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A Change from Negative to Positive of Later Adoption Using the Innovation Decision Process to Imply Sustainability for HR Chatbots of Private Companies in Thailand

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Abstract: The current adoption of human resource (HR) chatbots has created problems within organizations, such as stilted conversational flow and a limited range of queries and responses. This paper presents an analysis of the factors affecting these issues by employing a new conceptual model. The instances of rejection and acceptance of an HR chatbot were analyzed in this study using the innovation decision process. A survey of 251 employees from private companies in Thailand was conducted, scrutinizing their experiences of using HR chatbots. Then, the innovation decision process was utilized to identify the critical factors that influenced the shift in attitude from rejection to acceptance. The survey identified three key findings affecting employees' negative attitudes towards the HR chatbot, namely, hesitation concerning the perceived ease-of-use (HPEOU), word of mouth (WoM), and personal innovation (PI). Additionally, our research also revealed that the way people perceive the level of risk associated with using the HR chatbot directly affects their intention to reject. This highlighted the significance of organizational development for facilitating the re-engagement of employees with the HR chatbot, and specifically, a focus on the elements of people (PP), processes (PC), technology (TE), and policy (PL). This study demonstrated the advances in process development within an organization and its corresponding policies. The validation of HR chatbots was influenced by a distinct corporate vision. This study provides guidelines for the implementation of HR chatbots for employees in private corporations in Thailand. The findings can assist in enhancing operational performance and the subsequent adoption of HR chatbots, resulting in the sustainable development of an efficient acceptance evaluation model of change from negative to positive. This model uses the innovation decision process to foster the sustainability of HR chatbots in private companies in Thailand.

Keywords: digital transformation; HR chatbots; later adoption; innovation decision process; organization; sustainable development

1. Introduction

Rapid social, economic, and cultural transformations are the norm in the twenty-first century, propelled by the development of digital technologies that have created global connections. In this age of digital transformation, these changes have had an impact on the operations of all industrial enterprises. Business operations have evolved in tandem with the modern world. Organizations and businesses have reoriented their focus towards survival to increasing investment in products and services that are more innovative [1]. In order to thrive in the twenty-first century, managers must be cognizant of and prepared to navigate its challenges. This entails staying abreast of contemporary developments in information, communication, and technology, which have assumed a pivotal role in the progress of businesses across all sectors, integrating digital technology into operational processes to enhance user service, and cultivating managerial competencies that will be

regarded as critical factors in the coming century. Moreover, fostering a rapidly expanding business culture is essential for improving an organization's management, and new technology is crucial for the organization's sustainable development [2].

At present, it is evident that artificial intelligence (AI) is an additional technological tool that can assist organizations, resulting in cost and efficiency savings. Chatbot, a computer program that interacts with humans using automated algorithmic technologies including natural language processing, machine learning, and AI, is one example of the use of AI that is crucial for the development of modern corporations [3]. The valuation of the worldwide chatbot market indicated that it amounted to USD 0.84 billion in 2022 and is projected to reach approximately USD 4.9 billion by 2032, expanding at an average annual rate of 19.29% between 2022 and 2023, as shown in Figure 1 [4].
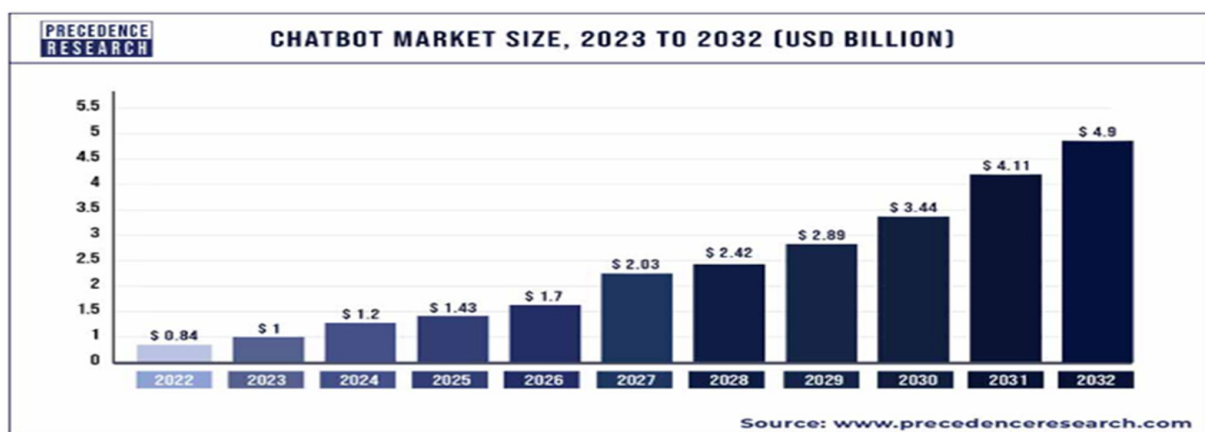

Figure 1. Chatbot market size, 2023 to 2032 (USD BILLION). Source: www.precedenceresearch.com (accessed on 26 June 2024).

