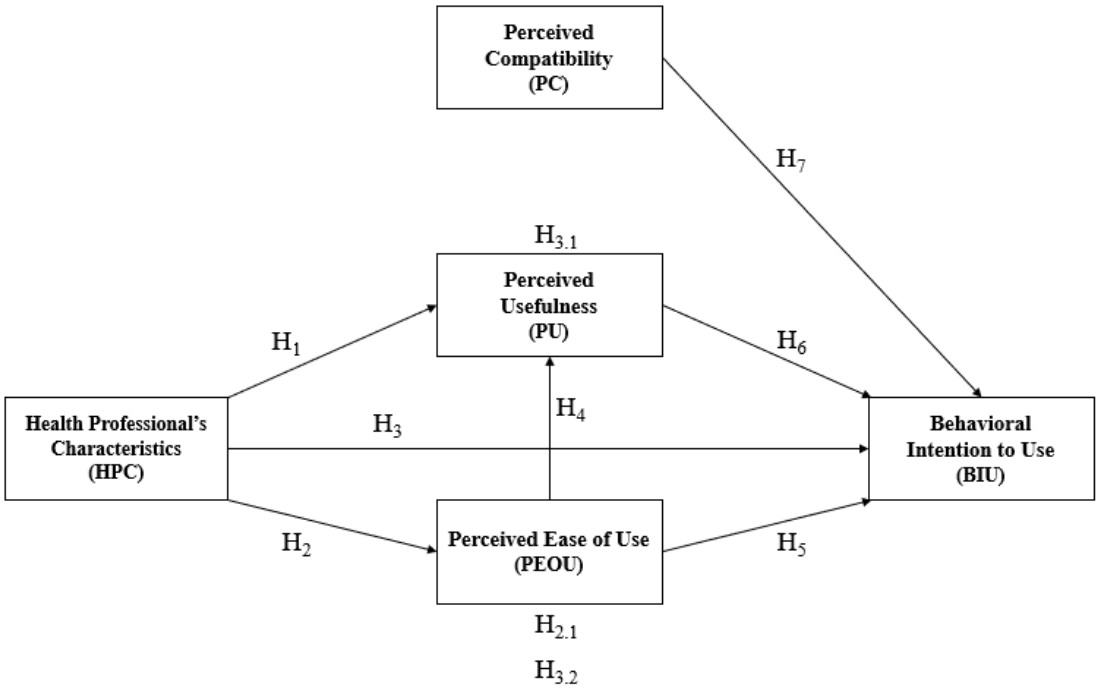


Figure 1: Conceptual Model

3 Methodology

Initially, this chapter will present the research hypotheses that were obtained in the previous chapter.

The methodology is a fundamental chapter of a dissertation, where the methods and instruments used to collect information and data that will be used to answer the research question are explained, but also the methodology used, describe the methods and instruments that will be used to try to validate the research hypotheses.

3.1 Research Hypotheses

In the previous chapter, Literature Review, seven research hypotheses were presented. These were created in order to validate certain assumptions, to be applied in the application of an eTriage system in the MTS.

Table 1: Research Hypotheses

H_1:	Healthcare professionals' characteristics has direct influence on Perceived Usefulness
H_2:	Healthcare professionals' characteristics has direct influence on Perceived Ease of Use
$H_{2.1}$:	Healthcare professionals' characteristics has influence on Perceived Usefulness, mediated by Perceived Ease of Use
H_3:	Healthcare professionals' characteristics has direct influence on Behavioral Intention to Use
$H_{3.1}$:	Healthcare professionals' characteristics has influence on Behavioral Intention to Use, mediated by Perceived Usefulness
$H_{3.2}$:	Healthcare professionals' characteristics has influence on Behavioral Intention to Use, mediated by Perceived Ease of Use
H_4:	Perceived Ease of Use has direct influence on Perceived Usefulness
H_5:	Perceived Ease of Use has direct influence on Behavioral Intention to Use
H_6:	Perceived Usefulness has direct influence on Behavioral Intention to Use
H_7:	Perceived Compatibility has direct influence on Behavioral Intention to Use

3.2 Model Operationalization

With the aim of putting into practice the conceptual model presented at the end of the literature review, a questionnaire was developed, being divided into five parts: (i) Health Professional's characterization (characterization of the respondent), composed by seven questions; (ii) Perceived Usefulness; (iii) Perceived Ease of Use; (iv) Behavioral Intention to Use and (v) Perceived Compatibility.

As carried out in Abu-Dalbouh (2013), the information will be collected through a questionnaire, which *"consisted of two parts. The first recorded the subject's demographic information. The second record the subject's perception of each variable in the model."*.

At the beginning of the questionnaire, the respondent is asked about his/her Professional Background (Physician, Nursing, Medicine Student, Nursing Student and Others), then his/her gender, age, location of the educational institution he/she is attending - for students- or the location of the health care institution where they work - for physicians and nurses -, their status (Private or Public) and whether they have received any training on the use of eHealth.

For the evaluation of the Willingness to Use and apply a new technological system, as mentioned above, TAM 2 was used in conjunction with the IDT, with some changes so that they are better adapted to the context of the application of technology in health, in this case in the process of triage of EDs in Portugal.

Five items were used in the questionnaire to assess Perceived Usefulness, other five to assess the Perceived Ease of Use and two items in order to evaluate the Behavioral Intention to Use. To finish the questionnaire, in order to evaluate the Perceived Compatibility, three items were used, these are from several studies such as Wu & Wang (2005); Van der Heijden (2004); Park (2009); Tung, et al. (2008).

All fifteen items were measured using a scale of five-point Likert scale (with the following anchors: -2 = "Strongly disagree" and 2= "Strongly agree").

Next chapter explains in detail all the dimensions - PU, PEOU, BIU, and PC- and the respective items and how they are used and applied in the context of this study.

3.3 Definition of Measurement Variables

The measures used for Perceived Usefulness, Perceived Ease of Use and Behavioral Intent to Use were adapted from the original TAM model. The measure for Perceived Compatibility, as conducted by Wu & Wang (2005), "*was based on Chen et al. and Eastin*".

According to pieces of advice from previous studies is important "*to begin by formulating conceptual definitions of what is to be measured and preparing items to fit the construct definition*" (Anastasi, 1986, as cited at, Davis, 1989). As so, candidate items for Perceived Usefulness, Perceived Ease of Use, Behavioral Intention to Use and Perceived Compatibility "*were generated based on their conceptual definitions (…) and then pretested in order to select those items that best fit the content domains*" (Davis, 1989).

In order to determine the number of items measured, was calculated an average of the number of items used in various studies (Van der Heijden, 2004) (Park, 2009) (Davis, 1993) (Tung, Chang & Chou, 2008) (Wu & Wang, 2005), (Davis, 1989). With this calculation, the average number of items for Perceived Usefulness is 5 measurable items, the same for the Perceived Ease of Use, 2 to measure the Behavioral Intention to Use and 3 to measure Perceived Compatibility.

3.3.1 Perceived Usefulness

Perceived Usefulness is "*the degree to which a person believes that using a particular system would enhance his or her job performance*" (Fenech, 1998) and it is defined as the degree to which the actual and future health professional believes that the MTS, in the ED in Portugal, will be improved

by the application of eHealth. As was mentioned earlier, through the result of averaging the measurable items from various studies, the number of measurable items to be used is 5, as Abu-Dalbouh (2013) states: "*The measurement of perceived usefulness comprises of 5 items modified to the context of this study*". The measurement items of Perceived Usefulness are shown in the Table below:

Table 2: PU Items

CONSTRUCT	OPERATIONAL DEFINITIONS	MEASURED ITEMS	SOURCE
PERCEIVED USEFULNESS	Perceived Usefulness is a feeling that the actual and future healthcare professionals hold toward the improvement of the MTS thanks to the use of a computerized triage system	**PU1**: Using e-Triage would improve my performance in the triage process **PU2**: Using e-Triage would increase my productivity in the triage process **PU3**: Using e-Triage would facilitate the triage process **PU4**: Using e-Triage enhance my effectiveness in the triage process **PU5**: Using e-Triage enables me to accomplish tasks more quickly	**Wu, J. H., & Wang, S. C., (2005); Van der Heijden, H., (2004); Park, S. Y., (2009); Davis, F. D., (1993); Tung, F., et al., (2008)**

3.3.2 Perceived Ease of Use

Perceived Ease of Use is "*the degree to which a person believes that using a particular system would be free of effort*" (Fenech, 1998) and it is defined as the degree to which the actual and future healthcare professional believes that the implementation of eTriage in the MTS, in the ED in Portugal, will improve the easiness of the triage process. As was mentioned earlier, through the result of averaging the measurable items from various studies, the number of measurable items to be used is 5, as Abu-Dalbouh (2013) states: "*The measurement of perceived ease of use construct contained 5 items and modified to the context of this study*". The measurement items of Perceived Ease of Use are shown in the Table below:

Table 3: PEOU Items

CONSTRUCT	OPERATIONAL DEFINITIONS	MEASURED ITEMS	SOURCE
PERCEIVED EASE OF USE	Perceived Ease of Use refers to a level of easiness that the actual and future healthcare professionals feel toward the implementation of a computerized triage system in the MTS	**PEOU1**: I find learning to use e-Triage is easy **PEOU2**: I think finding what I want via e-Triage is easy **PEOU3:** I think becoming skillful at using e-Triage is easy **PEOU4:** I think using e-Triage is easy **PEOU**5: I think the interaction with e-Triage	**Wu, J. H., & Wang, S. C., (2005); Van der Heijden, H., (2004); Park, S. Y., (2009); Davis, F. D., (1993); Tung, F., et al., (2008)**

	system is clear and understandable

3.3.3 Behavioral Intention to Use

According to Davis (1989), *"The theoretical importance of perceived usefulness and perceived ease of use as determinants of user behaviour is indicated by several diverse lines of research".* Behavioral Intention to Use refers to the consumer's intention to use and accept a particular technology or system (Ajzen & Fishbein, 1980), which means that is defined by the degree to which the actual and future healthcare professionals will accept and use the eTriage system to complement the MTS, in the ED in Portugal. As was mentioned earlier, through the result of averaging the measurable items from various studies, the number of measurable items to be used is 2. The measurement items of Behavioral Intention to Use are shown in the Table below:

Table 4: BIU Items

CONSTRUCT	OPERATIONAL DEFINITIONS	MEASURED ITEMS	SOURCE
BEHAVIORAL INTENTION TO USE	Behavioral Intention to Use refers to the actual and future healthcare professional's likelihood to engage toward acceptance and use of a computerized triage system in the MTS	**BIU1**: Assuming I had access to e-Triage, I intend to use it **BIU2**: Given that I had access to E-Triage, I predict that I would use it	**Wu, J. H., & Wang, S. C., (2005); Van der Heijden, H., (2004); Park, S. Y., (2009); Tung, F., et al., (2008)**

3.3.4 Perceived Compatibility

Perceived Compatibility is "*the extent to which adopting the innovation is compatible with what people do*" (Kaasinen, 2005, as cited at, Wani & Ali, 2015) and is the degree to "*which an innovation is perceived as consistent with consumer needs, values and beliefs, previous ideas and past experiences*." (Wani & Ali, 2015).

The more compatible the innovation is the better chances of this getting adopted. In the case of this study, the introduction of eTriage to complement the MTS in the ED, in Portugal, cannot have much impact on the existing lines of the triage process (Sonnenwald, et al, 2001). If the eTriage "*will disrupt the existing operational lines it may increase the cost involved and the firm may scrap the deal*". Nevertheless, according to (Wani & Ali, 2015), "*too much compatibility can be sometimes a problem as the users may find it unworthy to try a new innovation or might not perceive it to be an innovation*." Given this, the third measured item suffered slight changes in order to better analyse the Perceived Compatibility to obtain more precise results in the study. As was mentioned earlier, through the result of averaging the measurable items from various studies, the number of

measurable items to be used is 3. The measurement items of Perceived Compatibility are shown in the Table below:

Table 5: PC Items

CONSTRUCT	OPERATIONAL DEFINITIONS	MEASURED ITEMS	SOURCE
PERCEIVED COMPATIBILITY	The degree to which using a computerized triage system to complement the MTS is perceived as being consistent with the healthcare professional's existing values, beliefs, previous experiences, and current needs.	**PC1:** Using an e-Triage system is compatible with most aspects of my work **PC2:** Using an e-Triage system is suitable for my work style **PC3:** Using an e-Triage system is compatible with the normal operation of hospital triage	**Wu, J. H., & Wang, S. C., (2005); Van der Heijden, H., (2004); Park, S. Y., (2009); Davis, F. D., (1993); Tung, F., et al., (2008)**

3.4 Definition of Characterization Variables

To realize the first part of the questionnaire it is necessary to collect the following additional information:

Age: according to INE (2020), is divided into 6 echelons: from 18 to 24 years old; 25-34 years old; 35-44 years old; 45-55 years old; 56-64 years old and 65 or more years old.

Gender: as a binomial variable, appears with feminine and masculine as response options.

Educational background: as a binomial variable, appears with nursing and medicine as response options.

Professional Background: appears with nurse, physician, medicine student and nursing student as response options.

Number of years of experience is only carried out for current healthcare professionals. Those who answered, in the variable, professional training, nursing or doctor, have as response options: less than 15 years; between 15 and 25 years; more than 25 years.

Location of the educational/work institution: whereby for medical students it presents the districts where there are medical teaching institutions and for nursing students the districts where there are nursing teaching institutions. For the health professionals, it shows all the districts in Portugal.

Regime of the educational/work institution: as a binomial variable, appears with Public and Private as response options.

Ever received training about the use of eHealth: as a binomial variable, appears with yes and no as response options.

3.5 Data Collection Methodology

Before starting the data collection through the online questionnaire, it is recommended to validate it through cognitive interviews. “Cognitive interviews are pretest methods to explore the conceptual equivalence of survey items” (Nápoles-Springer, Santoyo-Olsson, O'Brien, H. & Stewart, 2006). through the realization of these with representatives of the sample, it’s possible to detect possible flaws, mistakes, but also to make some arrangements and improvements (Presser, Couper, Lessler, Martin, Martin, Rothgeb & Singer, n.d).

As such, to obtain further validation and understand whether the questionnaire was the most appropriate one and whether it gathered the intended information well, a cognitive interview was conducted with four representatives of each group, which means sixteen representatives of the total sample group between the month of February 2022. As such, four physicians, four nurses, four medical students and four nursing students were interviewed.

These interviews were conducted through video and telephone calls and the interviews did not enter the population questioned in the final questionnaire. The interviewees' advice and opinions have been applied to the fine model of the questionnaire so that it is as correct as possible.

The Data was collected through an online questionnaire that was conducted through Google Forms and was targeted to all healthcare professionals with contact or experience with the MTS, third, fourth, fifth- and sixth-year medical students and third- and fourth-year nursing students. This population was chosen because an improvement of a triage system, such will affect healthcare professionals who are currently performing their functions, as well as future healthcare professionals.

The questionnaire was released online through a link and collected data between the 25$^{th\ of}$ March until the 25th of the following month of 2022. During this period, it gathered 469 responses, out of which 31 were removed as they did not belong to the target audience of this study. As previously mentioned, the respondents were physicians, nurses, medical students, and nursing students, and the latter two were only considered to be first-year students.

It is important to note that the questionnaire sample has its limitations since it is a survey and that the surveyed population does not represent the entire population under study since the respondents were not individually selected to represent the reality of Portuguese physicians, nurses, medical students, and nursing students.

An example of this limitation is the fact that the sample size of each group is not fully representative of the population since there is no real disproportionality between the groups surveyed and the distribution of the responses across the various districts is not uniform and is not representative of the distribution of the population within those districts-

3.6 Data Analysis Tools

The processing, treatment and analysis of the collected data will be carried out through the use of IBM Statistical Package for the Social Science (SPSS) software, version 28 of 2021.

This will allow, in the first phase, a descriptive analysis that will lead to a characterization of the sample collected and, in the second phase, an analysis of the consistency of the scale used, which will be evaluated through the use of Cronbach's Alpha. Finally, the hypotheses created in the previous chapter will be tested through simple and multiple linear regression.

The conceptual model presented in chapter 2 is similar to the Statistical Diagram of the Serial Multiple Mediator Model with two mediators of Hayes (2018). These two models have in common an external variable, Health Professional's Characteristics, which directly and indirectly influences BIU, through two mediators, PU and PEOU, where one influence the other, PEOU influence PU.

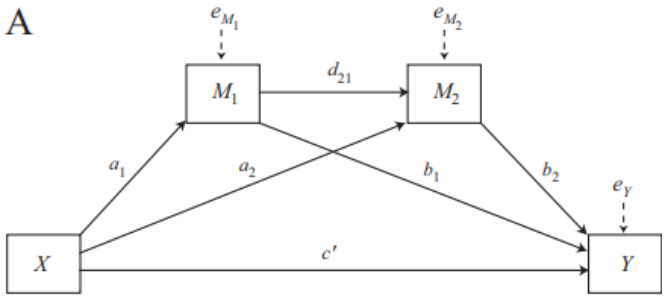


Figure 2:Statistical Diagram of the Serial Multiple Mediator Model with two mediators

(Source: Hayes, 2018, pp. 169)

In the two-mediator model presented above, X is modelled so that it affects Y by four paths, only one of these four being direct and the rest indirect. One of them goes from X to Y passing only at M1, a second one passes only at M2 and finally, a third one, which passes both at M1 and M2.

The difference between the conceptual model of this study and the moderation model presented above is that the model presented in this study has not only one independent variable X but seven, which are the various characteristics of health professionals and the existence of a covariate variable-PC.

Hayes (2018) created the Macro PROCESS v3.5 for SPSS, SAS, and R in order to be a useful modelling tool for logistic regression path analysis that allows the analysis of direct and indirect

effects in models with single or multiple mediators. As such, Macro PROCESS, for SPSS, will be used for testing hypotheses through linear regressions.

Seven different tests using the Macro PROCESS were conducted, one for each of the different seven antecedent independent variables X in order to analyse the impact of each on the dependent variables.

3.7 Conclusion

This chapter described the methodologies used throughout this study to test and validate the hypotheses and research questions addressed. Considering the previously stated hypotheses, a questionnaire was developed to be shared online, including the Health Professionals' Characteristics, PU, PEOU, PC and BIU.

The questionnaire went through a pre-test period to make its content the most adequate for better data collection, this was done through interviews with representatives of each group of the population under study, it should be noted that these were not counted for the final questionnaire. After being posted online, a total of 469 responses were collected being 440 valid.

The Table below, Table (6), represents a resume to provide a better understanding of the construction of the investigation, explaining how is made the analysis considering the specific objectives and the respective research.

Table 6: Constructs of the Investigation

Specific Objectives	**Research Questions**	**Analysis**
Q1) Evaluate the impact of the Health Professional's Characteristics in the application of a new technological system.	What is the healthcare professionals' willingness to use a technological system to support the Triage System in the ED as a complement to the MTS?	Descriptive Analysis + Linear Regression from PROCESS (H1, H2, H3)
Q2) Measure and assess the impact of the Perceived Compatibility of the application of a new technological system.		Descriptive Analysis + Linear Regression from PROCESS (H7)
Q3) Evaluate Perceived Usefulness, Perceived Ease of Use and Behavioral Intention from the perspective of the healthcare professionals.		Descriptive Analysis + Linear Regression from PROCESS (H4, H5, H6)
Q4) Measure and assess the impact of the Health Professional's Characteristics on the Perceived Usefulness, Perceived Ease of Use and Behavioral Intention to Use of the application of a new technological system.	How is the health professionals' Behavioral Intention to Use is impacted by their characteristics, Perceived Usefulness, Perceived Ease of Use and Perceived Compatibility?	Descriptive Analysis + Linear Regression from PROCESS (H1, H2, H3, H4)

4 Analysis of Results

This chapter aims to present the results obtained through the data collection instrument on the willingness of current and future physicians and nurses to use an eTriage system aimed at complementing the MTS in Portugal. These will be presented in the form of Tables and Figures, to better organize and systematize the data obtained and preceded by the respective analysis.

For a better synthesis of data and a clearer and more objective analysis of the same, a descriptive analysis of the sample will be carried out. Then, an analysis will be made for the consistency of the constructs and some tests will be performed to answer the research hypotheses. Finally, the results will be discussed.

4.1 Sample Characterization

To characterize the sample regarding the characteristics of health professionals, the following variables were used: *Professional Background*, *Gender*, *Age*, *Years of Experience*, *Years of Study*, *Location of the Institution of Study or Work*, *Regime of Educational or Work Institution, Received training about the use of eHealth?* In Table (B.1) in Annex B, both the absolute and relative frequencies for these variables are presented, allowing for a better characterization of the sample.

The first independent variable used is the *Professional Background* of the respondents. Nursing is the most represented group of the sample with 56.8%, which is in line with the objective since they are the ones who perform the triage process in ED in Portugal. Next, come the physicians with 20.7% and then the groups of students of both courses, nursing, and medicine, with similar percentages, 10% and 12.5%, respectively.

When analyzing the *Gender* variable, it is possible to verify an unbalanced distribution, with approximately 79% female and the remaining 21% of the sample being male.

According to *Age*, this variable was evaluated based on 6 age groups (between 18-24 years old, between 25-34 years old, between 35-44 years old, between 45-55 years old. Between 56-64 years old and more than 65 years old). In the last age group, more than 65 years old, the sample is shorter when compared to other groups. One of the main reasons for the lack of sampling in the last group is due to the fact that it is a very advanced age for health professionals to still be on active duty. When analyzing the division of the sample by age groups it is possible to conclude that around 56% is in the group between 25-34 years old and that the groups between 18-24 years old and the group between 35-44 years old are of similar size, both representing around 20% of the sample.

The variable *Years of Experience* refer only to the population under analysis in professional activity (nurses and physicians). Of the population surveyed 80.6% have less than 15 years of

experience, 15.2% between 15 and 25 years and only 4.1% have more than 25 years of experience in the area.

The questionnaire asked which district the respondent's institution of work or study was located in. However, the answers obtained in the questionnaire were not sufficiently distributed, and there were cases of districts with fewer than 10 answers. As such, the answers concerning the location will be distributed not by districts but by NUTS II – North, Centre, Metropolitan Area of Lisbon, Alentejo, Algarve, Autonomous Region of Madeira, and Autonomous Region of Azores.

The variable *Location of the Institution of Study or Work* registered that 30% of the health professionals and students who answered the questionnaire work or study in the North region, 10.2% in the Centre region, 48.6% in the Metropolitan Area of Lisbon which is the most represented, the region of Alentejo and Algarve registering 4.1% and 5.5%, respectively, the Autonomous Region of the Azores and the Autonomous Region of Madeira registering 0.7%.

As for the *Regime of the Educational or Work Institution*, all the medical student's study in a public institution since, at the date of the questionnaire, the only private medical college only has students in the first year, which was not evaluated in this questionnaire; as for the nursing students, 66.7% study in a public institution, and the remaining 33.3% study in a private institution. As for the health professionals, 74.49% work in a public health institution, 20.23% in a private one and the remaining 5.28% in a public-private institution (PPP).

The last variable refers to formation/training on the use of eHealth- *Ever received training about the use of eHealth?* To this question, of the 440 respondents, only 7.3% said they had received training, while the vast majority, 92.7% had not received any training.

4.2 Reliability of the Scales

"*The internal-consistency reliability reflects the stability of individual measurement items across replications from the same information source."* (Zhao, Fang & Jin, 2018). As this study is dependent on the treatment and analysis of the dimensions presented in the conceptual model, PU, PEOU, BIU, and PC, it is crucial to analyze the validity of the scales used in their constructions within the sample in use.

According to Marôco and Garcia (2006), "*any reference to issues of reliability of a measure raises reference to the Cronbach's alpha index"* so when the objective is to measure the internal consistency between constructs and its's reliability is computed Cronbach's α (αlpha).

This evaluates internal consistency using a scale ranging from 0 to 1, whereby the higher the value, the greater the consistency. According to Marôco and Garcia (2006), a scale with an alpha value equal to or higher than 0.7 is considered reliable.

Table 7:Cronbach's Alphas for the instrument dimensions

DIMENSIONS	CRONBACH'S ALPHA
PERCEIVED USEFULNESS- 5 ITEMS	0.936
PERCEIVED EASE OF USE – 5 ITEMS	0.900
BEHAVIORAL INTENTION – 2 ITEMS	0.816
PERCEIVED COMPATIBILITY- 3 ITEMS	0.855
GLOBAL INSTRUMENT	**0.924**

The Table above, Table (7), shows the Cronbach's alpha of all dimensions presented in the questionnaire, and it is possible to observe that all of them have an alpha greater than 0.7, proving the reliability and consistency of the constructs to evaluate this concrete reality.

In Annex C, the contribution of each item to the reliability of each dimension is presented. According to Table (C.1), in general, all the items would diminish the reliability of the scale if they were removed, the same not occur with PC2, without this item, the alpha of Perceived Compatibility would be 0.880. In the same Table, it can be seen that no item could be removed from Behavioral Intention to Use since this dimension only contains 2 items.

4.3 Descriptive Characterization of the dimensions present on the questionnaire

In Table D1, which can be found in the appendices, the mean and standard deviation (SD) as well as the relative frequencies distributed by the 5-point Likert scale were calculated to assess the Perceived Usefulness, Perceived Ease of Use, Behavioral Intention, and Perceived Compatibility of the participants of the questionnaire.

Perceived Usefulness (PU) has a mean of 1.243, with a minimum of 1.20, a maximum of 1.34 and a standard deviation (SD) of 0.769. The item with the lowest score was PU1 (*The use of a computerized triage system would improve my performance in the triage process*) with 1.20 (SD=0.850) and, on the other hand, the item with the highest score was PU3 (*The use of a computerized triage system would facilitate the triage process for me*) with 1.34 (SD=806).

Perceived Ease of Use (PEOU) has a mean of 1.055, with a minimum of 0.89, a maximum of 1.30 and a standard deviation (SD) of 0.738. The item with the lowest value was PEOU5 (*I find the interaction with a computerized triage system clear and understandable*) with 0.89 (SD=0.919) and,

on the other hand, the item with the highest value was PEOU3 (*The use of a computerized triage system would facilitate the triage process for me*.) with 1.30(SD=0.814).

Behavioral Intention to Use presents a mean of 1.131. The items pertaining to this dimension are chromed between 1.09 and 1.17 and recorded a standard deviation (SD) of 0.911. The item with the lowest value is B2 *(I predict that I will use a computerized triage system*) with 1.09 (SD=1.028) and, on the other hand, the item with the highest value is B1 (*I intend to use a computerized triage system*) with 1.17 (SD=0.952).

Regarding *Perceived Compatibility*, this dimension presents a mean of 0.878. The items pertaining to this dimension are comprised of between 0.75 and 1.07 and registered a standard deviation (SD) of 0.829. The item that registered the lowest value is PC1 (*Using an eHealth system is compatible with most aspects of my work*) with 0.75 (SD=0.917) and on the other hand, the item that registered the highest value is PC3 (*Using an eHealth system is compatible with the normal operation of hospital triage*) with 1.07 (SD=0.934) The Table below, Table (8) shows the mean and standard deviation (SD) of the various dimensions used in the questionnaire.

Table 8:Mean and Standard Deviation of PU, PEOU, BIU and PC dimensions

DIMENSIONS	MEAN	STANDARD DEVIATION (SD)
PERCEIVE USEFULNESS	1.243	0.769
PERCEIVE EASE OF USE	1.055	0.738
BEHAVIORAL INTENTION TO USE	1.131	0.911
PERCEIVED COMPATIBILITY	0.878	0.829

In general, considering that the scale used has a minimum value of -2 (“Strongly disagree”), and a maximum of 2 (“Strongly agree”), positive feedback was registered, above 0 (“No opinion/ Do not agree or disagree”), and the dimension that registered a higher average, and as such a higher approval by the respondents, was Perceived Usefulness (1.243) (SD=0.769).

4.4 Research Hypotheses Testing

The research hypotheses previously presented in chapter 2 were tested in this chapter, and for this, it was used multiple linear regression, in several dimensions. Linear regression was intended to test the various hypotheses, after validating the assumptions underlying the linear regression.

The PEOU is a dependent variable of the variables that are part of the Health Professional's Characteristics- *Professional Background*, *Gender*, *Age*, *Years of Experience*, *Location of Institution of Study or Work*, *Regime of the Institution* and *Formation about the use of eHealth*- as such, multiple

linear regression was performed for this one since it has more than two independent variables. The same occurred with PU, as it is dependent on Health Professional's Characteristics and PEOU, and with BIU, as it is also dependent on Health Professional's Characteristics, PU, PEOU, and PC.

According to Marôco (2007) and Hayes (2018), several assumptions have to be checked in order to perform a linear regression and validate its results.

The first assumption is that of *Normality*, the residuals from a regression must follow a normal distribution. The second hypothesis is the hypothesis of *Homoscedasticity*, which states that the residuals of regression are distributed. The third assumption is Linearity, there must be a linear relationship between the variables under analysis. This assumption is generally valid when the two previous assumptions are as indicated by (Tabachnick & Fidell, 2007).

All the assumptions can be proved in Figures F1 to F3 and proved by the Person's r test present in Table F3, all in the Annexes. The first is proven since the residuals, when plotted, are randomly distributed around the 0 value of the regression standardized residuals. The second is proven because the lack of pattern in the Figures proves that the residuals are distributed, (Marôco,2007).

The fourth and last assumption is the lack of *Multicollinearity* among the predictor variables. This assumption can be verified by the values of tolerance and Variance Influence Factors (VIF). The tolerance values must be greater than 0.2 and the VIF value, if it is equal to 1 means that there is no correlation, if it is between 1 and 5 it means that it is moderately correlated and when the VIF is greater than 5 it is highly correlated (Dupuis & Victoria-Feser, 2013). It is possible to verify this assumption in Tables F1, F2 F3 since the tolerance values are always greater than 0.2 and all VIFs are greater than 1.

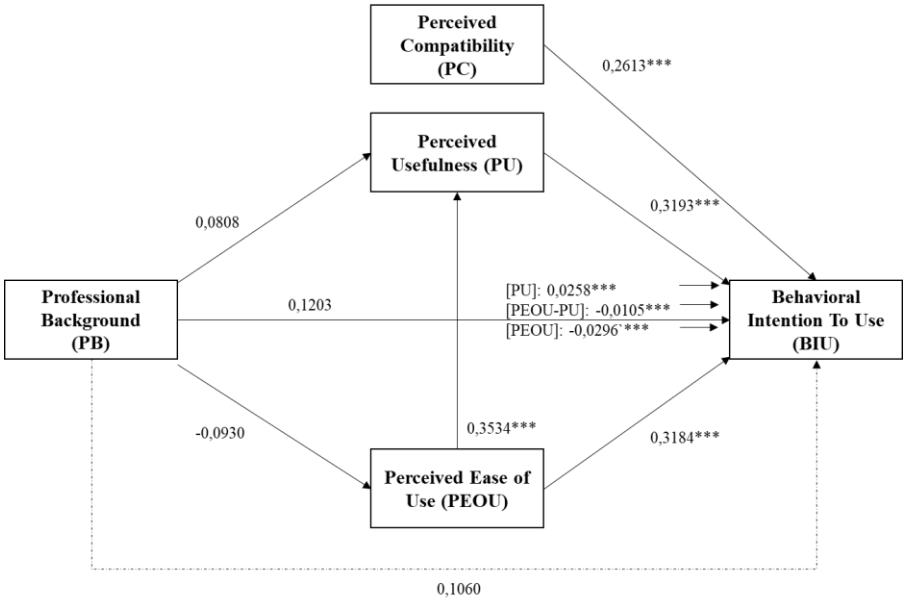
In the following chapters, the results of the linear regression model can be seen in the Tables and Figures, considering each characteristic of the health professionals. The direct outputs of the Hayes (2018) Macro PROCESS can be seen in Annex G.

It is not necessary to carry out several tests to understand that PC influences BIU since no variable or dimension influences this connection between these two dimensions, as such it is possible to state that H7 is validated

4.4.1 Professional Background

Table 9:Regression Coefficients (Coeff.), Standard Errors (SE) and Model Summary Information with Professional Background as antecedent independent variable X

ANTECEDENT	M1 (PEOU)			M2 (PU)			Y(BIU)		
	Coeff.	***SE***	***p***	**Coeff.**	***SE***	***p***	**Coeff.**	***SE***	***p***
X (PB)	-0.0930	0.365	0.0111	0.0808	0.0360	0.0252	0.1203	0.0404	0.0031
M1(PEOU)	-	-	-	0.3534	0.0468	< .001	0.3184	0.0556	< .001
M2(PU)	-	-	-	-	-	-	0.3193	0.0535	< .001
CV(PC)	-	-	-	-	-	-	0.2613	0.0493	< .001
CONSTANT	0.8719	0.0867	< .001	0.4397	0.942	< .001	-0.0862	0.1079	0.4244



Key: The dashed line represents the *total effect* of PB on BIU. [PEOU]- regression coefficient for the *indirect effect* via Perceived Ease of Use. [PU]- regression coefficient for the *indirect effect* via Perceived Usefulness. [PEOU-PU]- regression coefficient for the *indirect effect* via Perceived Ease of Use and Perceived Usefulness. The current data represents the nonstandardized coefficients B.***p<.001

Figure3:Effect of Professional Background on Behavioral Intention to Use mediated by Perceived Ease of Use and Perceived Usefulness and covariate by Perceived Compatibility

Taking into account the results provided by the direct output of the Macro PROCESS by Hayes (2018) it's possible to analyze that the Professional Background has a direct and moderate positive influence on PU (B=0.0808, SE=0.0360, p=0.0252), H1 is validated, a moderate direct and negative influence on PEOU (B=-0.0930, SE=0.365, p=0.0111), given the Lower Level of Confidence Interval (-0.1647) and the Upper Level of Confidence Interval (-0.0213) that don't contain 0, it can be affirmed that the direct influence is different from 0 as so, H2 is validated.

PEOU has a positive influence on PU (B=0.3534, SE=0.0468, p < 0.001), therefore H4 is validated. PEOU has a positive influence on BIU (B=0.3184, SE=0.0556, p<0.001), therefore H5 is validated.

PU has a positive influence on BIU (B=0.3193, SE=0.0535, p<0.001), and as so, H6 is validated.

Professional Background influences directly and indirectly BIU. There is a positive and direct effect on BIU (B=0.1203, SE=0.0404, p=0.0031). As for indirect influence, this occurs three times, being mediated by PEOU with a bootstrap confidence interval that does not include 0 (B=-0.0296, 95% Boot IC=-0.0589, -0.0068); PU with a bootstrap confidence interval that does not include 0 (B=0.0258, 95% Boot IC=0.0046, 0.0539); and PU via PEOU with a bootstrap confidence interval that does not include 0 (B=-0.0105, 95% Boot IC=-0.0214, -0.0026). Considering the analysis performed of the influence of Professional Background on BIU, the total effect of this is represented by B=0.1060, as such H3, H3.1 and H3.2 are validated.

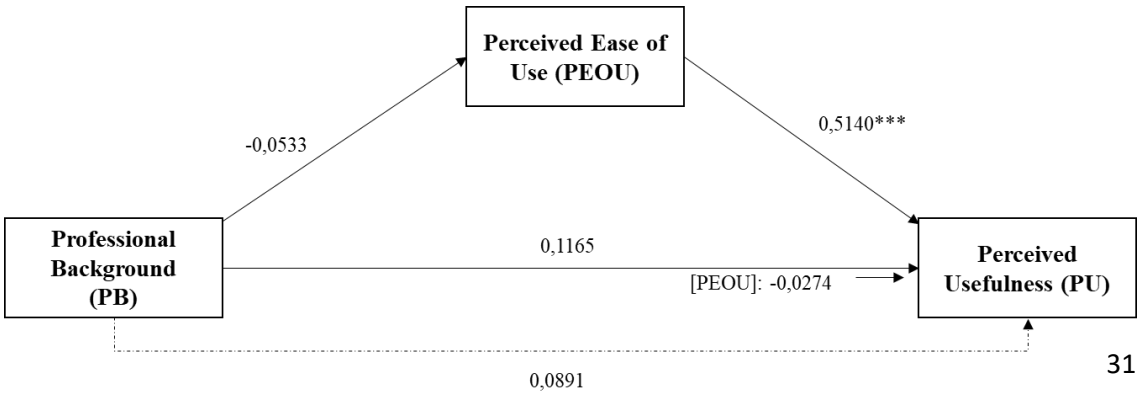
The direct effect has more weigh (B=0.1203) than the sum of indirect effects regarding the influence of Professional Background on BIU, mediated by both PEOU and PU (B=-0.0143).

The model created by Hayes (2018) previously conducted does not allow testing whether the indirect effect of Professional Background has a positive influence on PU, mediated by PEOU. As such, it is necessary to re-use the PROCESS Macro with Professional Background as a predecessor, PU as the outcome variable with PEOU as a mediator to test H2.1.

Table (10) and Figure (4) show the results obtained for this linear regression model. The direct output of the Macro PROCESS (Hayes, 2018) for this model can be found in Annex H.

Table 10:Regression Coefficients (Coeff.), Standard Errors (SE) and Model Summary Information with Professional Background as antecedent independent variable X

ANTECEDENT	**M1 (PEOU)**			**M2 (PU)**		
	Coeff.	***SE***	***p***	**Coeff.**	***SE***	***p***
X (PB)	-0.0533	0.415	0.1995	0.1165	0.0376	0.0021
M1(PEOU)	-	-	-	0.5140	0.0432	< .001
CONSTANT	1.1675	0.0946	< .001	0.4543	0.0994	< .001



Key: The dashed line represents the *total effect*. [PEOU]- regression coefficient for the *indirect effect* via Perceived Ease of Use. The current data represents the nonstandardized coefficients B. ***p<0.001

Figure 4:Effect of Professional Background on Perceived Usefulness mediated by Perceived Ease of Use

Professional Background has a negative indirect effect on PU, mediated by PEOU, with a bootstrap confidence interval that includes 0 (B=-0.0274, 95% Boot IC= -0.0706, ,0132). Therefore, H2.1 cannot be validated.

The Table (11), presented below, compiles the results for the validation of hypotheses:

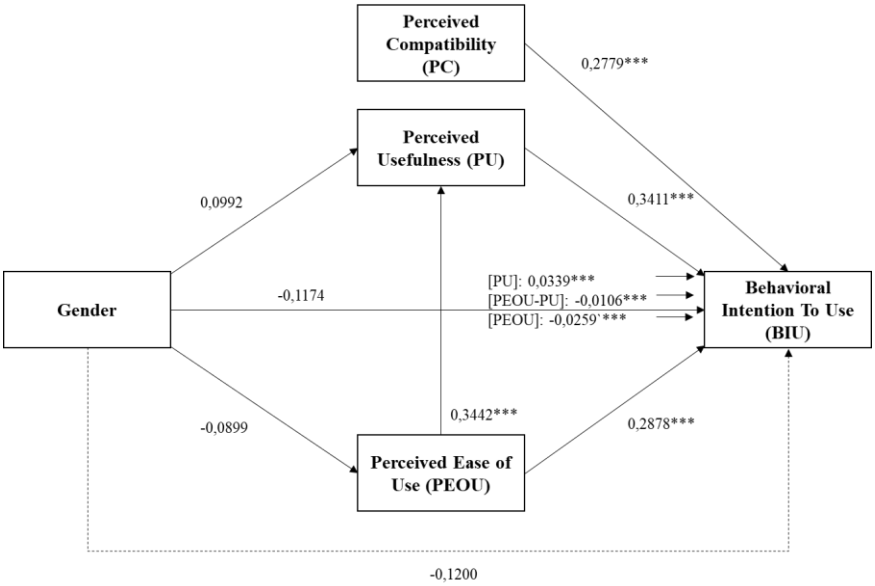
Table 11:Research Hypotheses Validation Results - Professional Background

H_1: Professional Background has direct influence on PU	Validated
H_2: Professional Background characteristics has a direct influence on PEOU	Validated
$H_{2.1}$: Professional Background characteristics has influence on PU, mediated by PEOU	Not validated
H_3: Professional Background characteristics has direct influence on BIU	Validated
$H_{3.1}$: Professional Background characteristics has influence on BIU, mediated by PU	Validated
$H_{3.2}$: Professional Background characteristics has influence on BIU, mediated by PEOU	Validated
H_4: PEOU has direct influence on PU	Validated
H_5: PEOU has direct influence on BIU	Validated
H6: PU has direct influence on BIU	Validated
H_7: PC has direct influence on BIU	Validated

4.4.2 Gender

Table 12:Regression Coefficients (Coeff.), Standard Errors (SE) and Model Summary Information with Gender as antecedent independent variable X

ANTECEDENT	**M1 (PEOU)**			**M2 (PU)**			**Y(BIU)**		
	Coeff.	***SE***	***p***	**Coeff.**	***SE***	***p***	**Coeff.**	***SE***	***p***
X (GENDER)	-0.0899	0.0759	0.2370	0.0992	0.0743	0.1821	-0.1174	0.0835	0.1603
M1(PEOU)	-	-	-	0.3442	0.0467	< .001	0.2878	0.0556	< .001
M2(PU)	-	-	-	-	-	-	0.3411	0.0537	< .001
CV(PC)	-	-	-	-	-	-	0.2779	0.0495	< .001
CONSTANT	0.8421	0.1419	< .001	0.4344	0.1441	0.0027	0.3690	0.1634	0.0244



Key: The dashed line represents the *total effect* of Gender on BIU. [PEOU]- regression coefficient for the *indirect effect* via Perceived Ease of Use. [PU]- regression coefficient for the *indirect effect* via PU. [PEOU-PU]- regression coefficient for the *indirect effect* via Perceived Ease of Use and PU. The current data represents the nonstandardized coefficients B. ***p<.001

Figure5: Effect of Gender on Behavioral Intention to Use mediated by Perceived Ease of Use and PU and covariate by Perceived Compatibility

Taking into account the results provided by the direct output of the Macro PROCESS by Hayes (2018) it's possible to analyze that Gender has a direct and moderate positive influence on PU (B=0.0992, SE=0.0759, p=0.2370), H1 is validated, a moderate direct and negative influence on PEOU (B=-0.0899, SE=0.0759, p=0.2370), given the Lower Level of Confidence Interval (-0.2390) and the Upper Level of Confidence Interval (0.0593) that contain 0, as so it cannot be affirmed that the direct influence is different from 0, as so, H2 is not validated.

PEOU has a positive influence on PU (B=0.3442, SE=0.0467, p<0.001), therefore H4 is validated. PEOU has a positive influence on BIU (B=0.3442, SE=0.0467, p<0.001), therefore H5 is validated.

Perceive Usefulness has a positive influence on BIU (B=0.3411, SE=0.0537, p<0.001), and as so, H6 is validated.

Gender influences, directly and indirectly, BIU. There is a negative and direct effect on BIU (B=-0.1174, SE=0.0835, p=0.1603). As for indirect influence, this occurs three times, being mediated by PEOU with a bootstrap confidence interval that includes 0 (B=-0.0296, 95% Boot IC=-0.0781, 0.0202); PU with a bootstrap confidence interval that includes 0 (B=0.0339, 95% Boot IC=-0.0181, 0.0901); and PU via PEOU with a bootstrap confidence interval that includes 0 (B=-0.0106, 95% Boot IC=-0.0309, 0.0084). Considering the analysis performed of the influence of Professional Background on BIU, the total effect of this is represented by B=-0.1200, as such H3, H3.1 and H3.2 are not validated.

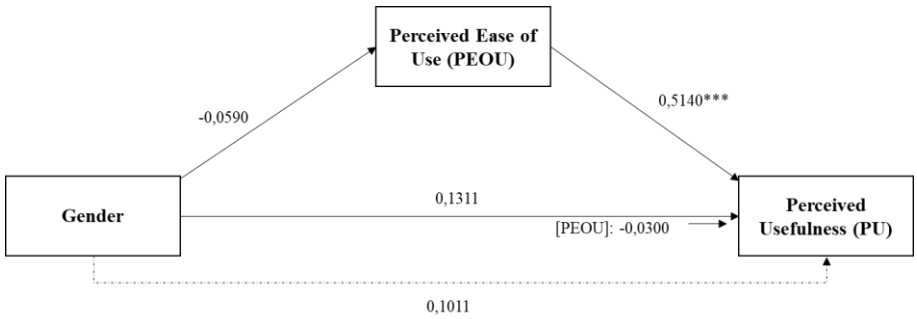
The direct effect has less weigh (B=-0.1174) than the sum of indirect effects regarding the influence of Gender on BIU, mediated by both PEOU and PU (B=-0.0026).

The model created by Hayes (2018) previously conducted does not allow testing whether the indirect effect of Gender has a positive influence on PU, mediated by PEOU. As such, it is necessary to re-use the PROCESS Macro with Gender as the predecessor, PU as the outcome variable with PEOU as a mediator to test H2.1.

Table (13) and Figure (6) show the results obtained for this linear regression model. The direct output of the Macro PROCESS (Hayes, 2018) for this model can be found in Annex H.

Table 13: Regression Coefficients (Coeff.), Standard Errors (SE) and Model Summary Information with Gender as antecedent independent variable X

ANTECEDENT	**M1 (PEOU)**			**M2 (PU)**		
	Coeff.	***SE***	***p***	**Coeff.**	***SE***	***p***
X (GENDER**)**	-0.0590	0.0862	0.4941	0.1311	0.0785	0.0956
M1(PEOU)	-	-	-	0.5140	0.0432	< .001
CONSTANT	1.1601	0.1582	< .001	0.4728	0.1525	0.0021



Key: The dashed line represents the *total effect*. [PEOU]- regression coefficient for the *indirect effect* via Perceived Ease of Use. The current data represents the nonstandardized coefficients B. ***p<0.001

Figure 6: Effect of Gender on Perceived Usefulness mediated by Perceived Ease of Use

Gender has a negative indirect effect on PU, mediated by PEOU, with a bootstrap confidence interval that includes 0 (B=-0.0300, 95% Boot IC= -0.1232, 0.0673). Therefore, H2.1 cannot be validated.