A competitive advantage can be gained through the implementation of chatbots in diverse business sectors, including that of corporate communication, by generating additional revenue opportunities.

Chatbots are classified into three distinct categories based on their intended purpose.

1. ChatGPT is a natural language processing (NLP) model that has been trained with 175 billion parameters. The system was trained using extensive data and utilizes deep learning algorithms for mimicking human-like responses to user commands. Over the past few years, this artificial intelligence (AI) program has gained global acclaim. In addition, the program's extracurricular activities now include the creation of articles, which fulfill various purposes in many countries around the world [5].
2. The use of a commercial chatbot has evolved into an indispensable element of the customer service process for transactions, functioning as an intelligent conversation agent. Due to the proliferation of online inquiries of and support messages from the customer service function, self-service channels have supplanted conventional voice and email interactions [6].
3. Business organizations utilize HR chatbot, a natural language processing (NLP) technology, primarily for communication objectives. This enterprise chatbot can assist the human resources function within organizations with expedited communication, providing responses to external candidates, employees, and teams operating within the organization [7].

In particular, the HR chatbots that many organizations choose to use can add flexibility to the work of individuals and employees and reduce delays and inefficiencies in many cases. For example, a number of research studies have focused on the introduction of chatbot technology in organizations, e.g., to increase sales, as well as examining the benefits derived from this technology and the extent of its acceptance. The authors of [8] studied

the factors that influenced attitudes and intentions in accepting chatbot use in supporting smartphone purchases, using the technology acceptance theory (TAM). In [9], the authors studied the factors of performance expectations, social impact, confidence in information, and security in relation to the use of chatbots. The authors of [10] studied the use of chatbots under electronic supervision. Using the theory of acceptance and use of technology (UTAUT), they discovered that a user's previous level of computer knowledge and concerns about technological changes were influential in their experiential introduction to and use of chatbots. However, according to the theory of reasoned action (TRA), chatbot usage also has some limitations, such as response time, lack of privacy, and customer preferences for human interactions over interacting with the chatbot [11]. In addition to the limitations introduced by the possible questions users can ask, the answers received are limited by the quantity of accessible information the chatbot possesses, thus reducing the chatbot's responsiveness [7]. These limitations may affect the future acceptance of chatbots, in particular, for small and medium-sized enterprises that want to innovate to upgrade their customer service. This could affect the sustainability of chatbots or other customer technology [12]. Therefore, due to such limitations, chatbot use is still largely unsatisfactory. The above limitations might also relate to the introduction of HR chatbots to private enterprises. Furthermore, in implementing HR chatbots for employees, an organization faces the challenge of satisfying employees' requirements in lieu of having them engage in conversation with human resources officers. As a result, constant acceptance is an aspect that must be emphasized. The utilization of chatbots and preceding technologies within an organization has been the subject of research, which can be summarized by studies that have employed the innovation decision process to delineate the adoption of technologies. Recent studies have exclusively focused on the positive aspects of technology adoption (adoption). However, the negative aspects of acceptance (rejection) and the decision-making processes in steps 1–3 (knowledge, persuasion, and decision) have yet to be addressed. To date, there is a lack of research investigating methods that can enhance the innovation decision process. The distinct stages of the innovation decision process comprise the following: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. Therefore, to elaborate on the outcomes of the execution and implementation of DOI, it is necessary to provide a detailed explanation of these elements.

The purpose of this research can be achieved by formulating the following research questions in relation to private companies in Thailand:

RQ1: What significant factors in the knowledge and persuasive processes impact an individual's attitude towards rejection and subsequently contribute to the later adoption of an HR chatbot?

RQ2: What factors in the decision-making process have influenced the intention to reject and lead to the later acceptance of the use of a chatbot?

RQ3: What is the entire sequence of the innovation decision process (DOI) for evaluating the transition from rejection to the later adoption of personal resource chatbots?

RQ4: How can sustainable development be fostered with the use of an HR chatbot?

This study centered on the progression of employees' adoption of HR chatbots, beginning with their initial rejection. Through a survey acquiring data from employees of private companies in Thailand who had prior experience of utilizing HR chatbots, the research utilized the diffusion of innovation process to model the novel concepts that precipitated the rejection of an HR chatbot and its subsequent improvement and acceptance. This approach aimed to generate more substantial development outcomes, which will be elaborated on in the following section (Figure 2).