The Table (14), presented below, compiles the results for the validation of hypotheses:

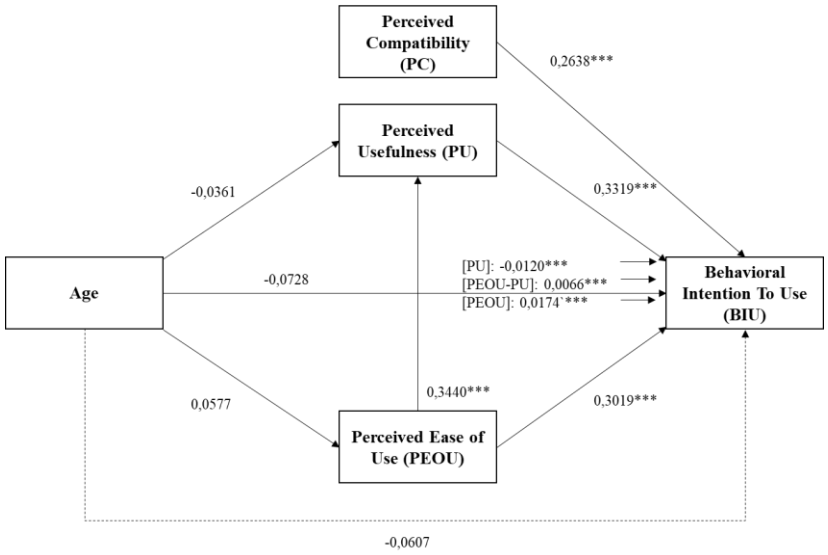
Table 14: Effect of Gender on Perceived Usefulness mediated by Perceived Ease of Use- Gender

H_1: Gender has direct positive influence on PU	Validated
H_2: Gender characteristics has direct influence on PEOU	Not Validated
$H_{2.1}$: Gender characteristics has influence on PU, mediated by PEOU	Not validated
H_3: Gender characteristics has direct influence on BIU	Not validated
$H_{3.1}$: Gender characteristics has influence on BIU, mediated by PU	Not validated
$H_{3.2}$: Gender characteristics has influence on BIU, mediated by PEOU	Not validated
H_4: PEOU has direct influence on PU	Validated
H_5: PEOU has direct influence on BIU	Validated
H6: PU has direct influence on BIU	Validated
H_7: Perceived Compatibility has direct influence on BIU	Validated

4.4.3 Age

Table 15:Regression Coefficients (Coeff.), Standard Errors (SE) and Model Summary Information with Age as antecedent independent variable X

ANTECEDENT	**M1 (PEOU)**			**M2 (PU)**			**Y(BIU)**		
	Coeff.	***SE***	***p***	**Coeff.**	***SE***	***p***	**Coeff.**	***SE***	***p***
X (AGE)	0.0577	0.0376	0.1261	-0.0361	0.0370	0.3295	-0.0728	0.0414	0.0796
M1(PEOU)	-	-	-	0.3440	0.0468	< .001	0.3019	0.0556	< .001
M2(PU)	-	-	-	-	-	-	0.3319	0.0536	< .001
CV(PC)	-	-	-	-	-	-	0.2638	0.0498	< .001
CONSTANT	0.5535	0.0956	< .001	0.6914	0.0972	< .001	0.3220	0.1149	0.0053



Key: The dashed line represents the *total effect* of Age on BIU. [PEOU]- regression coefficient for the *indirect effect* via Perceived Ease of Use. [PU]- regression coefficient for the *indirect effect* via PU. [PEOU-PU]- regression coefficient for the

indirect effect via Perceived Ease of Use and PU. The current data represents the nonstandardized coefficients B. ***p<.001

Figure 7:Effect of Age on Behavioral Intention to Use mediated by Perceived Ease of Use and Perceived Usefulness and covariate by Perceived Compatibility

Taking into account the results provided by the direct output of the Macro PROCESS by Hayes (2018) it's possible to analyze that Age has a direct and negative influence on PU (B=-0.0361, SE=0.0370, p=0.3295), given the Lower Level of Confidence Interval (-0.1087) and the Upper Level of Confidence Interval (0.0366) that contain 0, as H1 is not validated, a moderate direct and positive influence on PEOU (B=0.0577, SE=0.376, p=0.1261), but given the Lower Level of Confidence Interval (-0.163) and the Upper Level of Confidence Interval (0.1317) that can contain 0, it cannot be affirmed that the direct influence is different from 0, as so, H2 is not validated.

PEOU has a positive influence on PU (B=0.3440, SE=0.0468, p < 0.001), therefore H4 is validated. PEOU has a positive influence on BIU (B=0.3019, SE=0.0556, p<0.001), therefore H5 is validated.

Perceive Usefulness has a positive influence on BIU (B=0.3319, SE=0.0536, p<0.001), and as so, H6 is validated.

Age influences directly and indirectly BIU. There is a positive and direct effect on BIU (B=-0.728, SE=0.0414, p=0.0796) given the Lower Level of Confidence Interval (-0.1541) and the Upper Level of Confidence Interval (0.0086) that contains 0. As for indirect influence, this occurs three times, being mediated by PEOU with a bootstrap confidence interval that includes 0 (B=0.0174, 95% Boot IC=-0.0073, 0.0476); PU with a bootstrap confidence interval that includes 0 (B=-0.0120, 95% Boot IC=-0.0373, 0.0121); and PU via PEOU with a bootstrap confidence interval that includes 0 (B=0.066, 95% Boot IC=-0.0026, 0.0180). Considering the analysis performed of the influence of Professional Background on BIU, the total effect of this is represented by B=-0.0607, as such H3, H3.1 and H3.2 are not validated.

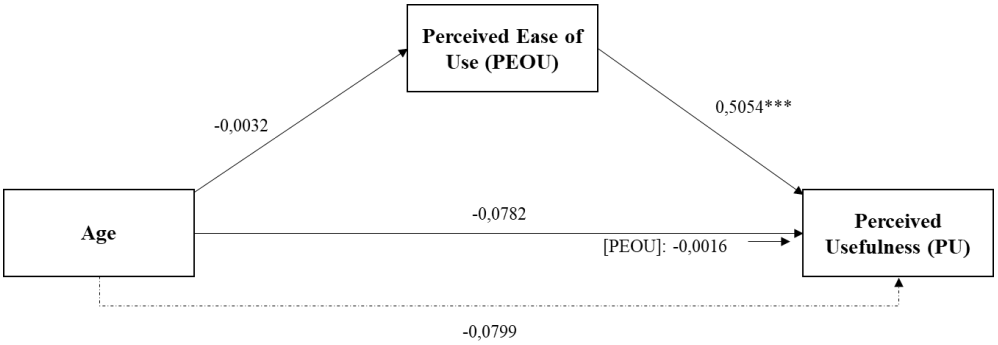
The direct effect has less weigh (B=-0.0728) than the sum of indirect effects regarding the influence of Age on BIU, mediated by both PEOU and PU (B=0.0120).

The model created by Hayes (2018) previously conducted does not allow testing whether the indirect effect of Age has a positive influence on PU, mediated by PEOU. As such, it is necessary to re-use the PROCESS Macro with Age as a predecessor, PU as the outcome variable with PEOU as a mediator to test H2.1.

Table (16) and Figure (8) show the results obtained for this linear regression model. The direct output of the Macro PROCESS (Hayes, 2018) for this model can be found in Annex H.

Table 16: Regression Coefficients (Coeff.), Standard Errors (SE) and Model Summary Information with Age as antecedent independent variable X

ANTECEDENT	M1 (PEOU)			M2 (PU)		
	Coeff.	***SE***	***p***	**Coeff.**	***SE***	***p***
X (AGE**)**	-0.0533	0.415	0.1995	0.1165	0.0376	0.0021
M1(PEOU)	-	-	-	0.5140	0.0432	< .001
CONSTANT	1.1675	0.0946	< .001	0.4543	0.0994	< .001



Key: The dashed line represents the *total effect*. [PEOU]- regression coefficient for the *indirect effect* via Perceived Ease of Use. The current data represents the nonstandardized coefficients B. ***p<0.001

Figure 8: Effect of Age on Perceived Usefulness mediated by Perceived Ease of Use

Age has a negative indirect effect on PU, mediated by PEOU, with a bootstrap confidence interval that includes 0 (B=-0.0016, 95% Boot IC= -0.0545, 0.0487). Therefore, H2.1 cannot be validated.

The Table (17), presented below, compiles the results for the validation of hypotheses:

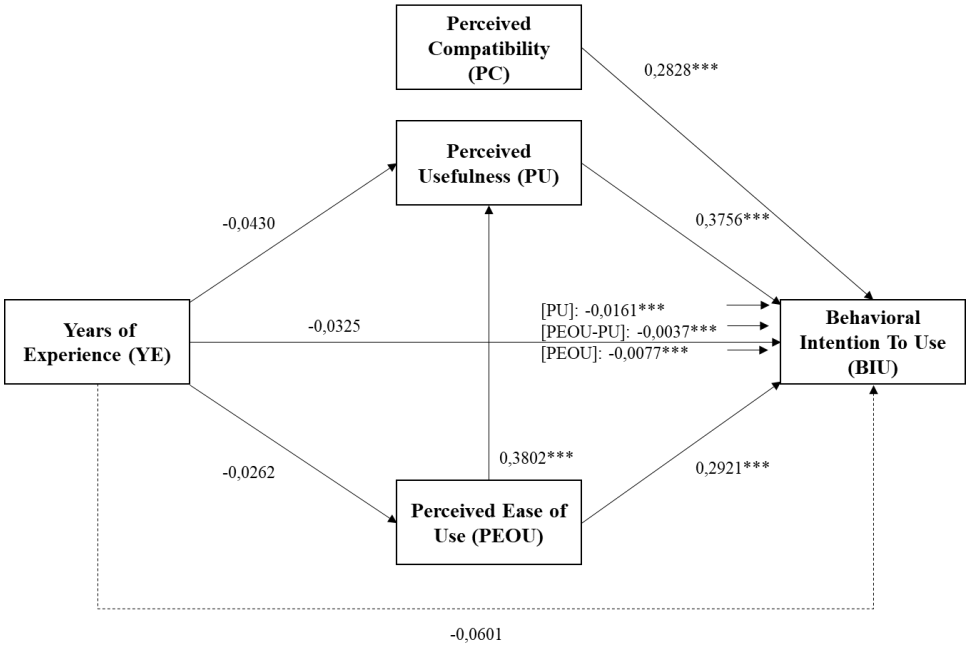
Table 17: Research Hypotheses Validation Results- Age

H_1: Age has direct influence on PU	Not Validated
H_2: Age characteristics has direct influence on PEOU	Not Validated
$H_{2.1}$: Age characteristics has influence on PU, mediated by PEOU	Not validated
H_3: Age characteristics has direct influence on BIU	Not validated
$H_{3.1}$: Age characteristics has influence on BIU, mediated by PU	Not validated
$H_{3.2}$: Age characteristics has influence on BIU, mediated by PEOU	Not validated
H_4: PEOU has direct influence on PU	Validated
H_5: PEOU has direct influence on BIU	Validated
H6: PU has direct influence on BIU	Validated
H_7: PC has direct influence on BIU	Validated

4.4.4 Years of Experience

Table 18:Regression Coefficients (Coeff.), Standard Errors (SE) and Model Summary Information with Years of Experience as antecedent independent variable X

ANTECEDENT	M1 (PEOU)			M2 (PU)			Y(BIU)		
	Coeff.	***SE***	***p***	**Coeff.**	***SE***	***p***	**Coeff.**	***SE***	***p***
X (YE)	-0.0262	0.0693	0.7049	-0.0430	0.0690	0.5337	-0.0325	0.0787	0.6796
M1(PEOU)	-	-	-	0.3802	0.0541	< .001	0.2921	0.0661	< .001
M2(PU)	-	-	-	-	-	-	0.3756	0.0621	< .001
CV(PC)	-	-	-	-	-	-	0.2828	0.0577	< .001
CONSTANT	0.7684	0.1031	< .001	0.6181	0.1108	< .001	0.1161	0.1320	0.3798



Key: The dashed line represents the *total effect* of YE on BIU. [PEOU]- regression coefficient for the *indirect effect* via Perceived Ease of Use. [PU]- regression coefficient for the *indirect effect* via Perceived Usefulness. [PEOU-PU]- regression coefficient for the *indirect effect* via Perceived Ease of Use and Perceived Usefulness. The current data represents the nonstandardized coefficients B. ***p<.001

Figure 9:Effect of Years of Experience on Behavioral Intention to Use mediated by Perceived Ease of Use and Perceived Usefulness and covariate by Perceived Compatibility

Taking into account the results provided by the direct output of the Macro PROCESS by Hayes (2018) it's possible to analyze that the Years of Experience has a direct and negative influence on PU (B=-0.0430, SE=0.0690, p=0.5337), given the Lower Level of Confidence Interval (-0.1786) and the Upper Level of Confidence Interval (-0.0927) that contain 0, as so H1 is not validated, a moderate direct and negative influence on PEOU (B=-0.0262, SE=0.0693, p=0.7049), given the Lower Level of Confidence

Interval (-0.1625) and the Upper Level of Confidence Interval (0.1100) that contain 0 as so, H2 is not validated.

PEOU has a positive influence on PU (B=0.3802, SE=0.0541, p < 0.001), therefore H4 is validated. PEOU has a positive influence on BIU (B=0.2921, SE=0.0661, p<0.001), therefore H5 is validated.

Perceive Usefulness has a positive influence on BIU (B=0.3756, SE=0.0661, p<0.001), and as so, H6 is validated.

Years of Experience influence, directly and indirectly, BIU. There is a negative effect on BIU (B=-0.0325, SE=0.0787, p=0.6796). As for indirect influence, this occurs three times, being mediated by PEOU with a bootstrap confidence interval that includes 0 (B=-0.0077, 95% Boot IC=-0.0604, 0.0382); PU with a bootstrap confidence interval that includes 0 (B=-0.0161, 95% Boot IC=-0.0682, 0.0380); and PU via PEOU with a bootstrap confidence interval that includes 0 (B=-0.0020, 95% Boot IC=-0.0144, 0.0099). Taking into account the analysis performed of the influence of Years of Experience on BIU, the total effect of this is represented by B=-0.0601, as such H3, H3.1 and H3.2 are not validated.

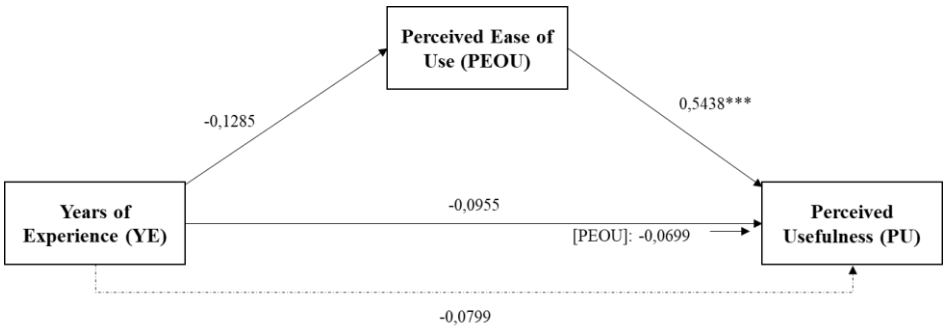
The direct effect has more weigh (B=-0.0325) than the sum of indirect effects regarding the influence of Years of Experience on BIU, mediated by both PEOU and PU (B=-0.0275).

The model created by Hayes (2018) previously conducted does not allow testing whether the indirect effect of Years of Experience has a positive influence on PU, mediated by PEOU. As such, it is necessary to re-use the PROCESS Macro with Years of Experience as a predecessor, PU as the outcome variable with PEOU as a mediator to test H2.1.

Table (19) and Figure (10) show the results obtained for this linear regression model. The direct output of the Macro PROCESS (Hayes, 2018) for this model can be found in Annex H

Table 19: Regression Coefficients (Coeff.), Standard Errors (SE) and Model Summary Information with Years of Experience as antecedent independent variable X

ANTECEDENT	**M1 (PEOU)**			**M2 (PU)**		
	Coeff.	***SE***	***p***	**Coeff.**	***SE***	***p***
X (YE**)**	-0.0533	0.415	0.1995	0.1165	0.0376	0.0021
M1(PEOU)	-	-	-	0.5140	0.0432	< .001
CONSTANT	1.1675	0.0946	< .001	0.4543	0.0994	< .001



Key: The dashed line represents the *total effect*. [PEOU]- regression coefficient for the *indirect effect* via Perceived Ease of Use. The current data represents the nonstandardized coefficients B. ***p<0.001

Figure 10: Effect of Years of Experience on Perceived Usefulness mediated by Perceived Ease of Use

Years of Experience has a negative indirect effect on PU, mediated by PEOU, with a bootstrap confidence interval that includes 0 (B=-0.0699, 95% Boot IC= -0.1766, 0.0297). Therefore, H2.1 cannot be validated.

The Table (20), presented below, compiles the results for the validation of hypotheses:

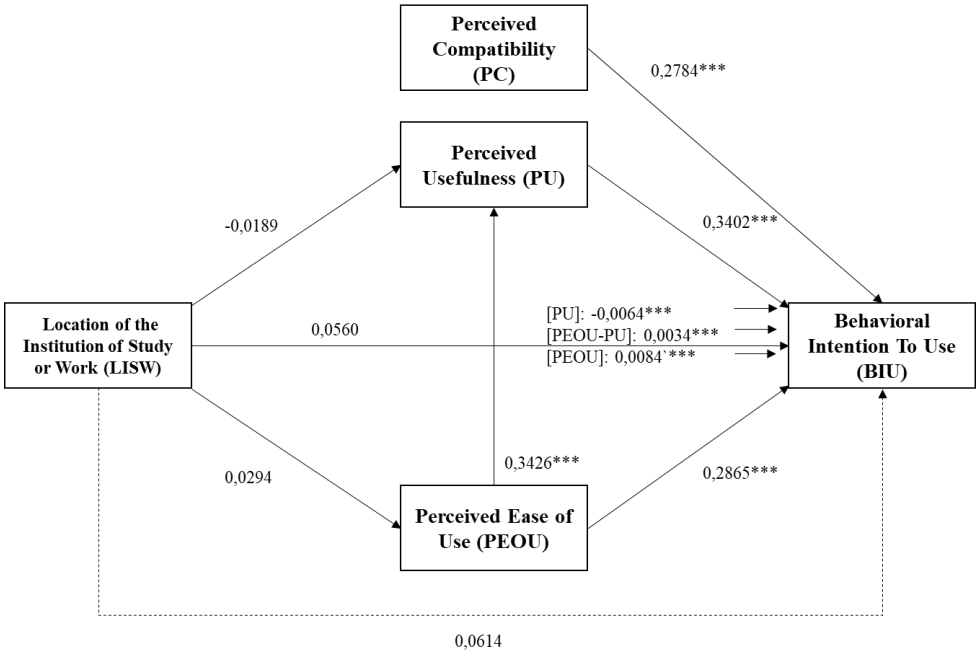
Table 20: Research Hypotheses Validation Results- Years of Experience

H_1: Years of Experience has direct influence on PU	Not Validated
H_2: Years of Experience characteristics has direct influence on PEOU	Not Validated
$H_{2.1}$: Years of Experience characteristics has influence on PU, mediated by PEOU	Not validated
H_3: Years of Experience characteristics has direct influence on BIU	Not validated
$H_{3.1}$: Years of Experience characteristics has influence on BIU, mediated by PU	Not validated
$H_{3.2}$: Years of Experience characteristics has influence on BIU, mediated by PEOU	Not validated
H_4: PEOU has direct influence on PU	Validated
H_5: PEOU has direct influence on BIU	Validated
H6: PU has direct influence on BIU	Validated
H_7: PC has direct influence on BIU	Validated

4.4.5 Location of the Institution of Study or Work

Table 21: Regression Coefficients (Coeff.), Standard Errors (SE) and Model Summary Information with Location of the Institution of Study or Work, as antecedent independent variable X

ANTECEDENT	M1 (PEOU)			M2 (PU)			Y(BIU)		
	Coeff.	***SE***	***p***	**Coeff.**	***SE***	***p***	**Coeff.**	***SE***	***p***
X (LISW)	0.0294	0.0254	0.2475	-0.0189	0.0249	0.4472	0.0560	0.0278	0.0446
M1(PEOU)	-	-	-	0.3426	0.0468	< .001	0.2865	0.0554	< .001
M2(PU)	-	-	-	-	-	-	0.3402	0.0535	< .001
CV(PC)	-	-	-	-	-	-	0.2784	0.0493	< .001
CONSTANT	0.6086	0.0783	< .001	0.6592	0.0818	< .001	0.0212	0.0979	0.8288



Key: The dashed line represents the *total effect* of LISW on BIU. [PEOU]- regression coefficient for the *indirect effect* via Perceived Ease of Use. [PU]- regression coefficient for the *indirect effect* via Perceived Usefulness. [PEOU-PU]- regression coefficient for the *indirect effect* via Perceived Ease of Use and Perceived Usefulness. The current data represents the nonstandardized coefficients B. ***p<.001

Figure 11: Effect of Location of the Institution of Study or Work on Behavioral Intention to Use mediated by Perceived Ease of Use and Perceived Usefulness and covariate by Perceived

4.4.6 Perceived Compatibility

Taking into account the results provided by the direct output of the Macro PROCESS by Hayes (2018) it's possible to analyze that the Location of the Institution of Study or Work has a negative influence on PU (B=-0.0189, SE=0.0249, p=0.4472), given the Lower Level of Confidence Interval (-0.0678) and the Upper Level of Confidence Interval (0.0299) that contain 0, not validating H1, a moderate direct

and positive influence on PEOU (B=0.0294, SE=0.254, p=0.02475), however, given the Lower Level of Confidence Interval (-0.0205) and the Upper Level of Confidence Interval (0.0792) can contain 0, as so, not validating H2.

PEOU has a positive influence on PU (B=0.3426, SE=0.0468, p < 0.001), therefore H4 is validated. PEOU has a positive influence on BIU (B=0.2865, SE=0.0554, p<0.001), therefore H5 is validated.

Perceive Usefulness has a positive influence on BIU (B=0.3402, SE=0.0535, p<0.001), and as so, H6 is validated.

Location of the Institution of Study and Work influences directly and indirectly BIU. There is a positive and direct effect on BIU (B=0.0560, SE=0.0278, p=0.0446). As for indirect influence, this occurs three times, being mediated by PEOU with a bootstrap confidence interval that includes 0 (B=0.0084, 95% Boot IC=-0.0053, 0.0253); PU with a bootstrap confidence interval that includes 0 (B=-0.0064, 95% Boot IC=-0.0240, 0.0109); and PU via PEOU with a bootstrap confidence interval that includes 0 (B=-0.0034, 95% Boot IC=-0.0022, 0.0097). Taking into account the analysis performed of the influence of Location of the Institution of Study and Work on BIU, the total effect of this is represented by B=0.0614, as such H3 are validated but, H3.1 and H3.2 cannot be validated.