Figure 2. Proposed new idea of HR chatbot later adoption.

2. Literature Review and Theoretical Framework

2.1. Chatbots in Human Resource Management

Chatbots are regarded as a fundamental example of an advanced technology in natural language processing (NLP). NLP has primarily been implemented in business organizations for internal communication purposes. Chatbots can assist human resources by responding to candidates for recruitment, existing employees and teams, and providing information more quickly [13]. Conversations with real people require time, whereas chatbots can provide responses in mere seconds. Inquiries and phone calls may be made at any given moment. The function of HR chatbots within an organization is demonstrated in Figure 3 [7].

Figure 3. Functionality of HR chatbot.

2.1.1. Automate HR Routine Processes

The implementation of HR chatbots can result in time savings for human resource teams when it comes to performing repetitive duties such as the screening, provision support, and interviewing of candidates for administrative positions, among others. An illustration of this is the utilization of robot-recruiters developed by bots, which facilitates the development of automated recruitment processes in their entirety and leads to enhanced performance [14]. Additionally, HR chatbots can be employed to automate staff induction, a critical function within the department. Additional functions that can be automated through the HR chatbot include employee performance review, access tracking, employee satisfaction surveys based on needs and expectations, employee balance monitoring in organizations, dismissals, and more. These capabilities have significantly enhanced the system's efficiency when utilized by groups of users [7].

2.1.2. HR Chatbots for Recruiting

The process of candidate selection poses a significant human resources challenge when there is a large pool of candidates. HR chatbots can streamline the process by extracting essential information from the candidates, providing them with necessary guidance, and conducting background checks [15,16].

2.1.3. HR Chatbots for Employee Onboarding and Training

The company initiates the onboarding process when an employee is hired following their interview. The HR manager can efficiently oversee this process through communication and employee management. In [17], the onboarding process was facilitated using an HR chatbot, which was developed and implemented to conduct training and education

through the delivery of PowerPoint and video presentations. Thus, the effectiveness of training can be enhanced [18].

2.1.4. HR Chatbots for Benefit Enrolments

The registration process for employees within the organization may be time-consuming for the HR function, and as a result, errors may occasionally occur. An HR chatbot has the potential to facilitate the registration process for employees, thereby reducing errors and streamlining the overall procedure [19].

2.1.5. FAQ Responding

An organization has to answer a data of questions from applicants and employees, including questions about company history, job features, and benefits. An HR representative needs time to address every query. An HR chatbot can communicate more easily with an employee than speaking with an HR staff member, provided it can handle all of these tasks and provide answers to frequently asked questions, such as summer vacations, pay questions, materials, nursing care, job logs, and more [20]. This will be able to reduce the workload of the HR department and free up time for the department to develop the remaining job duties [21].

2.1.6. Collect Feedback

Collecting feedback from candidates who have been unsuccessful during a particular phase in the recruitment process is a critical responsibility that can be allocated to chatbots. The acquisition of valuable feedback from applicants is crucial for enhancing the candidate experience and establishing a more favorable employer reputation in the business world [7].

2.2. *Acceptance Technology Theoretical*

Technology Acceptance Model (TAM)

The theory of technology acceptance model (TAM), developed by Davis, Fred D. [22], is an extension of Ajzen and Fishbein's theory of reasoned action (TRA) [23], replacing the factors that determine attitudes with technology acceptance factors, "perceived usefulness" (PU) and "ease-of-use perceptions" (PEOU). Based on the information from the TRA, variations may occur in accordance with user attributes, namely, culture, social standing, gender, and age. Through identification of the factors that impact user decisions, the TAM theory can be employed to examine the methods and the manner in which users adopt novel technologies. Specifically, attitudes (ATs) that are generally impressed by technology, such as attributing user behaviors to systems or technologies utilized by their institutions, have an effect on behavior intentions (BIs) [24]. As a notable example, employees declined to utilize a new system created by modifications made to an existing system. In order to establish a TAM, it is crucial to ensure that technology acceptance is a fundamental concept that guides employee conduct when interacting with new systems or technologies. In [22], the authors further elucidated the emphasis on perceived ease-of-use (PEOU) and perceived usefulness (PU) by identifying "ease-of-use" and "benefit of use" [25] as the significant determinants in "intention to use", "attitude toward", and "actual use". The technology acceptance model (TAM) is depicted in Figure 4.
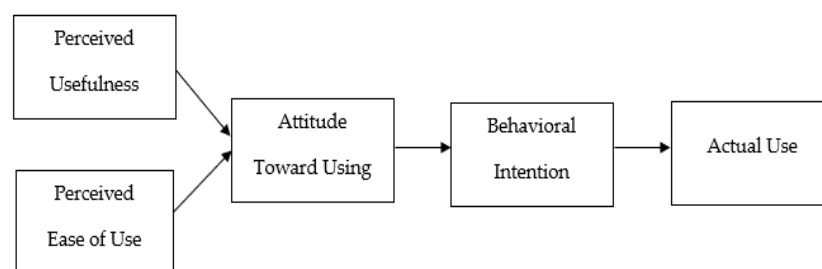

Figure 4. Technology Acceptance Model [22].

Typically, the majority of the research revolves around the acceptance of technology. Various theories, including the TAM [22], TPB [26], UTAUT [27], and UTAUT2 [28], explain user behavior. Nevertheless, numerous research studies have primarily employed the TAM and the unified theory of acceptance and use of technology (UTAUT) to elucidate factors influencing user behavior in relation to technology. As shown in Figure 4, there are two important factors in the TAM: perceived usefulness (PU) and perceived ease-of-use (PEOU). There is a similarity with the factors in the UTAUT model, which contains performance expectancy (PE) and effort expectancy (EE). There are also two factors of process and outcome that are similar in both the TAM and UTAUT, namely, intention to use (ITU) and actual use (AU), respectively. However, only the TAM includes an attitude (ATT) factor. For this reason, the ATT factor in the TAM requires knowing how the use and behavior of a technology user (HR chatbot) occurs, so the researchers chose to introduce the TAM theory into this research. Based on the research study above on the TAM theory, it can be concluded that various factors are applied. However, it is evident that "Perceived usefulness (PU)—the perception of the benefits of use" and "Perceived ease-of-use (PEOU)—the ease-of-use" are the important factors in determining the "Attitude toward (ATT)"—"the attitude towards usage", "Intention to use", and "Actual Use" of every technology. This is illustrated in Table 1 in the summary of factors for applications using acceptance technology theories.

Table 1. The summary of factors for applications using Acceptance Technology Theories.

Base Model	Application	Factors	Adoption	Continue Adoption
TAM	Web-based training [29]	**PU, PEOU**, EJ, CA, SI, OS, IQ, SQ, US, TOT	✓	-
	Mobile shopping applications [30]	**PU, PEOU**, PR, PEJ, PI, ST, IU	✓	-
	Smartphone chatbots for shopping [8]	**PU, PEOU**, PEJ, PC, PR, TR, PI, ATT, IU	✓	-
	Mobile ticketing services in tourism [31]	**PU, PEOU**, COM, MB, IU	✓	-
	E-recruitment [32]	**PU, PEOU**, ATT, BI	✓	-
TAM, UTAUT	Latest version smartphones [33]	**PU, PEOU**, PE, PEJ, COM, PV, EE, SI, OBS, BI, AD	✓	-
	Virtual Reality [34]	**PU, PEOU,** PE, EE, SI, FC, PV, HA, HM, PB, ATT, BI	✓	-
TAM, TPB	Technology and AI in the banking industry of an emerging market [35]	**PU, PEOU,** CE, ATT, TAU, TD, SQ, CS, CBB	✓	-

PU (Perceived Usefulness), PEOU (Perceived Ease of Use), EJ (Enjoyment), CA (Computer anxiety), SI (Social influence), OS (Organizational support), IQ (Information quality), SQ (System quality), US (User satisfaction), TOT (Transfer of training), PR (Perceived Risk), PEJ (Perceived enjoyment), ST (Satisfaction), IU (Intention to use), PC (Price Consciousness), TR (Trust), PI (Personal Innovativeness), ATT (Attitude), IU (Intention to Use), COM (Compatibility), MB (Mobility), PE (Performance Expectancy), PV (Price Value), EE (Effort Expectancy), OBS (Observability), BI (Behavioral Intention), AD (Adoption), FC (facilitating conditions), HA (Habit), HM (Hedonic motivation), PB (Perceived Benefit), CE (Customer experience), TAU (Technology usage), TD (Tchnology downtime), CS (Customer satisfaction), CBB (Consumer buying behavior).

Table 1 shows that recent research has used the TAM theory to explain the acceptance of these technologies. However, no research has addressed the ongoing application process once the technology has been accepted. The researchers have conducted further studies in the subsequent sections.

This research applied the TAM theory and the perceived usefulness and perceived ease-of-use variables to describe the hesitation in perceived usefulness and perceived ease-of-use of HR chatbots for employees in private companies in Thailand. These will be discussed in Sections 3.1.1 and 3.1.2.