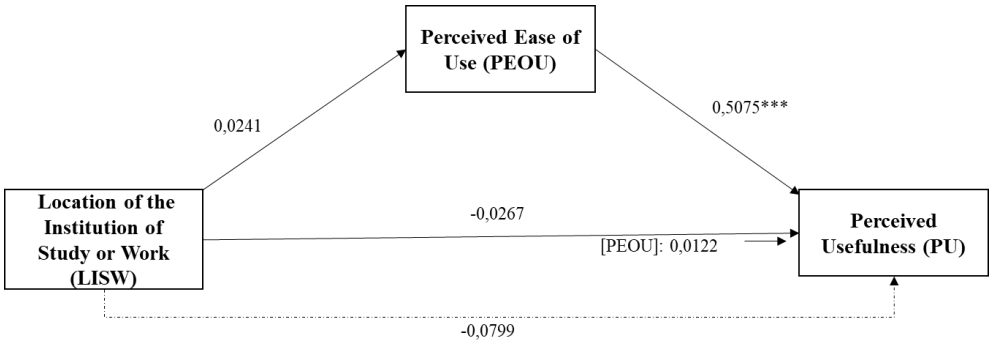
The direct effect has more weigh (B=0.0560) than the sum of indirect effects regarding the influence of the Location of the Institution of Study and Work on BIU, mediated by both PEOU and PU (B=0.0054).

The model created by Hayes (2018) previously conducted does not allow testing whether the indirect effect of the Location of the Institution of Study and Work has a positive influence on PU, mediated by PEOU. As such, it is necessary to re-use the PROCESS Macro with the Location of the Institution of Study and Work as a predecessor, PU as the outcome variable with PEOU as a mediator to test H2.1.

Table (22) and Figure (12) show the results obtained for this linear regression model. The direct output of the Macro PROCESS (Hayes, 2018) for this model can be found in Annex H.

Table 22: Regression Coefficients (Coeff.), Standard Errors (SE) and Model Summary Information with Location of the Institution of Study or Work as antecedent independent variable X

ANTECEDENT	**M1 (PEOU)**			**M2 (PU)**		
	Coeff.	***SE***	***p***	**Coeff.**	***SE***	***p***
X (LISW)	-0.0533	0.415	0.1995	0.1165	0.0376	0.0021
M1(PEOU)	-	-	-	0.5140	0.0432	< .001
CONSTANT	1.1675	0.0946	< .001	0.4543	0.0994	< .001



Key: The dashed line represents the *total effect*. [PEOU]- regression coefficient for the *indirect effect* via Perceived Ease of Use. The current data represents the nonstandardized coefficients B. ***p<0.001

Figure 12: Effect of Location of the Institution of Study and Work on Perceived Usefulness mediated by Perceived Ease of Use

Location of the Institution of Study and Work has a negative indirect effect on PU, mediated by PEOU, with a bootstrap confidence interval that includes 0 (B=0.0122, 95% Boot IC= -0.168, 0.0428). Therefore, H2.1 cannot be validated. The Table (23), presented below, compiles the results for the validation of hypotheses:

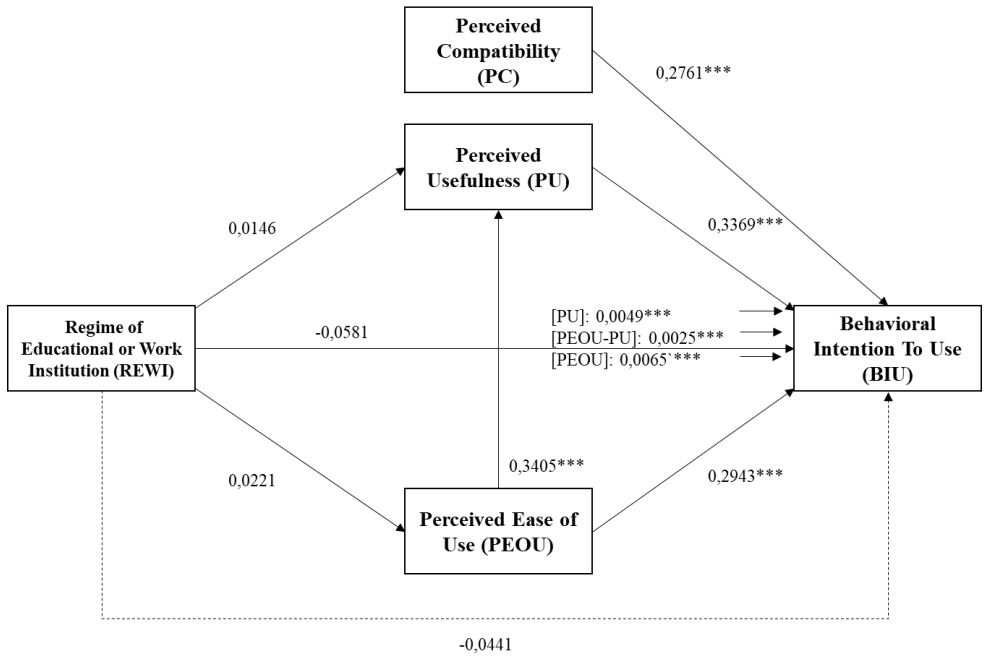
Table 23: Research Hypotheses Validation Results- Location of the Institution of Study and Work

H_1: Location of the Institution of Study and Work has direct influence on PU	Not Validated
H_2: Location of the Institution of Study and Work characteristics has direct influence on PEOU	Not Validated
$H_{2.1}$: Location of The Institution of Study and Work characteristics has influence on PU, mediated by PEOU	Not validated
H_3: Location of the Institution of Study and Work characteristics has direct influence on BIU	Validated
$H_{3.1}$: Location of the Institution of Study and Work characteristics has influence on BIU, mediated by PU	Not validated
$H_{3.2}$: Location of The Institution of Study and Work characteristics has influence on BIU, mediated by PEOU	Not validated
H_4: PEOU has direct influence on PU	Validated
H_5: PEOU has direct influence on BIU	Validated
H6: PU has direct influence on BIU	Validated
H_7: PC has direct influence on BIU	Validated

4.4.7 Regime of Educational or Work Institution

Table 24: Regression Coefficients (Coeff.), Standard Errors (SE) and Model Summary Information with Regime of Educational or Work Institution, as antecedent independent variable X

ANTECEDENT	M1 (PEOU)			M2 (PU)			Y(BIU)		
	Coeff.	***SE***	***p***	**Coeff.**	***SE***	***p***	**Coeff.**	***SE***	***p***
X (REWI)	0.0221	0.0587	0.7065	0.0146	0.0574	0.7996	-0.0581	0.0644	0.3674
M1(PEOU)	-	-	-	0.3405	0.0468	< .001	0.2943	0.0555	< .001
M2(PU)	-	-	-	-	-	-	0.3369	0.0537	< .001
CV(PC)	-	-	-	-	-	-	0.2761	0.0495	< .001
CONSTANT	0.6550	0.0864	< .001	0.5947	0.0899	< .001	0.2329	0.1057	0.0281



Key: The dashed line represents the *total effect* of REWI on BIU. [PEOU]- regression coefficient for the *indirect effect* via Perceived Ease of Use. [PU]- regression coefficient for the *indirect effect* via Perceived Usefulness. [PEOU-PU]- regression coefficient for the *indirect effect* via Perceived Ease of Use and Perceived Usefulness. The current data represents the nonstandardized coefficients B. ***p<.001

Figure 13: Effect of Regime of Educational or Educational Institution on Behavioral Intention to Use mediated by Perceived Ease of Use and Perceived Usefulness and covariate by Perceived Compatibility

Taking into account the results provided by the direct output of the Macro PROCESS by Hayes (2018) it's possible to analyze that the Regime of Educational or Work Institution has a direct and moderate positive influence on PU (B=0.0146, SE=0.0574, p=0.7996), given the Lower Level of Confidence Interval (-0.982) and the Upper Level of Confidence Interval (0.1274) that contain 0, not validating H1, a moderate direct and negative influence on PEOU (B=0.221, SE=0.0587, p=0.7065), given the

Lower Level of Confidence Interval (-0.0933) and the Upper Level of Confidence Interval (0.1375) that can contain 0, as so, not validating H2.

PEOU has a positive influence on PU (B=0.3405, SE=0.0468, p < 0.001), therefore H4 is validated. PEOU has a positive influence on BIU (B=0.2943, SE=0.0555, p<0.001), therefore H5 is validated.

Perceive Usefulness has a positive influence on BIU (B=0.3369, SE=0.0537, p<0.001), and as so, H6 is validated.

The Regime of Educational or Work Institutions influences directly and indirectly BIU. There is a negative effect of BIU (B=-0.0581, SE=0.0644, p=0.3674), with a bootstrap confidence interval that can include 0, given the Lower Level of Confidence Interval (-0.1846) and the Upper Level of Confidence Interval (0.0684). As for indirect influence, this occurs three times, being mediated by PEOU with a bootstrap confidence interval that can include 0 (B=0.0065, 95% Boot IC=-0.0229, 0.0432); PU with a bootstrap confidence interval that can include 0 (B=0.0049, 95% Boot IC=-0.0281, 0.0400); and PU via PEOU with a bootstrap confidence interval that can include 0 (B=-0.0025, 95% Boot IC=-0.0094, 0.0162). Considering the analysis performed of the influence of Professional Background on BIU, the total effect of this is represented by B=-0.0414, as such H3, H3.1 and H3.2 are not validated.

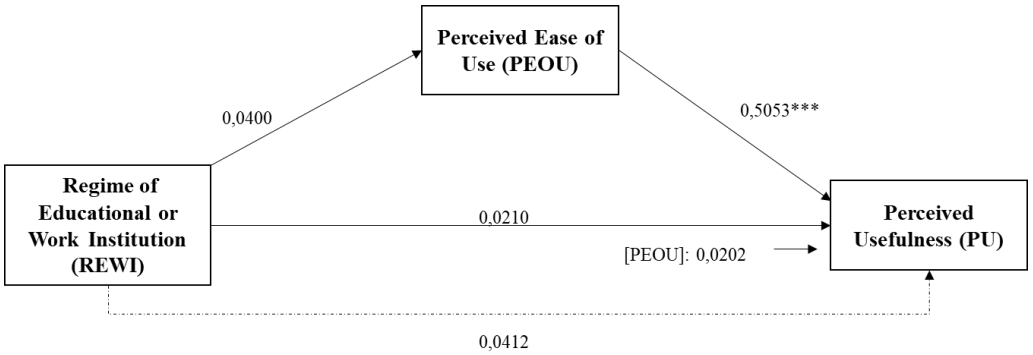
The direct effect has less weigh (B=-0.0581) than the sum of indirect effects regarding the influence of the Regime of Educational or Work Institution on BIU, mediated by both PEOU and PU (B=0.0140).

The model created by Hayes (2018) previously conducted does not allow testing whether the indirect effect of the Regime of Educational or Work Institutions has a positive influence on PU, mediated by PEOU. As such, it is necessary to re-use the PROCESS Macro with the Regime of Educational or Work Institution as a predecessor, PU as the outcome variable with PEOU as a mediator to test H2.1.

Table (25) and Figure (14) show the results obtained for this linear regression model. The direct output of the Macro PROCESS (Hayes, 2018) for this model can be found in Annex H.

Table 25: Regression Coefficients (Coeff.), Standard Errors (SE) and Model Summary Information with Regime of Educational or Educational Institution as antecedent independent variable X

ANTECEDENT	M1 (PEOU)			M2 (PU)		
	Coeff.	***SE***	***p***	**Coeff.**	***SE***	***p***
X (REWI**)**	-0.0533	0.415	0.1995	0.1165	0.0376	0.0021
M1(PEOU)	-	-	-	0.5140	0.0432	< .001
CONSTANT	1.1675	0.0946	< .001	0.4543	0.0994	< .001



Key: The dashed line represents the *total effect*. [PEOU]- regression coefficient for the *indirect effect* via Perceived Ease of Use. The current data represents the nonstandardized coefficients B. ***p<0.001

Figure 14: Effect of Location of the Institution of Study and Work on Perceived Usefulness mediated by Perceived Ease of Use

The Regime of Educational or Work Institutions has a negative indirect effect on PU, mediated by PEOU, with a bootstrap confidence interval that includes 0 (B=0.0202, 95% Boot IC= -0.0390, 0.0848). Therefore, H2.1 cannot be validated. The Table (26), presented below, compiles the results for the validation of hypotheses:

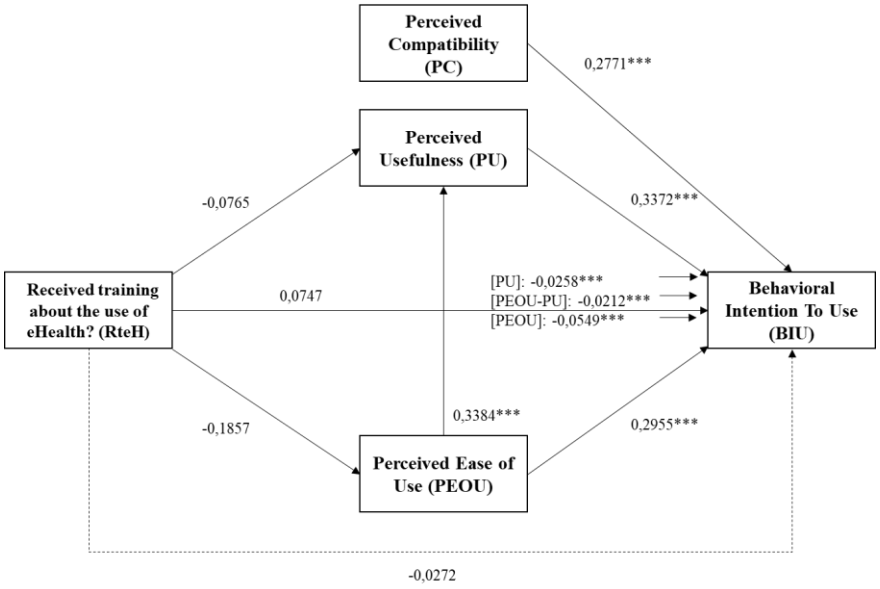
Table 26: Research Hypotheses Validation Results- Regime of Educational or Work Institution

H_1: Regime of Educational or Work Institution has direct influence on PU	Not Validated
H_2: Regime of Educational or Work Institution characteristics has direct influence on PEOU	Not Validated
$H_{2.1}$: Regime of Educational or Work Institution characteristics has influence on PU, mediated by PEOU	Not Validated
H_3: Regime of Educational or Work Institution characteristics has direct influence on BIU	Not Validated
$H_{3.1}$: Regime of Educational or Work Institution characteristics has influence on BIU, mediated by PU	Not validated
$H_{3.2}$: Regime of Educational or Work Institution characteristics has influence on BIU, mediated by PEOU	Not validated
H_4: PEOU has direct influence on PU	Validated
H_5: PEOU has direct influence on BIU	Validated
H6: PU has direct influence on BIU	Validated
H_7: PC has direct influence on BIU	Validated

4.4.8 Received training about the use of eHealth?

Table 27: Regression Coefficients (Coeff.), Standard Errors (SE) and Model Summary Information with Received training about the use of eHealth? as antecedent independent variable X

ANTECEDENT	M1 (PEOU)			M2 (PU)			Y(BIU)		
	Coeff.	***SE***	***p***	**Coeff.**	***SE***	***p***	**Coeff.**	***SE***	***p***
X (RTEH)	-0.1857	0.1199	0.1221	-0.0765	0.1178	0.5166	0.0747	0.1322	0.5726
M1(PEOU)	-	-	-	0.3384	0.0469	< .001	0..2955	0.0556	< .001
M2(PU)	-	-	-	-	-	-	0.3372	0.0537	< .001
CV(PC)	-	-	-	-	-	-	0.2771	0.0496	< .001
CONSTANT	1.0466	0.2391	< .001	0.7641	0.2394	0..0015	0.0126	0.2717	0.9631



Key: The dashed line represents the *total effect* of RteH on BIU. [PEOU]- regression coefficient for the *indirect effect* via Perceived Ease of Use. [PU]- regression coefficient for the *indirect effect* via Perceived Usefulness. [PEOU-PU]- regression coefficient for the *indirect effect* via Perceived Ease of Use and Perceived Usefulness. The current data represents the nonstandardized coefficients B. ***p<.001

Figure 15: Effect of Received training about the use of eHealth? on Behavioral Intention to Use mediated by Perceived Ease of Use and Perceived Usefulness and covariate by Perceived Compatibility

Taking into account the results provided by the direct output of the Macro PROCESS by Hayes (2018) it's possible to analyze if the variable "*Received training about the use of eHealth?"* has a negative influence on PU (B=-0.0765, SE=0.1178, p=0.5166), given the Lower Level of Confidence Interval (-0.3080) and the Upper Level of Confidence Interval (0.1550) that can contain 0, not validating H1, a moderate direct and negative influence on PEOU (B=-0.1857, SE=0.1199, p=0.1221), given the Lower Level of Confidence Interval (-0.4213) and the Upper Level of Confidence Interval (0.0499) that can contain 0, as so, not validating H2.

PEOU has a positive influence on PU (B=0.3384, SE=0.0469, p < 0.001), therefore H4 is validated. PEOU has a positive influence on BIU (B=0.2955, SE=0.0556, p<0.001), therefore H5 is validated.

Perceive Usefulness has a positive influence on BIU (B=0.3372, SE=0.0537, p<0.001), as so, H6 is not validated.

The variable "*Received training about the use of eHealth*?" influences, directly and indirectly, BIU. There is a positive and direct effect on BIU (B=0.0747, SE=0.1322, p=0.5726). As for indirect influence, this occurs three times, being mediated by PEOU with a bootstrap confidence interval that can include 0 (B=-0.0549, 95% Boot IC=-0.1300, -0.0119); PU with a bootstrap confidence interval that can include 0 (B=0.0258, 95% Boot IC=0.0875, 0.0367); and PU via PEOU with a bootstrap confidence interval that can include 0 (B=-0.0212, 95% Boot IC=-0.0537, -0.0042). Considering the analysis performed of the influence of Professional Background on BIU, the total effect of this is represented by B=-0.0272, as such H3, H3.1 and H3.2 are not validated.

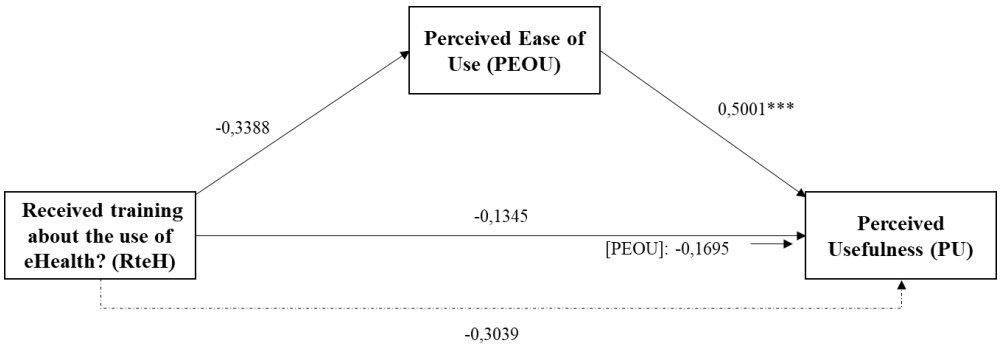
The direct effect has more weigh (B=0.0747) than the sum of indirect effects regarding the influence of the variable "*Received training about the use of eHealth?"* on BIU, mediated by both PEOU and PU (B=-0.1019).

The model created by Hayes (2018) previously conducted does not allow testing whether the indirect effect of the variable "*Received training about the use of eHealth?"* has a positive influence on PU, mediated by PEOU. As such, it is necessary to re-use the PROCESS Macro with the variable "*Received training about the use of eHealth?*" as a predecessor, PU as the outcome variable with PEOU as a mediator to test H2.1.

Table (28) and Figure (16) show the results obtained for this linear regression model. The direct output of the Macro PROCESS (Hayes, 2018) for this model can be found in Annex H.

Table 28: Regression Coefficients (Coeff.), Standard Errors (SE) and Model Summary Information with Received training about the use of eHealth? antecedent independent variable X

Antecedent	**M1 (PEOU)**			**M2 (PU)**		
	Coeff.	***SE***	***p***	**Coeff.**	***SE***	***p***
X (RteH)	-0.0533	0.415	0.1995	0.1165	0.0376	0.0021
M1(PEOU)	-	-	-	0.5140	0.0432	< .001
Constant	1.1675	0.0946	< .001	0.4543	0.0994	< .001



Key: The dashed line represents the *total effect*. [PEOU]- regression coefficient for the *indirect effect* via Perceived Ease of Use. The current data represents the nonstandardized coefficients B. ***p<0.001

Figure 16: Effect of Location of the Institution of Study and Work on Perceived Usefulness mediated by Perceived Ease of Use

"Received training about the use of eHealth?" has a positive indirect effect on PU. mediated by PEOU, with a bootstrap confidence interval that cannot include 0 (B=-0.1695, 95% Boot IC= -0.2888, -0.0563). Therefore, H2.1 can be validated. The Table (29), presented below, compiles the results for the validation of hypotheses:

Table 29: Research Hypotheses Validation Results- Received Training about the use of eHealth?

H_1: Received Training about the use of eHealth? has direct influence on PU	Not Validated
H_2: Received Training about the use of eHealth? characteristics has direct influence on PEOU	Not Validated
$H_{2.1}$: Received Training about the use of eHealth? characteristics has influence on PU, mediated by PEOU	Validated
H_3: Received Training about the use of eHealth? characteristics has direct influence on BIU	Not Validated
$H_{3.1}$: Received Training about the use of eHealth? characteristics has influence on BIU, mediated by PU	Not validated
$H_{3.2}$ Received Training about the use of eHealth? characteristics has influence on BIU, mediated by PEOU	Not validated
H_4: PEOU has direct influence on PU	Validated
H_5: PEOU has direct influence on BIU	Validated
H6: PU has direct influence on BIU	Validated
H_7: PC has direct influence on BIU	Validated

4.5 Main Considerations

The present chapter attempted to evaluate the Willingness to Use on behalf of healthcare professionals of a technological system to support the Triage System in the ED as a complement of the MTS.

Thanks to an online questionnaire it was possible to gather 440 answers. The analyzed sample is mainly constituted of Nursers (56.8%), with the majority of individuals being Female (79%) aged between 25 to 34 years old (56%). Concerning Years of Experience, this question was only asked of

active health professionals, and of those required, the majority had less than 15 years of experience (80.6%), with the majority working in the Metropolitan Area of Lisbon (48.6%). When characterizing the Regime of the institution that they work or study, the majority work/study in a public institution. Almost all the respondents didn't receive any training (92.7%).

In order to evaluate the reliability of the scales used in the constructs of this study, Cronbach's Alpha was used, and since all constructs reached values above 0.7, they are very reliable.

All the dimensions- PU, PEOU, PC and BIU- have positive mean, which means more than 0 on a five-point Likert scale that goes from -2 to 2. All the items of the 4 dimensions also have a positive mean, being the PC1 (Using an eHealth system is compatible with most aspects of my work) the item that had the lowest mean (0.75).