2.3. Diffusion of Innovation Theory (Innovation Decision Process)

The diffusion of innovation theory (DOI) is widely used to examine factors that influence an individual's decision to accept an innovation or new technology. The DOI model illustrates the factors influencing an individual's choice to adopt a technology. There are five characteristics that define the diffusion of innovation (DOI) as a decision-making

process for new innovation: relative advantage, compatibility, complexity, observability, and trialability [36]. In [37], the authors defined the diffusion of innovation (DOI) as a decision-making process for new innovations consisting of five stages (Figure 5). These stages are as follows:
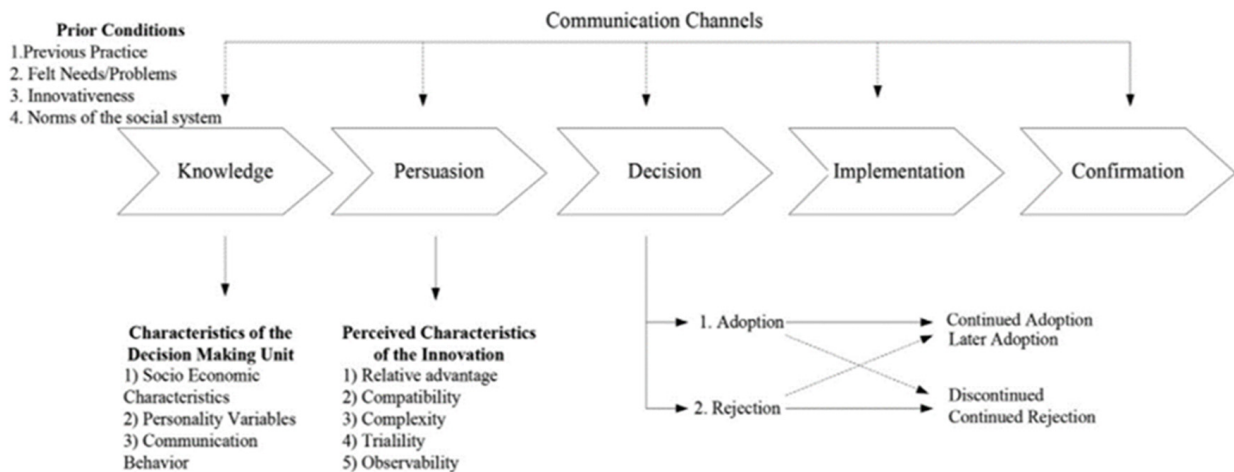

Figure 5. The Innovation-Decision Process [37].

(1) Knowledge is related to individual understanding, including socioeconomic characteristics, personality variables, and communication behavior. These are further explained in Sections 3.1 and 3.2.
(2) Persuasion refers to presenting the advantages or disadvantages of an innovation based on one's own emotions and feelings. This concept is elaborated upon in Section 3.3.
(3) Decision-making is the process by which an individual evaluates the advantages and disadvantages of an innovation before deciding whether to accept or reject it. This process is elaborated upon in Sections 3.4 and 3.5.
(4) Implementation refers to an individual putting an innovation into practice during the process of implementation. Nevertheless, difficulties in implementing an innovation or a particular value can result in resistance to innovation, as elaborated in Section 3.6.
(5) Confirmation refers to the user's statement that innovation is either consistently chosen or consistently rejected, as explained in Section 3.7 [12].

Finally, communication channels represent a combination of interpersonal and mass communication channels that can support the DOI theory [38].

Mass communication refers to the transmission of information from individuals through various mediums such as print, television, and the internet (including company pages, company Facebook, company websites, email, and online).

Interpersonal communication refers to the transmission of information from one person to another, such as between colleagues, relatives, or during training sessions [39].

There are several studies that refer to the innovation decision process, which can complement this study with the introduction of the DOI theory to describe the acceptance of technologies (see Table 2). From the table below, it can be seen that recent research has referred to the decision-making process in stages 1–3 (knowledge, persuasion, and decision) as references to the adoption of such technologies, but no studies have yet been conducted on the innovation decision process. The five stages—(1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation—first describe the rejection of technology and then its subsequent acceptance (HR chatbots), as described in Table 2.

Table 2. Summary of Innovation Decision Process used in related studies of Application Adoption/Rejection and Later Adoption.