As for the research hypotheses, we have previously analyzed all the research hypotheses considering the different characteristics of the health professionals and thanks to this analysis we have been able to understand if some characteristics affect the Willingness to Use on behalf of the healthcare professionals of a technological system to support the Triage System in the ED. If a characteristic affects one of the dimensions, one can say that it influences Willingness to Use, as such, to summarize, the Table below gives an overview of the characteristics that affect PU, PEOU, and BIU

Table 30: Characteristic Results

Characteristic	**Affect**
Professional Background	Validated
Gender	Validated
Age	Not Validated
Years of Experience	Not Validated
Location of the Institution of Study or Work	Validated
Regime of Educational or Work Institution	Not Validated
Received training about the use of eHealth?	Validated

5 Conclusions

This chapter presents the main conclusions that were extracted from this study. This will answer the research questions that were introduced before and will present the limitations of the results and suggestions for the future.

5.1 Answer to the Research Question

Q1. *What is the healthcare professionals' willingness to use a technological system to support the Triage System in the ED as a complement to the MTS?*

This study proved that the health professionals' willingness to use a technological system to support the Triage System in the ED as a complement to the MTS is positive, as demonstrated by the mean scores of the various dimensions used in the questionnaire. In general, all items of all dimensions showed positive values being all means between 0.75 and 1.34.

PU was the dimension which showed the most positive consensus with a mean score of 1.243, this refers to the health professionals' feelings regarding a possible improvement in triage thanks to the implementation of a technological system. Its item PU3 (Using E-Triage would make it easier for me to engage in the triage process) had the highest mean score (1.34).

The dimension that recorded the lowest mean was PC (0.878). This lower value comes from the subjectivity of the dimension as it examines whether respondents see that using a technological system to support the Triage System in the ED as a complement to the MTS, is consistent with their values, beliefs, previous experiences, and current needs.

Q2. *How is the health professionals' Behavioral Intention to Use impacted by their characteristics, Perceived Usefulness, Perceived Ease of Use and Perceived Compatibility?*

This study examined whether the respondents' BIU is affected by their characteristics as well as by the other dimensions. To study whether this was the case, several tests were conducted to understand the impact of the various variables.

It was possible to notice that the other dimensions - PU, PEOU, and PC - influence the Behavioral Intention to Use, as proven by the positive value that these dimensions registered through the various tests performed through the Macro PROCESS.

As for the respondents' characteristics, these obtained different results. The professional's background had an impact on PU, PEOU, and BIU, both directly and indirectly but not on PU, mediated by PEOU. As for gender, this only influences PU, as such, gender does not influence BIU or PEOU. The variables Age, Years of experience and Regime of Educational or Work Institution

recorded similar results. These do not influence directly or indirectly the BIU, just as they do not influence the other dimensions, both PU and PEOU. The Location of The Institution of Study and Work only directly influences the BIU however it does not indirectly influence or influence PU and PEOU.

Finally, Received Training about the use of eHealth? does not influence Behavioral Intention to Use directly or indirectly, as it only influences PU, mediated by PEOU.

BIU is the final variable of the model used in this study, as such, it is influenced by all its predecessor dimensions and variables. Therefore, it is possible to state that the variable that represents the characteristics of the respondents influences the BIU if it influences any previous dimension to this one, that is, even if they do not directly or indirectly influence BIU, by influencing a dimension that will influence BIU it is possible to state that the variable ends up influencing BIU.

As such, we can say that the variables Professional Background, Gender, Location of the Institution of Study or Work and Received training about the use of eHealth? and the PU, PEOU and PC dimensions influence the BIU.

In conclusion, this study shows that certain characteristics of health professionals can affect the health professionals' Willingness to Use a technological system to support the Triage System in the ED as a complement to the MTS. Nevertheless, it's possible to perceive that the variables that affect Willingness to Use record residual values, which leaves open the that possibly the characteristics do not influence more and do not have a greater impact because the vast majority of health professionals are Willing to Use and adopt such technological system.

5.2 Limitations and Future Research

Despite the conclusions drawn, it can be pointed out that the major limitation of this study is its limited scope. Even though the questionnaire had a decent number of responses, the collected data are not representative of the reality since there was no specific analysis of the health professionals who do triage in Portugal, but there was an analysis of the emergency department professionals involved.

As for recommendation for future research, and considering the aforementioned limitation, is to carry out a more precise analysis of the health professionals with a formation in tirage, since they are the ones who carry out the triage process in Portugal to obtain a more faithful representation of reality.

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7 Annexe

Annex A- Questionnaire

Portuguese version

Questionário Dissertação

Chamo-me Pedro Silva e sou estudante do Mestrado em Gestão de Serviços e da Tecnologia e estou a fazer um Double Degree em Management Engineering. Atualmente estou a realizar uma dissertação no ISCTE-Instituto Universitário de Lisboa em simultâneo com a Università degli Studi di Palermo, sob a supervisão da Professora Teresa Cardoso Grilo e do Professor Manfredi Bruccoleri.

Este questionário visa recolher informação de modo a compreender a disponibilidade (vontade) para utilizar um sistema tecnológico que complemente o Sistema de Triagem de Manchester em Portugal, por parte dos profissionais de saúde. Os resultados deste serão utilizados na minha dissertação, que pretende contribuir para um melhor funcionamento dos Serviços de Emergência através da melhoria do Sistema de Triagem, tirando partido das novas tecnologias de informação e comunicação.

Após uma revisão da literatura existente, foi possível concluir que o Sistema de Triagem de Manchester tem algumas limitações. A falta de adaptabilidade a novas situações, a falta de recolha de sinais vitais e de informação crucial de forma consistente, e a necessidade de ter um profissional de saúde para realizar a triagem pode levar a um aumento do tempo de espera, assim como também a casos de subtriagem.

Dadas estas limitações, a solução apresentada é a aplicação de um sistema de eHealth (eTriage, pois é aplicado ao sistema de triagem). Este deverá permitir que o Sistema de Triagem de Manchester se adapte com mais facilidade a novas situações, que forneça um mecanismo que receba as queixas dos pacientes e permita a monitorização e a recolha constante dos sinais vitais, e de informação crucial do paciente em tempo real, permitindo a deteção imediata de alterações no estado clínico deste enquanto aguarda por cuidados médicos.

Os dados fornecidos serão utilizados exclusivamente para fins de investigação científica.

Agradeço desde já a sua contribuição!

Nota:

Este questionário destina-se apenas a profissionais de saúde (Médicos e Enfermeiros), estudantes de Medicina e Enfermagem.

Portanto, se não pertence a nenhum destes grupos, peço-lhe que não responda a este, pois a sua resposta comprometeria a veracidade e fiabilidade do estudo assim como todo o trabalho realizado e muitas horas de esforço e dedicação nele investidas.

Obrigado pela sua compreensão

Qual é a sua área profissional?

- [ ] Medicina
- [ ] Enfermagem
- [ ] Estudante de Medicina
- [ ] Estudante de Enfermagem
- [ ] Outra

Questionário para estudantes de Enfermagem

Caso não seja estudante de Enfermagem, por favor volte atrás no questionário e selecione a opção que se ajuste a si na questão "Qual é a sua área profissional?".

Qual é o seu gênero?

- [ ] Feminino
- [ ] Masculino

Quantos anos têm?

- [ ] entre 18-24 anos
- [ ] entre 25-34 anos
- [ ] entre 35-44 anos
- [ ] entre 45-55 anos
- [ ] entre 56-64 anos
- [ ] 65 ou mais anos

Em que distrito se encontra a instituição de ensino onde estuda?

	Aveiro
	Beja
	Braga
	Bragança
	Castelo Branco
	Coimbra
	Évora
	Faro
	Guarda
	Leiria
	Lisboa
	Portalegre
	Porto
	R.A dos Açores
	R.A. da Madeira
	Santarém
	Setúbal
	Viana do Castelo
	Vila Real
	Viseu

Qual é a natureza da instituição de ensino em que estuda?

	Privada
	Pública

eHealth e eTriage

Estamos num mundo cada vez mais digital, onde a tecnologia é cada vez mais utilizada na saúde.

eHealth é a aplicação de sistemas informáticos e/ou de comunicação na saúde, os quais estão cada vez mais presentes na vida diária dos profissionais de saúde dando apoio às suas atividades.

Como tal, a eTriage é a aplicação destes sistemas à triagem. Deste modo, a aplicação da eTriage ao Sistema de Triagem de Manchester é a aplicação de um sistema informático a este de modo a combater as suas limitações.

Já recebeu alguma formação sobre o uso de eHealth?

eHealth é a aplicação de sistemas informáticos e/ou de comunicação na saúde.

	Sim
	Não

Numa escala de -2 a 2, classifique o seu nível de concordância/discordância com as seguintes afirmações, considerando -2 = "Discordo Totalmente", -1 =" Discordo em Parte", 0 = "Não tenho opinião/Não concordo nem discordo", 1 = "Concordo em Parte" e 2 = "Concordo Totalmente".

Perceived Usefulness

Perceção de utilidade

Escala	-2	-1	0	1	2
A utilização de um sistema de triagem informático melhoraria o meu desempenho no processo de triagem.					
A utilização de um sistema de triagem informático aumentaria a minha produtividade no processo de triagem.					
A utilização de um sistema de triagem informático facilitar-me--ia o processo de triagem.					
A utilização de um sistema de triagem informático aumentaria a minha eficácia no processo de triagem.					
A utilização de um sistema de triagem informático permitir-me-ia realizar tarefas mais rapidamente.					

Perceived Ease of Use

Perceção da facilidade de utilização

Escala	-2	-1	0	1	2
Considero que aprender a usar um sistema de triagem informático é fácil.					
Considero fácil obter o pretendido através de um sistema de triagem informático.					
Considero fácil tornar-me hábil na utilização de um sistema de triagem informático.					
Considero que usar um sistema de triagem informático é fácil.					
Considero que a interação com um sistema de triagem informático é clara e percetível.					

Behavioral Intention to Use

Intenção Comportamental de Utilização

Escala	-2	-1	0	1	2
Eu pretendo utilizar um sistema de triagem informático					
Eu prevejo que irei utilizar um sistema de triagem informático					

Perceived Compatibility

Perceived Compatibility

Escala	-2	-1	0	1	2
Utilizar um sistema de eHealth é compatível com a maioria dos aspetos do meu trabalho					

Utilizar um sistema de eHealth é adequado ao meu estilo de trabalho					
Utilizar um sistema de eHealth é compatível com o normal funcionamento da triagem hospitalar					

Questionário para estudantes de Medicina

Caso não seja estudante de Medicina, por favor volte atrás no questionário e selecione a opção que se ajuste a si na questão "Qual é a sua área profissional?".

Qual é o seu gênero?

- [ ] Feminino
- [ ] Masculino

Quantos anos têm?

- [ ] entre 18-24 anos
- [ ] entre 25-34 anos
- [ ] entre 35-44 anos
- [ ] entre 45-55 anos
- [ ] entre 56-64 anos
- [ ] 65 ou mais anos

Em que distrito se encontra a instituição de ensino onde estuda?

- [ ] Braga
- [ ] Coimbra
- [ ] Guarda
- [ ] Leiria
- [ ] Lisboa
- [ ] Porto
- [ ] R.A dos Açores
- [ ] R.A. da Madeira

Qual é a natureza da instituição de ensino em que estuda?

☐ Privada
☐ Pública

eHealth e eTriage

Estamos num mundo cada vez mais digital, onde a tecnologia é cada vez mais utilizada na saúde.

eHealth é a aplicação de sistemas informáticos e/ou de comunicação na saúde, os quais estão cada vez mais presentes na vida diária dos profissionais de saúde dando apoio às suas atividades.

Como tal, a eTriage é a aplicação destes sistemas à triagem. Deste modo, a aplicação da eTriage ao Sistema de Triagem de Manchester é a aplicação de um sistema informático a este de modo a combater as suas limitações.

Já recebeu alguma formação sobre o uso de eHealth?

eHealth é a aplicação de sistemas informáticos e/ou de comunicação na saúde.

☐ Sim
☐ Não

Numa escala de -2 a 2, classifique o seu nível de concordância/discordância com as seguintes afirmações, considerando -2 = “Discordo Totalmente”, -1 =” Discordo em Parte”, 0 = “Não tenho opinião/Não concordo nem discordo”, 1 = “Concordo em Parte” e 2 = “Concordo Totalmente”.

Perceived Usefulness

Perceção de utilidade

Escala	-2	-1	0	1	2
A utilização de um sistema de triagem informático melhoraria o meu desempenho no processo de triagem.					

A utilização de um sistema de triagem informático aumentaria a minha produtividade no processo de triagem.					
A utilização de um sistema de triagem informático facilitar-me--ia o processo de triagem.					
A utilização de um sistema de triagem informático aumentaria a minha eficácia no processo de triagem.					
A utilização de um sistema de triagem informático permitir-me-ia realizar tarefas mais rapidamente.					

Perceived Ease of Use

Perceção da facilidade de utilização

Escala	-2	-1	0	1	2
Considero que aprender a usar um sistema de triagem informático é fácil.					
Considero fácil obter o pretendido através de um sistema de triagem informático.					
Considero fácil tornar-me hábil na utilização de um sistema de triagem informático.					
Considero que usar um sistema de triagem informático é fácil.					
Considero que a interação com um sistema de triagem informático é clara e percetível.					

Behavioral Intention to Use

Intenção Comportamental de Utilização

Escala	-2	-1	0	1	2
Eu pretendo utilizar um sistema de triagem informático					

Eu prevejo que irei utilizar um sistema de triagem informático					

Perceived Compatibility

Compatibilidade Percecionada

Escala	-2	-1	0	1	2
Utilizar um sistema de eHealth é compatível com a maioria dos aspetos do meu trabalho					
Utilizar um sistema de eHealth é adequado ao meu estilo de trabalho					
Utilizar um sistema de eHealth é compatível com o normal funcionamento da triagem hospitalar					

Questionário Médicos

Caso não seja praticante de Medicina (médico/a), por favor volte atrás no questionário e selecione a opção que se ajuste a si na questão "Qual é a sua área profissional?".

Qual é o seu gênero?

- [ ] Feminino
- [ ] Masculino

Quantos anos têm?

- [ ] entre 18-24 anos
- [ ] entre 25-34 anos
- [ ] entre 35-44 anos
- [ ] entre 45-55 anos
- [ ] entre 56-64 anos
- [ ] 65 ou mais anos

Quantos anos de experiência tem na área da saúde?

- [ ] Menos de 15 anos
- [ ] Entre 15 e 25 anos
- [ ] Mais de 25 anos

Em que distrito se encontra o estabelecimento de saúde onde trabalha?

Caso trabalhe em distritos diferentes pode selecionar até 3 opções.

- [ ] Aveiro
- [ ] Beja
- [ ] Braga
- [ ] Bragança
- [ ] Castelo Branco
- [ ] Coimbra
- [ ] Évora
- [ ] Faro
- [ ] Guarda
- [ ] Leiria
- [ ] Lisboa
- [ ] Portalegre
- [ ] Porto
- [ ] R.A dos Açores
- [ ] R.A. da Madeira
- [ ] Santarém
- [ ] Setúbal
- [ ] Viana do Castelo
- [ ] Vila Real
- [ ] Viseu

Qual é o regime do estabelecimento de saúde em que trabalha?

Regime do estabelecimento de saúde onde trabalha com mais frequência.

- [ ] Privado
- [ ] Público

☐ Parceria Público-Privada (PPP)

eHealth e eTriage

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eHealth é a aplicação de sistemas informáticos e/ou de comunicação na saúde, os quais estão cada vez mais presentes na vida diária dos profissionais de saúde dando apoio às suas atividades.

Como tal, a eTriage é a aplicação destes sistemas à triagem. Deste modo, a aplicação da eTriage ao Sistema de Triagem de Manchester é a aplicação de um sistema informático a este de modo a combater as suas limitações.

Já recebeu alguma formação sobre o uso de eHealth?

eHealth é a aplicação de sistemas informáticos e/ou de comunicação na saúde.

☐ Sim
☐ Não

Numa escala de -2 a 2, classifique o seu nível de concordância/discordância com as seguintes afirmações, considerando -2 = "Discordo Totalmente", -1 =" Discordo em Parte", 0 = "Não tenho opinião/Não concordo nem discordo", 1 = "Concordo em Parte" e 2 = "Concordo Totalmente".

Perceived Usefulness

Perceção de utilidade

Escala	-2	-1	0	1	2
A utilização de um sistema de triagem informático melhoraria o meu desempenho no processo de triagem.					
A utilização de um sistema de triagem informático aumentaria a minha produtividade no processo de triagem.					

A utilização de um sistema de triagem informático facilitar-me--ia o processo de triagem.					
A utilização de um sistema de triagem informático aumentaria a minha eficácia no processo de triagem.					
A utilização de um sistema de triagem informático permitir-me-ia realizar tarefas mais rapidamente.					

Perceived Ease of Use

Perceção da facilidade de utilização

Escala	-2	-1	0	1	2
Considero que aprender a usar um sistema de triagem informático é fácil.					
Considero fácil obter o pretendido através de um sistema de triagem informático.					
Considero fácil tornar-me hábil na utilização de um sistema de triagem informático.					
Considero que usar um sistema de triagem informático é fácil.					
Considero que a interação com um sistema de triagem informático é clara e percetível.					

Behavioral Intention to Use

Intenção Comportamental de Utilização

Escala	-2	-1	0	1	2
Eu pretendo utilizar um sistema de triagem informático					
Eu prevejo que irei utilizar um sistema de triagem informático					

Compatibilidade

Perceived Compatibility

Escala	-2	-1	0	1	2
Utilizar um sistema de eHealth é compatível com a maioria dos aspetos do meu trabalho					
Utilizar um sistema de eHealth é adequado ao meu estilo de trabalho					
Utilizar um sistema de eHealth é compatível com o normal funcionamento da triagem hospitalar					

Questionário para Enfermeiros

Caso não seja praticante de Enfermagem (Enfermeiro/a), por favor volte atrás no questionário e selecione a opção que se ajuste a si na questão "Qual é a sua área profissional?".

Qual é o seu gênero?

- [ ] Feminino
- [ ] Masculino

Quantos anos têm?

- [ ] entre 18-24 anos
- [ ] entre 25-34 anos
- [ ] entre 35-44 anos
- [ ] entre 45-55 anos
- [ ] entre 56-64 anos
- [ ] 65 ou mais anos

Quantos anos de experiência têm na área da saúde?

- [ ] Menos de 15 anos
- [ ] Entre 15 e 25 anos

- [ ] Mais de 25 anos

Em que distrito se encontra o estabelecimento de saúde onde trabalha?

Caso trabalhe em distritos diferentes pode selecionar até 3 opções.

- [ ] Aveiro
- [ ] Beja
- [ ] Braga
- [ ] Bragança
- [ ] Castelo Branco
- [ ] Coimbra
- [ ] Évora
- [ ] Faro
- [ ] Guarda
- [ ] Leiria
- [ ] Lisboa
- [ ] Portalegre
- [ ] Porto
- [ ] R.A dos Açores
- [ ] R.A. da Madeira
- [ ] Santarém
- [ ] Setúbal
- [ ] Viana do Castelo
- [ ] Vila Real
- [ ] Viseu

Qual é o regime do estabelecimento de saúde em que trabalha?

Regime do estabelecimento de saúde onde trabalha com mais frequência.

- [ ] Privado
- [ ] Público
- [ ] Parceria Público-Privada (PPP)

eHealth e eTriage

Estamos num mundo cada vez mais digital, onde a tecnologia é cada vez mais utilizada na saúde.

eHealth é a aplicação de sistemas informáticos e/ou de comunicação na saúde, os quais estão cada vez mais presentes na vida diária dos profissionais de saúde dando apoio às suas atividades.

Como tal, a eTriage é a aplicação destes sistemas à triagem. Deste modo, a aplicação da eTriage ao Sistema de Triagem de Manchester é a aplicação de um sistema informático a este de modo a combater as suas limitações.

Já recebeu alguma formação sobre o uso de eHealth?

eHealth é a aplicação de sistemas informáticos e/ou de comunicação na saúde.

	Sim
	Não

Numa escala de -2 a 2, classifique o seu nível de concordância/discordância com as seguintes afirmações, considerando -2 = “Discordo Totalmente”, -1 =” Discordo em Parte”, 0 = “Não tenho opinião/Não concordo nem discordo”, 1 = “Concordo em Parte” e 2 = Concordo Totalmente”.

Perceived Usefulness

Perceção de utilidade

Escala	-2	-1	0	1	2
A utilização de um sistema de triagem informático melhoraria o meu desempenho no processo de triagem.					
A utilização de um sistema de triagem informático aumentaria a minha produtividade no processo de triagem.					
A utilização de um sistema de triagem informático facilitar-me--ia o processo de triagem.					
A utilização de um sistema de triagem informático aumentaria a minha eficácia no processo de triagem.					

A utilização de um sistema de triagem informático permitir-me-ia realizar tarefas mais rapidamente.					

Perceived Ease of Use

Perceção da facilidade de utilização

Escala	-2	-1	0	1	2
Considero que aprender a usar um sistema de triagem informático é fácil.					
Considero fácil obter o pretendido através de um sistema de triagem informático.					
Considero fácil tornar-me hábil na utilização de um sistema de triagem informático.					
Considero que usar um sistema de triagem informático é fácil.					
Considero que a interação com um sistema de triagem informático é clara e percetível.					

Behavioral Intention to Use

Intenção Comportamental de Utilização

Escala	-2	-1	0	1	2
Eu pretendo utilizar um sistema de triagem informático					
Eu prevejo que irei utilizar um sistema de triagem informático					

Compatibilidade

Perceived Compatibility

Escala	-2	-1	0	1	2
Utilizar um sistema de eHealth é compatível com a maioria dos aspetos do meu trabalho					
Utilizar um sistema de eHealth é adequado ao meu estilo de trabalho					
Utilizar um sistema de eHealth é compatível com o normal funcionamento da triagem hospitalar					

Nota:

Este questionário destina-se apenas a profissionais de saúde (Médicos e Enfermeiros) e estudantes de Medicina e Enfermagem.

Portanto, se não pertence a nenhum destes grupos, peço-lhe que não responda a este questionário, pois a sua resposta comprometeria a veracidade e fiabilidade do estudo e comprometeria todo o trabalho realizado e muitas horas de esforço e dedicação nele investidas.

Obrigado pela sua compreensão

Muito Obrigado

Agradeço imenso o facto de ter respondido a este questionário.

Peço-lhe que, se possível, partilhe este questionário com os seus colegas de modo que me permita obter mais respostas e assim ter uma melhor amostra da população em estudo, o que levará a uma maior veracidade e fiabilidade deste.

Mais uma vez muito obrigado pela sua contribuição e pelo tempo despendido.

English version

Thesis Questionnaire

My name is Pedro Silva and I am a Master's in Management of Services and Technology. I am doing a Double Degree in Management Engineering. I am currently doing a dissertation in ISCTE-Instituto Universitário de Lisboa simultaneously with Università Degli Studi di Palermo, under the supervision of Professor Teresa Cardoso Grilo and Professor Manfredi Bruccoleri.

This questionnaire aims to collect information to understand the willingness of health professionals to use a technological system that complements the Manchester Triage System in Portugal. This will be used in my dissertation, which aims to contribute to improving the functioning of the Emergency Services through the improvement of the Triage System, taking advantage of new information and communication technologies.

After a review of the existing literature, it is possible to conclude that the Manchester Triage System has some limitations. The lack of adaptability to new situations, the lack of collecting vital signs and crucial information consistently, and the need to have a health professional perform triage can lead to an increase in triage and waiting times and also lead to cases of under-screening.

Given these limitations, the solution presented is the application of an eHealth system (eTriage, as it is applied to the triage system). This should allow the Manchester Triage System to adapt more easily to new situations, provide a mechanism that receives patients' complaints and allows constant monitoring of the patient's vital signs in real-time, enabling immediate detection of changes in the patient's clinical status while waiting for medical care.

The data provided is used exclusively for scientific research purposes.

Thank you in advance for your contribution!

Notice:

This questionnaire is only intended for health professionals (Physicians and Nurses) and Medicine and Nursing students.

Therefore, if you do not belong to any of these groups, I kindly ask you not to answer this questionnaire as your answer would jeopardise the veracity and reliability of the study and would jeopardise all the work carried out and many hours of effort and dedication.

Thank you for your understanding

What is your Professional Background?

☐	Physician
☐	Nursing
☐	Medicine Student
☐	Nursing Student
☐	Others

Questionnaire for Nursing Students

If you are not a Nursing Student, please go back to the questionnaire and select the option you want in the question "What is your Professional Background? ".

What's your gender?

- [ ] Female
- [ ] Male

How old are you?

- [ ] entre 18-24 anos
- [ ] entre 25-34 anos
- [ ] entre 35-44 anos
- [ ] entre 45-55 anos
- [ ] entre 56-64 anos
- [ ] 65 ou mais anos

In which district is the educational institution where you study located?

- [ ] Aveiro
- [ ] Beja
- [ ] Braga
- [ ] Bragança
- [ ] Castelo Branco
- [ ] Coimbra
- [ ] Évora
- [ ] Faro
- [ ] Guarda
- [ ] Leiria
- [ ] Lisboa
- [ ] Portalegre
- [ ] Porto
- [ ] R.A dos Açores
- [ ] R.A. da Madeira

- [ ] Santarém
- [ ] Setúbal
- [ ] Viana do Castelo
- [ ] Vila Real
- [ ] Viseu

What is the "regime" of the educational institution where you study?

- [ ] Private
- [ ] Public

eHealth e eTriage

We are in an increasingly digital world, where technology is increasingly used in health. eHealth is the application of computer and/or communication systems in health and these are increasingly present in the daily lives of health professionals supporting their activities.

As such eTriage is the application of these computer systems to triage. Therefore, the application of eTriage to the Manchester Triage System is the application of an IT system to the MTS to combat its limitations.

Have you received any training on the use of eHealth?

eHealth is the application of technological and/or communication systems in Health.

- [ ] Yes
- [ ] No

On a scale of -2 to 2, please rate your level of agreement/disagreement with the following statements, considering -2 = "Strongly disagree", -1 = "Partly Disagree", 0 = "No opinion/ Do not Agree or Disagree", 1 = "Partly Agree" and 2 = "Strongly Agree".

Perceived Usefulness

Scale	-2	-1	0	1	2

The use of a computerised triage system would improve my performance in the triage process.					
The use of a computerised triage system would increase my productivity in the triage process					
The use of a computerised triage system would facilitate the triage process for me.					
The use of a computerised triage system would increase my efficiency in the triage process.					
The use of a computerised triage system would enable me to carry out tasks more quickly					

Perceived Ease of Use

Scale	-2	-1	0	1	2
I find learning to use a computerized triage system easy					
I find it easy to get what I want from a computerized triage system.					
I find it easy to become skilled in the use of a computerized triage system.					
I find it easy to use a computerized triage system.					
I find the interaction with a computerized triage system clear and understandable					

Behavioral Intention to Use

Scale	-2	-1	0	1	2
I intend to use a computerized triage system					
I predict that I will use a computerized triage system					

Perceived Compatibility

Scale	-2	-1	0	1	2
Using an eHealth system is compatible with most aspects of my work					
Using an eHealth system is appropriate to my work style					
Using an eHealth system is compatible with the normal operation of hospital triage					

Medicine Student's Questionnaire

If you are not a Medicine Student, please go back to the questionnaire and select the option you want in the question "What is your Professional Background? ".

What's your gender?

- [ ] Female
- [ ] Male

How old are you?

- [ ] between 18-24 years old
- [ ] between 25-34 years old
- [ ] between 35-44 years old
- [ ] between 45-55 years old
- [ ] between 56-64 years old
- [ ] 65 years and over

In which district is the educational institution where you study located?

- [ ] Braga
- [ ] Coimbra
- [ ] Guarda
- [ ] Lisboa

- [ ] Porto
- [ ] R.A dos Açores
- [ ] R.A. da Madeira

What is the "regime" of the educational institution where you study?

- [ ] Private
- [ ] Public

eHealth e eTriage

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As such eTriage is the application of these computer systems to triage. Therefore, the application of eTriage to the Manchester Triage System is the application of an IT system to the MTS to combat its limitations.

Have you received any training on the use of eHealth?

eHealth is the application of technological and/or communication systems in Health.

- [ ] Yes
- [ ] No

On a scale of -2 to 2, please rate your level of agreement/disagreement with the following statements, considering -2 = "Strongly disagree", -1 = "Partly Disagree", 0 = "No opinion/ Do not Agree or Disagree", 1 = "Partly Agree" and 2 = "Strongly Agree".

Perceived Usefulness

Scale	-2	-1	0	1	2
The use of a computerised triage system would improve my performance in the triage process.					

The use of a computerised triage system would increase my productivity in the triage process					
The use of a computerised triage system would facilitate the triage process for me.					
The use of a computerised triage system would increase my efficiency in the triage process.					
The use of a computerised triage system would enable me to carry out tasks more quickly					

Perceived Ease of Use

Scale	-2	-1	0	1	2
I find learning to use a computerized triage system easy					
I find it easy to get what I want from a computerized triage system.					
I find it easy to become skilled in the use of a computerized triage system.					
I find it easy to use a computerized triage system.					
I find the interaction with a computerized triage system clear and understandable					

Behavioral Intention to Use

Scale	-2	-1	0	1	2
I intend to use a computerized triage system					
I predict that I will use a computerized triage system					

Perceived Compatibility

Scale	-2	-1	0	1	2
Using an eHealth system is compatible with most aspects of my work					
Using an eHealth system is appropriate to my work style					
Using an eHealth system is compatible with the normal operation of hospital triage					

Physician's Questionnaire

If you are not a Physician, please go back in the questionnaire and select the option you want in the question "What is your Professional Background? ".

What's your gender?

- ☐ Female
- ☐ Male

How old are you?

- ☐ between 18-24 years old
- ☐ between 25-34 years old
- ☐ between 35-44 years old
- ☐ between 45-55 years old
- ☐ between 56-64 years old
- ☐ 65 years and over

How many years of experience do you have?

- ☐ Less than 15 years
- ☐ Between 15 and 25 years
- ☐ More than 25 years

In what district is the health establishment where you work located?

If you work in different districts you can select up to 3 options.

- [ ] Aveiro
- [ ] Beja
- [ ] Braga
- [ ] Bragança
- [ ] Castelo Branco
- [ ] Coimbra
- [ ] Évora
- [ ] Faro
- [ ] Guarda
- [ ] Leiria
- [ ] Lisboa
- [ ] Portalegre
- [ ] Porto
- [ ] R.A dos Açores
- [ ] R.A. da Madeira
- [ ] Santarém
- [ ] Setúbal
- [ ] Viana do Castelo
- [ ] Vila Real
- [ ] Viseu

What is the "regime" of the hospital where you work?

The regime of the health establishment where you work most frequently.

- [ ] Private
- [ ] Public
- [ ] Public-Private Partnership (PPP)

eHealth e eTriage

We are in an increasingly digital world, where technology is increasingly used in health. eHealth is the application of computer and/or communication systems in health and these are increasingly present in the daily lives of health professionals supporting their activities.

As such eTriage is the application of these computer systems to triage. Therefore, the application of eTriage to the Manchester Triage System is the application of an IT system to the MTS to combat its limitations.

Have you received any training on the use of eHealth?

eHealth is the application of technological and/or communication systems in Health.

	Yes
	No

On a scale of -2 to 2, please rate your level of agreement/disagreement with the following statements, considering -2 = "Strongly disagree", -1 = "Partly Disagree", 0 = "No opinion/ Do not Agree or Disagree", 1 = "Partly Agree" and 2 = "Strongly Agree".

Perceived Usefulness

Scale	-2	-1	0	1	2
The use of a computerised triage system would improve my performance in the triage process.					
The use of a computerised triage system would increase my productivity in the triage process					
The use of a computerised triage system would facilitate the triage process for me.					
The use of a computerised triage system would increase my efficiency in the triage process.					
The use of a computerised triage system would enable me to carry out tasks more quickly					

Perceived Ease of Use

Scale	-2	-1	0	1	2
I find learning to use a computerized triage system easy					
I find it easy to get what I want from a computerized triage system.					
I find it easy to become skilled in the use of a computerized triage system.					
I find it easy to use a computerized triage system.					
I find the interaction with a computerized triage system clear and understandable					

Behavioral Intention to Use

Scale	-2	-1	0	1	2
I intend to use a computerized triage system					
I predict that I will use a computerized triage system					

Perceived Compatibility

Scale	-2	-1	0	1	2
Using an eHealth system is compatible with most aspects of my work					
Using an eHealth system is appropriate to my work style					
Using an eHealth system is compatible with the normal operation of hospital triage					

Nurse's Questionnaire

If you are not a Nurse, please go back in the questionnaire and select the option you want in the question "What is your Professional Background? ".

What's your gender?

- [ ] Female
- [ ] Male

How old are you?

- [ ] between 18-24 years old
- [ ] between 25-34 years old
- [ ] between 35-44 years old
- [ ] between 45-55 years old
- [ ] between 56-64 years old
- [ ] 65 years and over

How many years of experience do you have?

- [ ] Less than 15 years
- [ ] Between 15 and 25 years
- [ ] More than 25 years

In what district is the health establishment where you work located?

If you work in different districts you can select up to 3 options.

- [ ] Aveiro
- [ ] Beja
- [ ] Braga
- [ ] Bragança
- [ ] Castelo Branco
- [ ] Coimbra

	Évora
	Faro
	Guarda
	Leiria
	Lisboa
	Portalegre
	Porto
	R.A dos Açores
	R.A. da Madeira
	Santarém
	Setúbal
	Viana do Castelo
	Vila Real
	Viseu

What is the "regime" of the hospital where you work?

The regime of the health establishment where you work most frequently.

	Private
	Public
	Public-Private Partnership (PPP)

eHealth e eTriage

We are in an increasingly digital world, where technology is increasingly used in health. eHealth is the application of computer and/or communication systems in health and these are increasingly present in the daily lives of health professionals supporting their activities.

As such eTriage is the application of these computer systems to triage. Therefore, the application of eTriage to the Manchester Triage System is the application of an IT system to the MTS to combat its limitations.

Have you received any training on the use of eHealth?

eHealth is the application of technological and/or communication systems in Health.

	Yes
	No

On a scale of -2 to 2, please rate your level of agreement/disagreement with the following statements, considering -2 = "Strongly disagree", -1 = "Partly Disagree", 0 = "No opinion/ Do not Agree or Disagree", 1 = "Partly Agree" and 2 = "Strongly Agree".

Perceived Usefulness

Scale	-2	-1	0	1	2
The use of a computerised triage system would improve my performance in the triage process.					
The use of a computerised triage system would increase my productivity in the triage process					
The use of a computerised triage system would facilitate the triage process for me.					
The use of a computerised triage system would increase my efficiency in the triage process.					
The use of a computerised triage system would enable me to carry out tasks more quickly					

Perceived Ease of Use

Scale	-2	-1	0	1	2
I find learning to use a computerized triage system easy					
I find it easy to get what I want from a computerized triage system.					
I find it easy to become skilled in the use of a computerized triage system.					

I find it easy to use a computerized triage system.					
I find the interaction with a computerized triage system clear and understandable					

Behavioral Intention to Use

Scale	-2	-1	0	1	2
I intend to use a computerized triage system					
I predict that I will use a computerized triage system					

Perceived Compatibility

Scale	-2	-1	0	1	2
Using an eHealth system is compatible with most aspects of my work					
Using an eHealth system is appropriate to my work style					
Using an eHealth system is compatible with the normal operation of hospital triage					

Thank you

Thank you very much for answering this questionnaire.

I would ask you, if possible, to share this questionnaire with your colleagues so that I can obtain more answers and thus have a better sample of the population under study, which will lead to greater veracity and reliability of this one.

Once again, thank you very much for your contribution and time spent.

Annex B -Sample Characterization

Table B.1: Sample Characterization- frequencies

Variable			Absolute Frequency	Relative Frequency
Professional Background	Physician		91	20.7%
	Nursing		250	56.8%
	Medicine Student		55	12.5%
	Nursing Student		45	10%
	Total		**440**	**100%**
Gender	Male		93	21.1%
	Female		347	78.9%
	Total		**440**	**100%**
Age	between 18-24 years old		87	19.8%
	between 25-34 years old		246	55.9%
	between 35-44 years old		86	19.5%
	between 45-55 years old		12	2.7%
	between 56-64 years old		8	1.8%
	65 years and over		1	0.2%
	Total		**440**	**100%**
Years of Experience	Health Professionals	Less than 15 years	275	62.5%
		Between 15 and 25 years	52	11.8%
		More than 25 years	24	3.2%
	Total		**440**	**100%**
Location of the Institution of Study or Work	North		132	30%
	Center		45	10.2%
	Metropolitan Area of Lisbon		214	48.6%
	Alentejo		18	4.1%
	Algarve		25	5.7%
	Autonomous Region of Madeira		3	0.7%
	Autonomous Region of the Azores		3	0.7%
	Total		**440**	**100%**
The regime of Educational or Work	Medicine Students	Public	55	100%
	Nursing Students	Public	28	66.7%

Institutions		Private	14	33.3%
	Health Professionals	Public	254	74.49%
		Private	69	20.23%
		Public Private Partnership	18	5.28%
	Total		**440**	**100%**
Received training about the use of eHealth?	Yes		32	7.3
	No		408	92.7
	Total		**440**	**100%**

Annex C - Cronbach's Alpha

Table C.1 - Cronbach's Alphas for the Willingness to Use dimensions

	Perceived Usefulness		Perceived Ease of Use		Behavioral Intention to Use		Perceived Combability	
Cronbach's Alpha	0.936		0.900		0.816		0.855	
Corrected Item-Total	**PU1**	0.781	**PEOU1**	0.723	**BIU1**	0.691	**PC1**	0.795
	PU2	0.861	**PEOU2**	0.710	**BIU2**	0.691	**PC2**	0.759
	PU3	0.885	**PEOU3**	0.725			**PC3**	0.409
	PU4	0.846	**PEOU4**	0.827				
	PU5	0.786	**PEOU5**	0.776				
Cronbach's Alpha if Item Deleted	**PU1**	0.931	**PEOU1**	0.884	**BIU1**	-	**PC1**	0.734
	PU2	0.916	**PEOU2**	0.887	**BIU2**	-	**PC2**	0.767
	PU3	0.912	**PEOU3**	0.884			**PC3**	0.880
	PU4	0.919	**PEOU4**	0.861				
	PU5	0.931	**PEOU5**	0.872				

Annexe D – Descriptive Analysis of Perceived Usefulness, Perceived Ease of Use, Behavioral Intention and Perceived Compatibility

Table D.1 - Perceived Usefulness, Perceived Ease of Use, Behavioral Intention and Perceived Compatibility by item

			Scale (Relative Frequencies %)				
	Mean	**SD**	**-2**	**-1**	**0**	**1**	**2**
Perceive Usefulness	**1.243**	**0.769**					
PU1	1.20	0.850	1.1%	2.7%	13.2%	41.4%	41.6%
PU2	1.24	0.854	1.4%	2.0%	13.0%	38.6%	45.0%
PU3	1.34	0.806	0.9%	1.6%	10.9%	35.7%	50.9%
PU4	1.22	0.870	1.4%	2.3%	14.3%	37.5%	44.5%
PU5	1.23	0.924	1.6%	3.4%	14.1%	32.7%	48.2%
Perceive Ease of Use	**1.055**	**0.738**					
PEOU1	1.04	0.898	0.2%	7.0%	15.9%	42.3%	34.5%
PEOU2	0.93	0.869	0.7%	6.8%	17%	50%	25.5%
PEOU3	1.30	0.814	0.5%	2.5%	12.3%	35.9%	48.9%
PEOU4	1.11	0.862	0.2%	5.0%	15.7%	41.4%	37.7%
PEOU5	0.89	0.919	0.9%	6.8%	22.3%	42.3%	27.7%
Behavioral Intention	**1.131**	**0.911**					
B1	1.17	0.952	2.0%	2.0%	19.8%	29.1%	47.0%
B2	1.09	1.028	3.0%	3.6%	20.0%	28.2%	45.2%
Perceived Compatibility	**0.878**	**0.829**					
PC1	0.75	0.917	0.9%	6.1%	31.4%	35.2%	23.6%
PC2	0.82	0.973	1.4%	6.1%	31.4%	31.6%	29.5%
PC3	1.07	0.934	0.9%	4.3%	21.8%	32.7%	40.2%

Annexe F- Validation of Linear Regression Assumptions

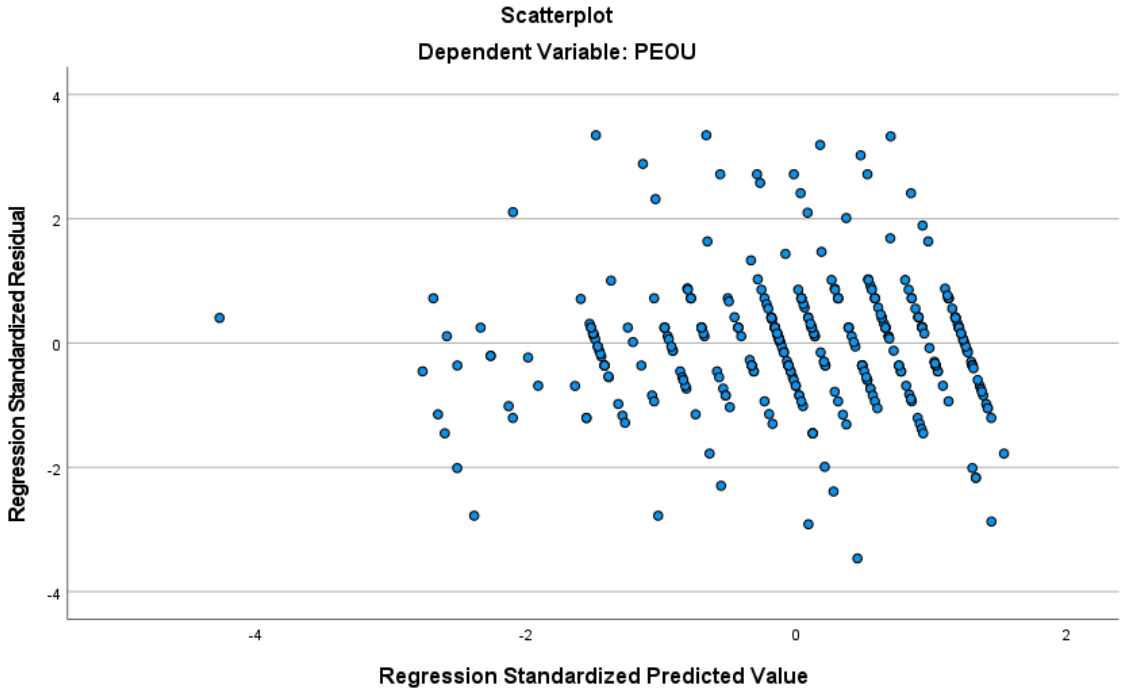

Figure F.1 - Normality, Homoscedasticity and Linearity Analysis – Multiple Linear Regression Scatterplot – Perceived Ease of Use (PEOU)

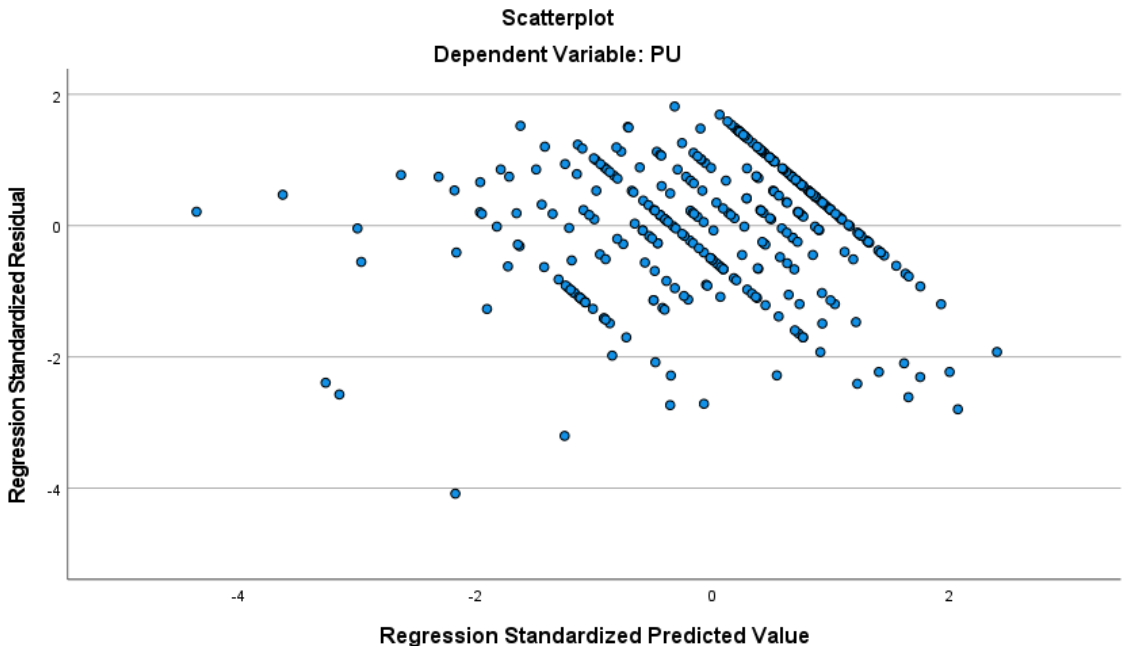

Figure F.2 - Normality, Homoscedasticity and Linearity Analysis – Multiple Linear Regression Scatterplot – Perceived Usefulness (PU)