Categories	Application	Theories	The Innovation Decision Process							
			Input	Process		Output				
			Knowledge	Persuasion		Decision		Implementation		Confirmation
			Barrier	Perceived Risk	Perception	Adoption	Rejection	Later Adoption	Continue Rejection	
Healthcare	Digital transformation in hospitality industry [40]	UTAUT	✓	-	✓	✓	-	-	-	-
	The Nano-foods [41]	DOI, TAM	✓	-	✓	✓	-	-	-	-
	Behavioral biometrics continuous authentication (BBCA) technology [42]	DOI, TAM	✓	-	✓	✓	-	-	-	-
Mobile	Mobile health application [43]	DOI, TAM	✓	-	✓	✓	-	-	-	-
	Mobile payment services [44]	DOI, TAM, UTAUT	✓	✓	✓	✓	-	-	-	-
	Mobile payment [45]	DOI, TAM, UTAUT	✓	-	✓	✓	-	-	-	-
	Mobile banking [46]	DOI, TPB, TAM	-	✓	✓	✓	-	-	-	-
Chatbot	Chatbot [12]	DOI, TAM	✓	✓	✓	✓	-	-	-	-
	Chatbots for shopping [8]	DOI, TAM	✓	✓	✓	✓	-	-	-	-
	EXX (Employee Experience) Chatbot [47]	TAM	-	✓	✓	✓	-	-	-	-
This Work	HR Chatbot	DOI, TAM	✓	✓	✓	-	✓	✓	-	✓

The current research has focused exclusively on adoption and has not addressed rejection, so the research has only discussed the decision-making process in the initial three stages: knowledge, persuasion, and decision. However, research has not yet been conducted on all five stages of the innovation decision process, which include knowledge, persuasion, decision, implementation, and confirmation. The DOI process is used for the thorough assessment of the factors contributing to the outcome in order to determine the implementation objective. This characteristic alone delineates the reasons and significance of outcomes resulting from the entire DOI procedure. However, this does not include any presentation of problem-solving solutions or enhancements to such applications, nor does it address the subsequent acceptance or rejection of said technology and its continued usage.

2.4. Risk Perception Theory

The study of an individual's behavior involves various factors, both internal and external. One of those factors is the ability to perceive the individual's situation [48]. There have been previous studies that have attempted to describe the expansion of individual perception behaviors. One is the perception of risk that occurs differently in either an individual or group of individuals; this is used to explain the effects of the use of services or consumption of goods resulting from the level of uncertainty that is caused by various factors. After an individual decides to use the service or consume the goods [49], a study [50] divided the types of risk perception that an individual perceives at that point into the following six dimensions: (1) performance, (2) financial, (3) opportunity/time, (4) safety/privacy, (5) social and ethical consequences, and (6) psychological loss. The results showed that people in the same sociological environment were closely associated in their perception of the social and ethical consequences [51].

This study aimed to examine the perception of individuals so that the results can be used in a variety of areas, from education to risk perception, that affect the intention to use social media and thereby increase the competitive advantage of the business [52]. This study examines customer perceptions of the risks to business satisfaction through the use of social media as a tool for communication between the business and customers to improve customer relationships. In addition, factors that influence user acceptance of the introduction of information technology into the organization, whether it is in business, banking, tourism, construction, or education, have been studied to understand the risks that affect user acceptance. The authors of [48,53–57] found that applying social media

to an organization's work requires prioritizing planning for data security issues that will arise from the social media connectivity process. The design of the information interface should be easy to use and accessible [58], and in the user section, it was discovered that the perception of risk influences the user's intention to use information technology [48].

2.5. People Process Technology (PPT Framework) and Policy

The three primary foundations of success in enterprise development are people, processes, and technology. The authors of [59] provided a more comprehensive analysis of the PPT framework. If people, processes, technologies, and context are ignored or undervalued, any process innovation can be deemed futile. Companies can enhance enterprise performance via achieving a harmonious balance among the three fundamental components and establishing connections between people, processes, and technology to increase efficiency [60]. The PPT framework can be likened to a three-legged table, where its stability is compromised if one of the legs becomes slightly diminished, such as in comparison to virtual development and technological advancements. Supporting new tools necessitates both the development of individuals and the synchronization of processes [59].

Furthermore, numerous organizations are endeavoring to address their commercial issues through the implementation of technology and use of sophisticated tools to enhance organizational development. Nevertheless, the efficiency of technology is directly correlated with the manner in which individuals operate. If an organization fails to establish robust processes, the utilization of staff is likely to be highly inefficient [61]. In addition to the factors of people, processes, and technology, policies also play a crucial role in facilitating effective decision-making and promoting long-term growth and sustainable development within an organization. Moreover, the formulation of corporate policies and goals must originate from either the board of directors or senior executives in order to showcase the company's underlying principles, visions, missions, and objectives that serve as guiding principles for the business [59].