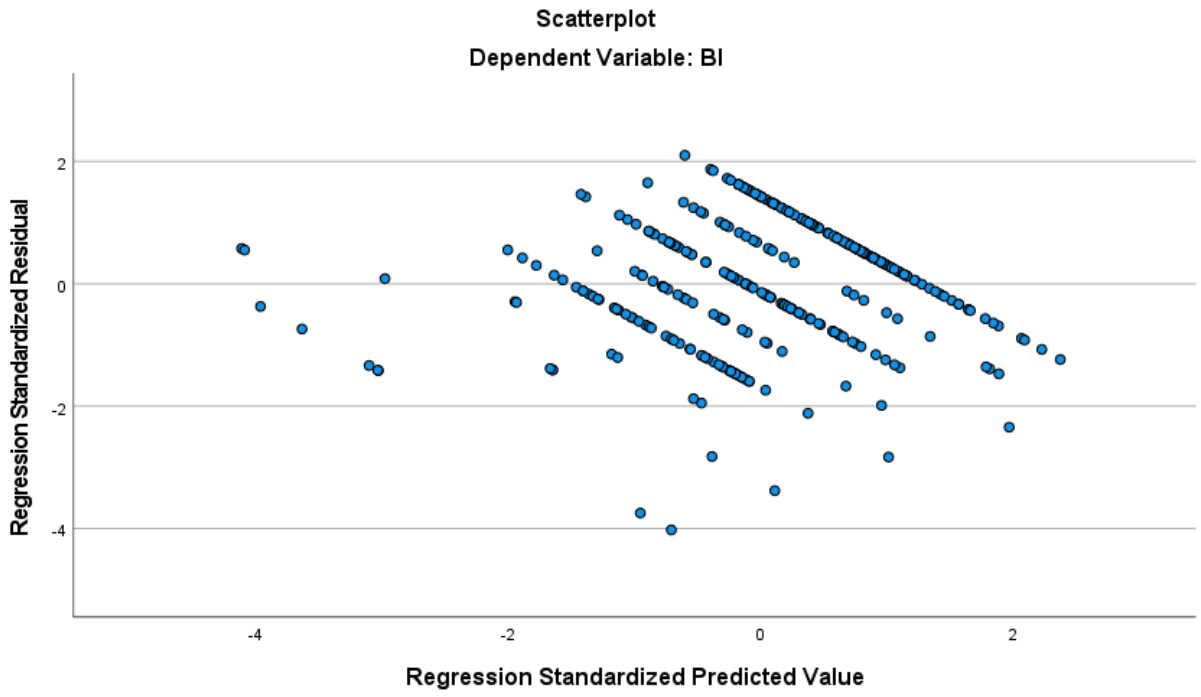

Figure F.3 - Normality, Homoscedasticity and Linearity Analysis – Multiple Linear Regression Scatterplot – Behavioral Intention to Use (BIU)

Table F.1 - Multicollinearity Analysis - Perceived Ease of Use (PEOU)

Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	1.995	.432		4.614	<.001		
Professional Background	-.057	.092	-.034	-.616	.538	.946	1.057
Gender	-.019	.102	-.010	-.184	.854	.955	1.048
Age	-.102	.097	-.097	-1.044	.297	.342	2.925
Years of Experience	-.030	.134	-.021	-.223	.824	.336	2.978
Location of the Institution of Study or Work	.037	.032	.064	1.157	.248	.970	1.031
The regime of Educational or Work Institutions	-.011	.072	-.009	-.158	.875	.953	1.050
Received training about the use of eHealth?	-.298	.163	-.099	-1.831	.068	.991	1.009

a. Dependent Variable: PEOU

Table F.2 - Multicollinearity Analysis - Perceived Usefulness (PU)

Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.268	.407		.658	.511		
Professional Background	.268	.084	.150	3.175	.002	.945	1.058
Gender	.167	.093	.084	1.788	.075	.954	1.048
Age	.062	.089	.055	.697	.486	.341	2.935
Years of Experience	-.159	.122	-.103	-1.295	.196	.336	2.979
Location of the Institution of Study or Work	-.018	.029	-.029	-.622	.534	.966	1.035
The regime of Educational or Work Institutions	.029	.066	.021	.436	.663	.952	1.050
Received training about the use of eHealth?	-.179	.149	-.056	-1.200	.231	.981	1.019
PEOU	.549	.050	.511	10.982	<.001	.973	1.028

a. Dependent Variable: PU

Table F.3 - Multicollinearity Analysis – Behavioral Intention to Use (BIU)

Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.105	.437		.240	.811		
Professional Background	.297	.092	.138	3.221	.001	.914	1.094
Gender	-.159	.101	-.066	-1.573	.117	.940	1.064
Age	-.114	.096	-.083	-1.185	.237	.339	2.950
Years of Experience	.018	.132	.010	.136	.892	.331	3.022
Location of the Institution of Study or Work	.065	.031	.086	2.070	.039	.965	1.036
The regime of Educational or Work Institutions	-.094	.071	-.056	-1.327	.185	.950	1.053
Received training about the use of eHealth?	-.016	.160	-.004	-.098	.922	.976	1.025
PEOU	.284	.066	.219	4.325	<.001	.648	1.543
PU	.353	.062	.293	5.687	<.001	.629	1.590
PC	.306	.057	.269	5.383	<.001	.665	1.503

a. Dependent Variable: PC

Table F.4 - Pearson's Correlation Matrix for Perceived Usefulness, Perceived Ease of Use, Perceived Compatibility and Behavioral Intention to Use.

Correlations

Pearson Correlation	BIU	Professional Background	Gender	Age	Years of Experience	Location	Regime	Formation	PEOU	PU	PC
BIU	1.000	.145	-.005	-.121	-.108	.094	-.014	-.076	.506	.552	.515
Professional Background	.145	1.000	-.015	.074	.108	.048	.200	.030	-.045	.120	-.023
Gender	-.005	-.015	1.000	-.179	-.192	-.099	.047	-.010	.006	.099	.114
Age	-.121	.074	-.179	1.000	.810	.119	-.026	.015	-.108	-.092	-.106
Years of Experience	-.108	.108	-.192	.810	1.000	.148	-.006	-.020	-.089	-.107	-.148
Location	.094	.048	-.099	.119	.148	1.000	-.024	.029	.046	-.018	-.011
Regime	-.014	.200	.047	-.026	-.006	-.024	1.000	.059	-.021	.041	.037
Formation	-.076	.030	-.010	.015	-.020	.029	.059	1.000	-.100	-.100	-.088
PEOU	.506	-.045	.006	-.108	-.089	.046	-.021	-.100	1.000	.512	.483
PU	.552	.120	.099	-.092	-.107	-.018	.041	-.100	.512	1.000	.497
PC	.515	-.023	.114	-.106	-.148	-.011	.037	-.088	.483	.497	1.000

Annexe G- Test Results from Mediation Model 1

Annex G.1- Mediation Model with variable *Professional Background* as variable X (antecedent independent variable)

Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 4.1 *****************

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2022). www.guilford.com/p/hayes3

****
Model : 6
Y : BIU
X : PB
M1 : PEOU
M2 : PU

Covariates:
PC

Sample
Size: 440

****

OUTCOME VARIABLE:
PEOU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.4876	.2377	.4169	68.1498	2.0000	437.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.8719	.0867	10.0541	.0000	.7015	1.0424
PB	-.0930	.0365	-2.5490	.0111	-.1647	-.0213
PC	.4324	.0373	11.5822	.0000	.3590	.5058

Standardized coefficients

	coeff
PB	-.1069
PC	.4859

****

OUTCOME VARIABLE:
PU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.5735	.3289	.3997	71.2212	3.0000	436.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.4397	.0942	4.6667	.0000	.2545	.6249
PB	.0808	.0360	2.2453	.0252	.0101	.1516
PEOU	.3534	.0468	7.5447	.0000	.2613	.4455
PC	.2956	.0418	7.0731	.0000	.2135	.3777

Standardized coefficients

	coeff
PB	.0891
PEOU	.3390
PC	.3187

****

OUTCOME VARIABLE:
BIU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.6358	.4042	.4989	73.7800	4.0000	435.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	-.0862	.1079	-.7996	.4244	-.2982	.1258
PB	.1203	.0404	2.9743	.0031	.0408	.1998
PEOU	.3184	.0556	5.7228	.0000	.2091	.4278
PU	.3193	.0535	5.9680	.0000	.2141	.4244
PC	.2613	.0493	5.3002	.0000	.1644	.3581

Standardized coefficients

	coeff
PB	.1120
PEOU	.2579
PU	.2696
PC	.2378

********** TOTAL EFFECT MODEL **********

OUTCOME VARIABLE:
BIU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.5123	.2624	.6148	77.7315	2.0000	437.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.4302	.1053	4.0848	.0001	.2232	.6372
PB	.1060	.0443	2.3918	.0172	.0189	.1931
PC	.5421	.0453	11.9580	.0000	.4530	.6312

Standardized coefficients

	coeff
PB	.0987
PC	.4935

********** TOTAL. DIRECT. AND INDIRECT EFFECTS OF X ON Y **********

Total effect of X on Y

Effect	se	t	p	LLCI	ULCI	c_cs
.1060	.0443	2.3918	.0172	.0189	.1931	.0987

Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI	c'_cs
.1203	.0404	2.9743	.0031	.0408	.1998	.1120

Indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
TOTAL	-.0143	.0192	-.0528	.0239
Ind1	-.0296	.0131	-.0589	-.0068
Ind2	.0258	.0125	.0046	.0539
Ind3	-.0105	.0048	-.0214	-.0026

Completely standardized indirect effect(s) of X on Y:

```
       Effect    BootSE   BootLLCI   BootULCI
TOTAL    -.0133     .0178    -.0489     .0218
Ind1     -.0276     .0121    -.0542    -.0065
Ind2      .0240     .0115     .0042     .0499
Ind3     -.0098     .0044    -.0198    -.0024

Indirect effect key:
Ind1 PB        ->   PEOU       ->   BIU
Ind2 PB        ->   PU         ->   BIU
Ind3 PB        ->   PEOU       ->   PU        ->   BIU

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
 95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
 5000

------ END MATRIX -----
```

Annex G.2- Mediation Model with variable *Gender* as variable X (antecedent independent variable)

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 4.1 *****************

        Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2022). www.guilford.com/p/hayes3

**************************************************************************
Model  : 6
   Y  : BIU
   X  : Gender
  M1  : PEOU
  M2  : PU

Covariates:
 PC

Sample
Size:  440

**************************************************************************
OUTCOME VARIABLE:
 PEOU

Model Summary
       R      R-sq       MSE         F       df1       df2         p
    .4784     .2289     .4217   64.8567    2.0000   437.0000     .0000
```

Model

	coeff	se	t	p	LLCI	ULCI
constant	.8421	.1419	5.9337	.0000	.5631	1.1210
Gender	-.0899	.0759	-1.1841	.2370	-.2390	.0593
PC	.4250	.0374	11.3626	.0000	.3515	.4986

Standardized coefficients

	coeff
Gender	-.1218
PC	.4776

****

OUTCOME VARIABLE:
PU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.5691	.3239	.4027	69.6227	3.0000	436.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.4344	.1441	3.0137	.0027	.1511	.7177
Gender	.0992	.0743	1.3363	.1821	-.0467	.2452
PEOU	.3442	.0467	7.3636	.0000	.2523	.4361
PC	.3055	.0416	7.3434	.0000	.2237	.3873

Standardized coefficients

	coeff
Gender	.1290
PEOU	.3302
PC	.3293

****

OUTCOME VARIABLE:
BIU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.6284	.3948	.5067	70.9554	4.0000	435.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.3690	.1634	2.2586	.0244	.0479	.6901
Gender	-.1174	.0835	-1.4064	.1603	-.2815	.0467
PEOU	.2878	.0556	5.1772	.0000	.1786	.3971
PU	.3411	.0537	6.3501	.0000	.2355	.4467
PC	.2779	.0495	5.6186	.0000	.1807	.3752

Standardized coefficients

	coeff
Gender	-.1289

```
PEOU       .2332
PU         .2880
PC         .2530

************************** TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 BIU

Model Summary
        R      R-sq       MSE         F       df1       df2         p
    .5056     .2556     .6204    75.0403    2.0000   437.0000     .0000

Model
           coeff       se         t         p      LLCI      ULCI
constant     .8584     .1721    4.9875     .0000     .5202    1.1967
Gender      -.1200     .0920   -1.3034     .1931    -.3008     .0609
PC           .5544     .0454   12.2200     .0000     .4653     .6436

Standardized coefficients
          coeff
Gender    -.1317
PC         .5047

************** TOTAL. DIRECT. AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
    Effect       se         t         p      LLCI      ULCI      c_ps
    -.1200     .0920   -1.3034     .1931    -.3008     .0609    -.1317

Direct effect of X on Y
    Effect       se         t         p      LLCI      ULCI     c'_ps
    -.1174     .0835   -1.4064     .1603    -.2815     .0467    -.1289

Indirect effect(s) of X on Y:
        Effect    BootSE   BootLLCI   BootULCI
TOTAL    -.0026     .0439    -.0924     .0841
Ind1     -.0259     .0249    -.0781     .0202
Ind2      .0339     .0273    -.0181     .0901
Ind3     -.0106     .0099    -.0309     .0084

Partially standardized indirect effect(s) of X on Y:
        Effect    BootSE   BootLLCI   BootULCI
TOTAL    -.0028     .0483    -.1021     .0912
Ind1     -.0284     .0274    -.0870     .0218
Ind2      .0372     .0299    -.0200     .0980
Ind3     -.0116     .0109    -.0339     .0094

Indirect effect key:
Ind1 Gender     ->   PEOU       ->   BIU
Ind2 Gender     ->   PU         ->   BIU
Ind3 Gender     ->   PEOU       ->   PU         ->   BIU
```

********** ANALYSIS NOTES AND ERRORS **********

Level of confidence for all confidence intervals in output:
 95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
 5000

NOTE: Standardized coefficients for dichotomous or multicategorical X are in
    partially standardized form.

------ END MATRIX -----

Annex G.3- Mediation Model with variable *Age* as variable X (antecedent independent variable)

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Version 4.1 **********

        Written by Andrew F. Hayes, Ph.D.   www.afhayes.com
    Documentation available in Hayes (2022). www.guilford.com/p/hayes3

****
Model : 6
   Y : BIU
   X : Age
  M1 : PEOU
  M2 : PU

Covariates:
 PC

Sample
Size: 440

****
OUTCOME VARIABLE:
 PEOU

Model Summary
       R   R-sq   MSE   F   df1   df2   p
    .4802   .2305   .4208   65.4683   2.0000 437.0000   .0000

Model
          coeff   se   t   p   LLCI   ULCI
constant   .5535   .0956   5.7886   .0000   .3656   .7414
Age   .0577   .0376   1.5325   .1261   -.0163   .1317
PC   .4316   .0377   11.4424   .0000   .3575   .5058

Standardized coefficients

```
       coeff
Age     .0650
PC      .4850

************************************************************************
OUTCOME VARIABLE:
 PU

Model Summary
       R      R-sq       MSE         F       df1       df2         p
    .5680     .3226     .4035    69.2138    3.0000   436.0000     .0000

Model
          coeff       se         t         p       LLCI      ULCI
constant     .6914     .0972    7.1165     .0000     .5004     .8823
Age         -.0361     .0370    -.9763     .3295    -.1087     .0366
PEOU         .3440     .0468    7.3446     .0000     .2520     .4361
PC           .3022     .0421    7.1777     .0000     .2195     .3850

Standardized coefficients
       coeff
Age     -.0390
PEOU     .3300
PC       .3258

************************************************************************
OUTCOME VARIABLE:
 BIU

Model Summary
       R      R-sq       MSE         F       df1       df2         p
    .6296     .3964     .5054    71.4116    4.0000   435.0000     .0000

Model
          coeff       se         t         p       LLCI      ULCI
constant     .3220     .1149    2.8032     .0053     .0962     .5478
Age         -.0728     .0414   -1.7570     .0796    -.1541     .0086
PEOU         .3019     .0556    5.4327     .0000     .1927     .4111
PU           .3319     .0536    6.1922     .0000     .2266     .4373
PC           .2638     .0498    5.2933     .0000     .1658     .3617

Standardized coefficients
       coeff
Age     -.0664
PEOU     .2446
PU       .2803
PC       .2401

************************** TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 BIU
```

Model Summary

R	R-sq	MSE	F	df1	df2	p
.5057	.2558	.6203	75.0850	2.0000	437.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.7818	.1161	6.7343	.0000	.5536	1.0100
Age	-.0607	.0457	-1.3288	.1846	-.1505	.0291
PC	.5437	.0458	11.8717	.0000	.4537	.6337

Standardized coefficients

	coeff
Age	-.0554
PC	.4949

********** TOTAL. DIRECT. AND INDIRECT EFFECTS OF X ON Y **********

Total effect of X on Y

Effect	se	t	p	LLCI	ULCI	c_cs
-.0607	.0457	-1.3288	.1846	-.1505	.0291	-.0554

Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI	c'_cs
-.0728	.0414	-1.7570	.0796	-.1541	.0086	-.0664

Indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
TOTAL	.0120	.0231	-.0319	.0586
Ind1	.0174	.0140	-.0073	.0476
Ind2	-.0120	.0125	-.0373	.0121
Ind3	.0066	.0053	-.0026	.0180

Completely standardized indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
TOTAL	.0110	.0210	-.0290	.0527
Ind1	.0159	.0126	-.0066	.0427
Ind2	-.0109	.0113	-.0338	.0111
Ind3	.0060	.0048	-.0024	.0162

Indirect effect key:

Ind1 Age -> PEOU -> BIU
Ind2 Age -> PU -> BIU
Ind3 Age -> PEOU -> PU -> BIU

********** ANALYSIS NOTES AND ERRORS **********

Level of confidence for all confidence intervals in output:
95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
5000

------ END MATRIX -----

Annex G.4- Mediation Model with variable *Years of Experience* as variable X (antecedent independent variable)

Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 4.1 *****************

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2022). www.guilford.com/p/hayes3

****
Model : 6
Y : BIU
X : YE
M1 : PEOU
M2 : PU

Covariates:
PC

Sample
Size: 341

****
OUTCOME VARIABLE:
PEOU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.4831	.2334	.4187	51.4480	2.0000	338.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.7684	.1031	7.4513	.0000	.5656	.9713
YE	-.0262	.0693	-.3790	.7049	-.1625	.1100
PC	.4209	.0422	9.9689	.0000	.3379	.5040

Standardized coefficients

	coeff
YE	-.0182
PC	.4801

****
OUTCOME VARIABLE:
PU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.5864	.3439	.4148	58.8784	3.0000	337.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.6181	.1108	5.5812	.0000	.4003	.8360
YE	-.0430	.0690	-.6230	.5337	-.1786	.0927
PEOU	.3802	.0541	7.0224	.0000	.2737	.4867
PC	.3031	.0478	6.3399	.0000	.2090	.3971

Standardized coefficients

	coeff
YE	-.0278
PEOU	.3539
PC	.3218

****

OUTCOME VARIABLE:
BIU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.6449	.4159	.5393	59.8004	4.0000	336.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.1161	.1320	.8794	.3798	-.1436	.3757
YE	-.0325	.0787	-.4133	.6796	-.1873	.1222
PEOU	.2921	.0661	4.4187	.0000	.1620	.4221
PU	.3756	.0621	6.0468	.0000	.2534	.4978
PC	.2828	.0577	4.9043	.0000	.1694	.3963

Standardized coefficients

	coeff
YE	-.0174
PEOU	.2253
PU	.3113
PC	.2488

********** TOTAL EFFECT MODEL **********

OUTCOME VARIABLE:
BIU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.5158	.2660	.6736	61.2533	2.0000	338.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.6824	.1308	5.2168	.0000	.4251	.9397
YE	-.0601	.0879	-.6837	.4946	-.2329	.1127

```
PC          .5797     .0536    10.8242     .0000     .4744     .6850

Standardized coefficients
       coeff
YE     -.0322
PC      .5100

************** TOTAL. DIRECT. AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
    Effect       se        t        p      LLCI      ULCI      c_cs
    -.0601     .0879    -.6837     .4946    -.2329     .1127    -.0322

Direct effect of X on Y
    Effect       se        t        p      LLCI      ULCI     c'_cs
    -.0325     .0787    -.4133     .6796    -.1873     .1222    -.0174

Indirect effect(s) of X on Y:
        Effect    BootSE   BootLLCI   BootULCI
TOTAL    -.0275     .0471    -.1220     .0612
Ind1     -.0077     .0244    -.0604     .0382
Ind2     -.0161     .0265    -.0682     .0380
Ind3     -.0037     .0116    -.0271     .0189

Completely standardized indirect effect(s) of X on Y:
        Effect    BootSE   BootLLCI   BootULCI
TOTAL    -.0148     .0250    -.0649     .0322
Ind1     -.0041     .0129    -.0317     .0198
Ind2     -.0087     .0140    -.0357     .0204
Ind3     -.0020     .0062    -.0144     .0099

Indirect effect key:
Ind1 YE        ->   PEOU      ->   BIU
Ind2 YE        ->   PU        ->   BIU
Ind3 YE        ->   PEOU      ->   PU        ->   BIU

********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
  5000

------ END MATRIX -----
```

Annex G.5- Mediation Model with variable *Location of Institution of Study or Work* as variable X (antecedent independent variable)

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 4.1 *****************

        Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2022). www.guilford.com/p/hayes3

**************************************************************************
Model  : 6
   Y  : BIU
   X  : LISW
  M1  : PEOU
  M2  : PU

Covariates:
 PC

Sample
Size:  440

**************************************************************************
OUTCOME VARIABLE:
 PEOU

Model Summary
        R      R-sq       MSE         F       df1       df2         p
    .4783     .2288     .4218    64.8171    2.0000   437.0000     .0000

Model
           coeff       se         t         p      LLCI      ULCI
constant     .6086     .0783    7.7716     .0000     .4547     .7625
LISW         .0294     .0254    1.1579     .2475    -.0205     .0792
PC           .4243     .0374   11.3460     .0000     .3508     .4977

Standardized coefficients
         coeff
LISW     .0487
PC       .4767

**************************************************************************
OUTCOME VARIABLE:
 PU

Model Summary
        R      R-sq       MSE         F       df1       df2         p
    .5675     .3220     .4038    69.0300    3.0000   436.0000     .0000

Model
           coeff       se         t         p      LLCI      ULCI
constant     .6592     .0818    8.0634     .0000     .4985     .8199
LISW        -.0189     .0249    -.7608     .4472    -.0678     .0299
PEOU         .3426     .0468    7.3206     .0000     .2507     .4346
```

```
PC          .3074     .0416     7.3849     .0000     .2256     .3892

Standardized coefficients
        coeff
LISW     -.0301
PEOU      .3287
PC        .3314

************************************************************************
OUTCOME VARIABLE:
 BIU

Model Summary
        R      R-sq       MSE         F       df1       df2         p
    .6306     .3977     .5043    71.8110    4.0000   435.0000     .0000

Model
          coeff       se         t         p      LLCI      ULCI
constant     .0212     .0979     .2164     .8288    -.1713     .2137
LISW         .0560     .0278    2.0146     .0446     .0014     .1106
PEOU         .2865     .0554    5.1689     .0000     .1776     .3954
PU           .3402     .0535    6.3572     .0000     .2350     .4454
PC           .2784     .0493    5.6415     .0000     .1814     .3754

Standardized coefficients
        coeff
LISW      .0751
PEOU      .2321
PU        .2873
PC        .2534

************************** TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 BIU

Model Summary
        R      R-sq       MSE         F       df1       df2         p
    .5094     .2595     .6172    76.5833    2.0000   437.0000     .0000

Model
          coeff       se         t         p      LLCI      ULCI
constant     .4908     .0947    5.1810     .0000     .3046     .6770
LISW         .0614     .0307    2.0012     .0460     .0011     .1217
PC           .5540     .0452   12.2478     .0000     .4651     .6429

Standardized coefficients
        coeff
LISW      .0824
PC        .5042

************** TOTAL. DIRECT. AND INDIRECT EFFECTS OF X ON Y **************
```

```
Total effect of X on Y
   Effect       se        t        p      LLCI      ULCI      c_cs
    .0614     .0307    2.0012     .0460     .0011     .1217     .0824

Direct effect of X on Y
   Effect       se        t        p      LLCI      ULCI     c'_cs
    .0560     .0278    2.0146     .0446     .0014     .1106     .0751

Indirect effect(s) of X on Y:
       Effect    BootSE   BootLLCI   BootULCI
TOTAL     .0054     .0138    -.0218     .0329
Ind1      .0084     .0076    -.0053     .0253
Ind2     -.0064     .0088    -.0240     .0109
Ind3      .0034     .0030    -.0022     .0097

Completely standardized indirect effect(s) of X on Y:
       Effect    BootSE   BootLLCI   BootULCI
TOTAL     .0073     .0185    -.0293     .0447
Ind1      .0113     .0101    -.0070     .0333
Ind2     -.0086     .0118    -.0318     .0150
Ind3      .0046     .0040    -.0030     .0129

Indirect effect key:
Ind1 LISW       ->   PEOU       ->   BIU
Ind2 LISW       ->   PU         ->   BIU
Ind3 LISW       ->   PEOU       ->   PU         ->   BIU

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
 95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
 5000

------ END MATRIX -----
```