3. Proposed Model and Hypothesis Development

This study investigated the import and export factors that impact the subsequent adoption of employee HR chatbots in private enterprises. According to the TAM, the way staff members perceive and understand the risks and barriers associated with a private employee HR chatbot will influence their decision-making process. These perceptions also play a role in the development of factors such as people, process, technology, and policy, which ultimately determine whether or not the HR chatbot is accepted. The elements encompassed in this list are as follows: (1) knowledge, (2) persuasion, (3) decision-making, (4) implementation, and (5) confirmation. This study aimed to identify the factors and elements that influence the acceptance process of external use of private technology, using the innovation decision process model (DOI) as a framework. Additionally, utilizing a personal chatbot can serve as a viable remedy for addressing issues pertaining to human rights and their advancement among employees in Thailand.

The researchers subsequently modeled a change from a negative to positive reaction to later adoption using the innovation decision process to encourage sustainability for HR chatbots in private companies in Thailand as follows (Figure 6):

This study utilized the diffusion of innovation theories, specifically the innovation decision process outlined by Rogers [37], to describe the five stages involved in the decision-making process for the acceptance of HR chatbots by employees in private enterprises. This study aimed to identify the attitude toward, intention to reject, and later adoption through the people (PP), process (PC), technology (TE), and policy (PL) factors, and finally, the confirmation adoption (CA) of HR chatbots used by private employees in Thailand.
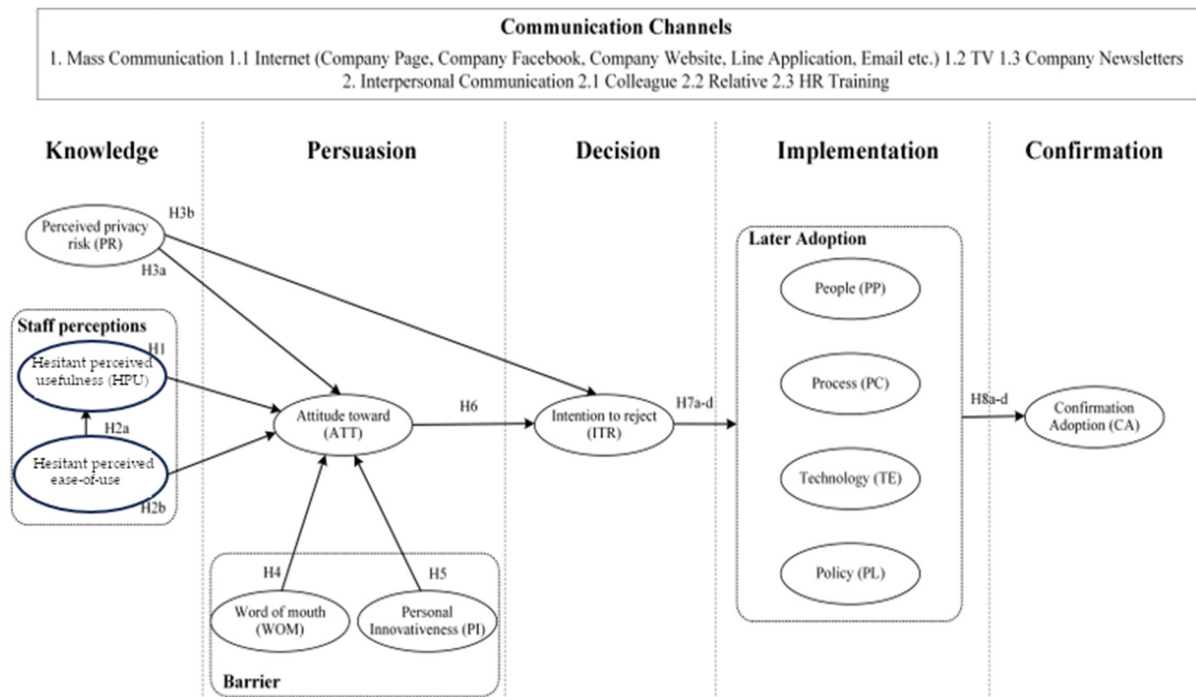
Figure 6. Proposed conceptual research model.

3.1. Staff Perception Factors

Human resources chatbots are a technological tool employed to enhance communication among employees within organizations and departments. They are currently utilized for assisting and supporting the HR department's operations in multiple domains. Prior studies have employed the TAM to elucidate user behavior in adopting novel technologies. The TAM has also been employed for elucidating chatbot behavior [12]. The recent studies have revealed that cognitive factors play a significant role in shaping attitudes towards the acceptance or rejection of technology.