Annex G.6- Mediation Model with variable *Regime of Educational or Work Institution or Work* as variable X (antecedent independent variable)

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 4.1 *****************

        Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2022). www.guilford.com/p/hayes3

**************************************************************************
Model  : 6
   Y  : BIU
   X  : RI
```

```
  M1  : PEOU
  M2  : PU

Covariates:
 PC

Sample
Size:  440

************************************************************************
OUTCOME VARIABLE:
 PEOU

Model Summary
       R      R-sq       MSE         F       df1       df2         p
    .4761     .2267     .4230    64.0422    2.0000   437.0000     .0000

Model
          coeff       se         t         p      LLCI      ULCI
constant     .6550     .0864    7.5764     .0000     .4851     .8249
RI           .0221     .0587     .3769     .7065    -.0933     .1375
PC           .4231     .0375   11.2969     .0000     .3495     .4967

Standardized coefficients
       coeff
RI     .0159
PC     .4754

************************************************************************
OUTCOME VARIABLE:
 PU

Model Summary
       R      R-sq       MSE         F       df1       df2         p
    .5668     .3212     .4043    68.7775    3.0000   436.0000     .0000

Model
          coeff       se         t         p      LLCI      ULCI
constant     .5947     .0899    6.6147     .0000     .4180     .7713
RI           .0146     .0574     .2540     .7996    -.0982     .1274
PEOU         .3405     .0468    7.2796     .0000     .2485     .4324
PC           .3086     .0416    7.4148     .0000     .2268     .3904

Standardized coefficients
        coeff
RI      .0100
PEOU    .3266
PC      .3327

************************************************************************
OUTCOME VARIABLE:
 BIU
```

Model Summary

R	R-sq	MSE	F	df1	df2	p
.6271	.3932	.5081	70.4768	4.0000	435.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.2329	.1057	2.2029	.0281	.0251	.4406
RI	-.0581	.0644	-.9022	.3674	-.1846	.0684
PEOU	.2943	.0555	5.3009	.0000	.1852	.4034
PU	.3369	.0537	6.2753	.0000	.2314	.4424
PC	.2761	.0495	5.5757	.0000	.1787	.3734

Standardized coefficients

	coeff
RI	-.0337
PEOU	.2384
PU	.2845
PC	.2513

********** TOTAL EFFECT MODEL **********

OUTCOME VARIABLE:
BIU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.5034	.2534	.6223	74.1602	2.0000	437.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.7011	.1049	6.6863	.0000	.4950	.9072
RI	-.0441	.0712	-.6194	.5360	-.1841	.0958
PC	.5531	.0454	12.1752	.0000	.4638	.6423

Standardized coefficients

	coeff
RI	-.0256
PC	.5034

********** TOTAL. DIRECT. AND INDIRECT EFFECTS OF X ON Y **********

Total effect of X on Y

Effect	se	t	p	LLCI	ULCI	c_cs
-.0441	.0712	-.6194	.5360	-.1841	.0958	-.0256

Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI	c'_cs
-.0581	.0644	-.9022	.3674	-.1846	.0684	-.0337

Indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
TOTAL	.0140	.0295	-.0416	.0750

```
Ind1      .0065     .0166    -.0229     .0432
Ind2      .0049     .0170    -.0281     .0400
Ind3      .0025     .0063    -.0094     .0162

Completely standardized indirect effect(s) of X on Y:
        Effect    BootSE   BootLLCI   BootULCI
TOTAL     .0081     .0170    -.0240     .0421
Ind1      .0038     .0095    -.0135     .0243
Ind2      .0029     .0098    -.0166     .0224
Ind3      .0015     .0037    -.0057     .0092

Indirect effect key:
Ind1 RI        ->    PEOU       ->    BIU
Ind2 RI        ->    PU         ->    BIU
Ind3 RI        ->    PEOU       ->    PU         ->    BIU

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
  5000

------ END MATRIX -----
```

Annex G.7- Mediation Model with variable *Received training about the use of eHealth?* as variable X (antecedent independent variable)

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 4.1 *****************

        Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2022). www.guilford.com/p/hayes3

**************************************************************************
Model  : 6
    Y  : BIU
    X  : FeH
   M1  : PEOU
   M2  : PU

Covariates:
 PC

Sample
Size:  440

**************************************************************************
OUTCOME VARIABLE:
```

PEOU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.4802	.2306	.4208	65.5016	2.0000	437.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	1.0466	.2391	4.3764	.0000	.5766	1.5166
FeH	-.1857	.1199	-1.5492	.1221	-.4213	.0499
PC	.4167	.0376	11.0863	.0000	.3429	.4906

Standardized coefficients

	coeff
FeH	-.2517
PC	.4683

****

OUTCOME VARIABLE:
PU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.5673	.3218	.4040	68.9527	3.0000	436.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.7641	.2394	3.1920	.0015	.2936	1.2346
FeH	-.0765	.1178	-.6491	.5166	-.3080	.1550
PEOU	.3384	.0469	7.2204	.0000	.2463	.4305
PC	.3070	.0417	7.3625	.0000	.2250	.3889

Standardized coefficients

	coeff
FeH	-.0994
PEOU	.3247
PC	.3309

****

OUTCOME VARIABLE:
BIU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.6265	.3925	.5086	70.2731	4.0000	435.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.0126	.2717	.0462	.9631	-.5215	.5466
FeH	.0747	.1322	.5647	.5726	-.1852	.3346
PEOU	.2955	.0556	5.3108	.0000	.1862	.4049
PU	.3372	.0537	6.2757	.0000	.2316	.4429

```
PC          .2771     .0496    5.5857     .0000     .1796     .3746

Standardized coefficients
        coeff
FeH      .0820
PEOU     .2394
PU       .2848
PC       .2522

************************** TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 BIU

Model Summary
        R      R-sq       MSE         F       df1       df2         p
    .5028     .2528     .6228    73.9268    2.0000   437.0000     .0000

Model
           coeff        se         t         p      LLCI      ULCI
constant     .6990     .2909    2.4028     .0167     .1272    1.2708
FeH         -.0272     .1458    -.1865     .8521    -.3138     .2594
PC           .5513     .0457   12.0556     .0000     .4614     .6412

Standardized coefficients
        coeff
FeH     -.0299
PC       .5018

************** TOTAL. DIRECT. AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
    Effect        se         t         p      LLCI      ULCI      c_ps
    -.0272     .1458    -.1865     .8521    -.3138     .2594    -.0299

Direct effect of X on Y
    Effect        se         t         p      LLCI      ULCI     c'_ps
     .0747     .1322     .5647     .5726    -.1852     .3346     .0820

Indirect effect(s) of X on Y:
        Effect    BootSE   BootLLCI   BootULCI
TOTAL    -.1019     .0538    -.2098    -.0012
Ind1     -.0549     .0366    -.1300     .0119
Ind2     -.0258     .0313    -.0875     .0367
Ind3     -.0212     .0147    -.0537     .0042

Partially standardized indirect effect(s) of X on Y:
        Effect    BootSE   BootLLCI   BootULCI
TOTAL    -.1118     .0590    -.2291    -.0013
Ind1     -.0603     .0400    -.1436     .0132
Ind2     -.0283     .0345    -.0974     .0397
Ind3     -.0233     .0161    -.0587     .0045
```

Indirect effect key:
Ind1 FeH -> PEOU -> BIU
Ind2 FeH -> PU -> BIU
Ind3 FeH -> PEOU -> PU -> BIU

********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
5000

NOTE: Standardized coefficients for dichotomous or multicategorical X are in
partially standardized form.

------ END MATRIX -----

Annex H- Test Results from Mediation Model 2

Annex H.1- Mediation Model 2 with variable *Professional Background* as variable X (antecedent independent variable)

Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 4.1 *****************

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2022). www.guilford.com/p/hayes3

****
Model : 4
Y : PU
X : PB
M : PEOU

Sample
Size: 440

****
OUTCOME VARIABLE:
PEOU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.0613	.0038	.5436	1.6508	1.0000	438.0000	.1995

Model

	coeff	se	t	p	LLCI	ULCI

```
constant    1.1675     .0946    12.3349     .0000     .9814    1.3535
PB          -.0533     .0415    -1.2848     .1995    -.1348     .0282

**************************************************************************
OUTCOME VARIABLE:
 PU

Model Summary
        R      R-sq       MSE         F       df1       df2         p
    .5019     .2519     .4446    73.5640    2.0000   437.0000     .0000

Model
          coeff       se         t         p       LLCI      ULCI
constant    .4543     .0994    4.5730     .0000     .2591     .6496
PB          .1165     .0376    3.1003     .0021     .0427     .1904
PEOU        .5140     .0432   11.8947     .0000     .4290     .5989

************************** TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 PU

Model Summary
        R      R-sq       MSE         F       df1       df2         p
    .0983     .0097     .5872    4.2740    1.0000   438.0000     .0393

Model
          coeff       se         t         p       LLCI      ULCI
constant    1.0544     .0984   10.7190     .0000     .8610    1.2477
PB          .0891     .0431    2.0674     .0393     .0044     .1739

************** TOTAL. DIRECT. AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
    Effect       se         t         p       LLCI      ULCI
    .0891     .0431    2.0674     .0393     .0044     .1739

Direct effect of X on Y
    Effect       se         t         p       LLCI      ULCI
    .1165     .0376    3.1003     .0021     .0427     .1904

Indirect effect(s) of X on Y:
       Effect    BootSE   BootLLCI   BootULCI
PEOU    -.0274     .0214    -.0706     .0132

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
  5000
```

------ END MATRIX -----

Annex H.2- Mediation Model 2 with variable *Professional Background* as variable X (antecedent independent variable)

Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 4.1 *****************

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2022). www.guilford.com/p/hayes3

****
Model : 4
Y : PU
X : Gender
M : PEOU

Sample
Size: 440

****
OUTCOME VARIABLE:
PEOU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.0327	.0011	.5451	.4684	1.0000	438.0000	.4941

Model

	coeff	se	t	p	LLCI	ULCI
constant	1.1601	.1582	7.3346	.0000	.8492	1.4709
Gender	-.0590	.0862	-.6844	.4941	-.2284	.1104

****
OUTCOME VARIABLE:
PU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.4902	.2403	.4515	69.1021	2.0000	437.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.4728	.1525	3.1001	.0021	.1731	.7726
Gender	.1311	.0785	1.6699	.0956	-.0232	.2854
PEOU	.5081	.0435	11.6852	.0000	.4227	.5936

************************ TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:

```
 PU

Model Summary
       R      R-sq       MSE         F       df1       df2         p
    .0537     .0029     .5912    1.2683    1.0000   438.0000     .2607

Model
          coeff       se         t         p      LLCI      ULCI
constant   1.0623     .1647    6.4494     .0000     .7386    1.3861
Gender      .1011     .0898    1.1262     .2607    -.0753     .2776

************** TOTAL. DIRECT. AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
    Effect       se         t         p      LLCI      ULCI
     .1011     .0898    1.1262     .2607    -.0753     .2776

Direct effect of X on Y
    Effect       se         t         p      LLCI      ULCI
     .1311     .0785    1.6699     .0956    -.0232     .2854

Indirect effect(s) of X on Y:
       Effect    BootSE   BootLLCI   BootULCI
PEOU    -.0300     .0485    -.1232     .0673

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
 95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
 5000

------ END MATRIX -----
```

Annex H.3- Mediation Model 2 with variable *Age* as variable X (antecedent independent variable)

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 4.1 *****************

        Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
   Documentation available in Hayes (2022). www.guilford.com/p/hayes3

**************************************************************************
Model  : 4
   Y  : PU
   X  : Age
   M  : PEOU
```

```
Sample
Size:  440

**************************************************************************
OUTCOME VARIABLE:
 PEOU

Model Summary
       R      R-sq       MSE         F       df1       df2         p
    .0036     .0000     .5457     .0058    1.0000   438.0000     .9392

Model
         coeff       se         t         p      LLCI      ULCI
constant    1.0614     .0964    11.0058     .0000     .8719    1.2509
Age        -.0032     .0424    -.0763     .9392    -.0866     .0802

**************************************************************************
OUTCOME VARIABLE:
 PU

Model Summary
       R      R-sq       MSE         F       df1       df2         p
    .4925     .2426     .4501    69.9721    2.0000   437.0000     .0000

Model
         coeff       se         t         p      LLCI      ULCI
constant     .8757     .0990    8.8483     .0000     .6812    1.0702
Age        -.0782     .0385   -2.0296     .0430    -.1540    -.0025
PEOU        .5054     .0434   11.6469     .0000     .4202     .5907

************************** TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 PU

Model Summary
       R      R-sq       MSE         F       df1       df2         p
    .0863     .0074     .5885    3.2839    1.0000   438.0000     .0706

Model
         coeff       se         t         p      LLCI      ULCI
constant    1.4121     .1002   14.0998     .0000    1.2153    1.6090
Age        -.0799     .0441   -1.8122     .0706    -.1665     .0068

************** TOTAL. DIRECT. AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
   Effect       se         t         p      LLCI      ULCI
   -.0799     .0441   -1.8122     .0706    -.1665     .0068

Direct effect of X on Y
   Effect       se         t         p      LLCI      ULCI
```

```
    -.0782     .0385    -2.0296     .0430    -.1540    -.0025

Indirect effect(s) of X on Y:
       Effect    BootSE   BootLLCI   BootULCI
PEOU    -.0016     .0257    -.0545     .0487

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
 95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
 5000

------ END MATRIX -----
```

Annex H.4- Mediation Model 2 with variable *Years of Experience* as variable X (antecedent independent variable)

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 4.1 *****************

        Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2022). www.guilford.com/p/hayes3

**************************************************************************
Model  : 4
   Y  : PU
   X  : YE
   M  : PEOU

Sample
Size:  341

**************************************************************************
OUTCOME VARIABLE:
 PEOU

Model Summary
        R      R-sq       MSE         F       df1       df2         p
     .0893     .0080     .5402    2.7259    1.0000   339.0000     .0997

Model
          coeff       se         t         p       LLCI      ULCI
constant    1.2419     .1040   11.9437     .0000    1.0374    1.4464
YE         -.1285     .0778   -1.6510     .0997    -.2815     .0246

**************************************************************************
OUTCOME VARIABLE:
```

PU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.5154	.2656	.4628	61.1316	2.0000	338.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.7559	.1147	6.5885	.0000	.5302	.9815
YE	-.0955	.0723	-1.3212	.1873	-.2378	.0467
PEOU	.5438	.0503	10.8162	.0000	.4449	.6427

********** TOTAL EFFECT MODEL **********

OUTCOME VARIABLE:
PU

Model Summary

R	R-sq	MSE	F	df1	df2	p
.1070	.0115	.6212	3.9293	1.0000	339.0000	.0483

Model

	coeff	se	t	p	LLCI	ULCI
constant	1.4312	.1115	12.8352	.0000	1.2118	1.6505
YE	-.1654	.0834	-1.9823	.0483	-.3295	-.0013

********** TOTAL. DIRECT. AND INDIRECT EFFECTS OF X ON Y **********

Total effect of X on Y

Effect	se	t	p	LLCI	ULCI
-.1654	.0834	-1.9823	.0483	-.3295	-.0013

Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI
-.0955	.0723	-1.3212	.1873	-.2378	.0467

Indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
PEOU	-.0699	.0527	-.1766	.0297

********** ANALYSIS NOTES AND ERRORS **********

Level of confidence for all confidence intervals in output:
95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
5000

------ END MATRIX -----

Annex H.5- Mediation Model 2 with variable *Location of Institution of Study or Work* as variable X (antecedent independent variable)

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 4.1 *****************

      Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
  Documentation available in Hayes (2022). www.guilford.com/p/hayes3

**************************************************************************
Model  : 4
  Y  : PU
  X  : LISW
  M  : PEOU

Sample
Size:  440

**************************************************************************
OUTCOME VARIABLE:
 PEOU

Model Summary
       R      R-sq       MSE         F       df1       df2         p
    .0399     .0016     .5448     .6985    1.0000   438.0000     .4037

Model
          coeff       se         t         p      LLCI      ULCI
constant     .9943     .0802   12.4011     .0000     .8367    1.1519
LISW         .0241     .0288     .8358     .4037    -.0326     .0807

**************************************************************************
OUTCOME VARIABLE:
 PU

Model Summary
       R      R-sq       MSE         F       df1       df2         p
    .4871     .2372     .4533   67.9523    2.0000   437.0000     .0000

Model
          coeff       se         t         p      LLCI      ULCI
constant     .7747     .0850    9.1131     .0000     .6076     .9418
LISW        -.0267     .0263   -1.0151     .3106    -.0784     .0250
PEOU         .5075     .0436   11.6448     .0000     .4219     .5932

************************** TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 PU

Model Summary
```

```
      R      R-sq       MSE         F       df1       df2         p
   .0230     .0005     .5926     .2322    1.0000   438.0000     .6302

Model
          coeff       se         t         p      LLCI      ULCI
constant   1.2794     .0836   15.2994     .0000    1.1150    1.4437
LISW       -.0145     .0301    -.4818     .6302    -.0736     .0446

************** TOTAL. DIRECT. AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
   Effect       se         t         p      LLCI      ULCI
   -.0145     .0301    -.4818     .6302    -.0736     .0446

Direct effect of X on Y
   Effect       se         t         p      LLCI      ULCI
   -.0267     .0263   -1.0151     .3106    -.0784     .0250

Indirect effect(s) of X on Y:
       Effect    BootSE   BootLLCI   BootULCI
PEOU     .0122     .0149    -.0168     .0428

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
 95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
 5000

------ END MATRIX -----
```

Annex H.6- Mediation Model 2 with variable *Regime of Educational or Work Institution or Work* as variable X (antecedent independent variable)

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 4.1 *****************

        Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2022). www.guilford.com/p/hayes3

**************************************************************************
Model  : 4
   Y  : PU
   X  : RI
   M  : PEOU

Sample
Size:  440
```

```
************************************************************************
OUTCOME VARIABLE:
 PEOU

Model Summary
       R      R-sq       MSE         F       df1       df2         p
    .0287     .0008     .5452     .3599    1.0000   438.0000     .5489

Model
          coeff       se         t         p      LLCI      ULCI
constant   1.0038     .0917   10.9489     .0000     .8236    1.1839
RI          .0400     .0666     .5999     .5489    -.0910     .1709

************************************************************************
OUTCOME VARIABLE:
 PU

Model Summary
       R      R-sq       MSE         F       df1       df2         p
    .4854     .2356     .4542   67.3564    2.0000   437.0000     .0000

Model
          coeff       se         t         p      LLCI      ULCI
constant    .6836     .0944    7.2385     .0000     .4980     .8692
RI          .0210     .0608     .3454     .7300    -.0986     .1406
PEOU        .5053     .0436   11.5868     .0000     .4196     .5911

************************** TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 PU

Model Summary
       R      R-sq       MSE         F       df1       df2         p
    .0283     .0008     .5924     .3521    1.0000   438.0000     .5532

Model
          coeff       se         t         p      LLCI      ULCI
constant   1.1908     .0956   12.4611     .0000    1.0030    1.3786
RI          .0412     .0695     .5934     .5532    -.0953     .1777

************** TOTAL. DIRECT. AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
    Effect       se         t         p      LLCI      ULCI
     .0412     .0695     .5934     .5532    -.0953     .1777

Direct effect of X on Y
    Effect       se         t         p      LLCI      ULCI
     .0210     .0608     .3454     .7300    -.0986     .1406

Indirect effect(s) of X on Y:
```

```
       Effect    BootSE   BootLLCI   BootULCI
PEOU     .0202     .0310    -.0390     .0848

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
  5000

------ END MATRIX -----
```

Annex H.7- Mediation Model 2 with variable *Received training about the use of eHealth?* as variable X (antecedent independent variable)

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 4.1 *****************

        Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2022). www.guilford.com/p/hayes3

**************************************************************************
Model  : 4
   Y  : PU
   X  : FeH
   M  : PEOU

Sample
Size:  440

**************************************************************************
OUTCOME VARIABLE:
 PEOU

Model Summary
        R      R-sq       MSE         F       df1       df2         p
     .1194     .0143     .5379    6.3337    1.0000   438.0000     .0122

Model
          coeff       se         t         p      LLCI      ULCI
constant   1.7076    .2618    6.5217    .0000    1.1930    2.2222
FeH        -.3388    .1346   -2.5167    .0122    -.6035    -.0742

**************************************************************************
OUTCOME VARIABLE:
 PU

Model Summary
```

```
       R      R-sq       MSE         F       df1       df2         p
    .4873     .2375     .4532    68.0415    2.0000   437.0000     .0000

Model
          coeff       se         t         p      LLCI      ULCI
constant     .9749     .2517    3.8730     .0001     .4802    1.4697
FeH        -.1345     .1245   -1.0803     .2806    -.3791     .1102
PEOU        .5001     .0439   11.4033     .0000     .4139     .5863

************************** TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 PU

Model Summary
       R      R-sq       MSE         F       df1       df2         p
    .1027     .0106     .5867    4.6719    1.0000   438.0000     .0312

Model
          coeff       se         t         p      LLCI      ULCI
constant    1.8289     .2734    6.6885     .0000    1.2915    2.3663
FeH        -.3039     .1406   -2.1615     .0312    -.5803    -.0276

************** TOTAL. DIRECT. AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
   Effect       se         t         p      LLCI      ULCI
   -.3039     .1406   -2.1615     .0312    -.5803    -.0276

Direct effect of X on Y
   Effect       se         t         p      LLCI      ULCI
   -.1345     .1245   -1.0803     .2806    -.3791     .1102

Indirect effect(s) of X on Y:
       Effect    BootSE   BootLLCI   BootULCI
PEOU    -.1695     .0593    -.2888    -.0563

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
  5000

------ END MATRIX -----
```