3.1.1. Hesitant Perceived Usefulness (HPU)

"Hesitant Perceived usefulness (HPU)" refers to an individual's feeling of hesitancy, and in [27], it was recognized that utilizing a system either can or cannot enhance the individual's performance [22]. Therefore, this primary variable is used to assess the outcomes of user behavior, namely, the user's acceptance or rejection of technologies. Several studies have identified perceived usefulness (PU) as a significant determinant of individuals' acceptance or rejection of technology, as indicated in Table 1, which leads to the definition of the factor "Hesitate Perceived usefulness (HPU)".

3.1.2. Hesitant Perceived Ease-of-Use (HPEOU)

The hesitant perceived ease-of-use (HPEOU) of an information system refers to an individual's feeling of hesitancy relating to the use of technology, which should be effortless from a psychological standpoint [22]. Multiple studies in the field of technology acceptance have demonstrated that perceived ease-of-use (PEOU) has both a direct and indirect impact on individuals' attitude toward or rejection of technology (the attitude toward (ATT)). Several empirical studies have examined the variable hesitant feeling of perceived ease-of-use and have identified it as a crucial determinant of individuals' intention to adopt or reject new technologies. However, this study focused on hesitant perceived ease-of-use (HPEOU), which is the main variable influencing attitudes regarding the rejection of the HR chatbot. This is shown in Table 1.

The factor related to the perceptions of staff refers to the employee perception factors that impact attitudes, decisions, and the choice to not use HR chatbots. This factor can be

divided into two parts: (1) the level to which something is considered to cause hesitant perceived usefulness (HPU), and (2) hesitant perceived ease-of-use (HPEOU), which refers to the subjective perception of how easy it is to reject a particular system or technology. Therefore, the hypotheses regarding employee services and employees in private companies in Thailand in relation to HR chatbots are as follows:

H1. *Hesitant perceived usefulness (HPU) has a positive influence on employees' attitude (ATT) toward refusing to use HR chatbots.*

H2a. *Hesitant perceived ease-of-use (HPEOU) has a positive influence on employees' hesitant perceived usefulness (HPU) of HR chatbots.*

H2b. *Hesitant perceived ease-of-use (HPEOU) has a positive influence on employees' attitude (ATT) toward refusing to use HR chatbots.*

3.2. Perceived Risk Factors

Perceived risk factors refer to the factors that employees perceive as influencing their attitudes, decisions, and their rejection of using HR chatbots. The analyses determined that risk is being utilized in a more multifaceted manner. When examining the DOI and TAM theories, it is important to recognize that risk perceptions can significantly influence the development of negative attitudes and ultimately result in the rejection of technology [36].

The presence of privacy risks influences both the inclination and regularity of utilizing chatbots. Data privacy concerns arise when platforms and applications collect and access user personal information, including their personal information and geolocation [54].

The conversations that occur through the HR chatbots and impact employees in the organization may be able to receive deidentified information as required [11]. However, the responses received from the chatbot are limited by the input data, so users may not receive complete information [7]. As a result, users may find that chatbots take longer than human conversations and this may eventually lead to denial of usage. Therefore, the hypotheses regarding employees of private companies in Thailand are as follows:

H3a. *Perceived risk (PR) has a positive influence on the attitude (ATT) to reject the use of the HR chatbot.*

H3b. *Perceived risk (PR) has a positive influence on the intention to reject (ITR) the HR chatbot.*

3.3. Barrier Factors

This section provides a description of the attitude barriers and intention to refuse to use HR chatbots for employees of private companies in Thailand. Whether it is personal innovation or speech-to-speech that has to change attitudes, the barrier factors describe the employee's perception of the risk factors that influence attitudes and intentions to reject the use of the HR chatbot. This investigates two specific factors, as follows: 1. personal innovation (PI) and 2. word of mouth (WoM).

3.3.1. Personal Innovation (PI)

Personal innovation (PI) reflects an individual's desire to discover new concepts or practices, where they perceive it as something new when accepting those technologies [62]. Personal innovation (PI) can influence the adoption of new technologies in different ways [63]. However, personal innovation (PI) can be an obstacle to the acceptance of HR chatbots in an organization, because some employees are still nervous of and discouraged by technology. When new technologies such as HR chatbots are introduced, some user groups may not have as much technological expertise as those with advanced skills or even be daunted because new technologies are inherently complex. There is no user-to-user guidance or user manual recommendations [64]. Therefore, the personal innovation (PI) in this research is an assessment of technology availability, which is the requirement to

verifywhether or not individuals are ready to accept and use new technologies effectively. In the absence of acceptance, this can lead to rejection, as shown in H4.

3.3.2. Word of Mouth (WoM)

Word of mouth (WoM) is both a positive and negative form of communication. If any use of technology, such as an HR chatbot, does not respond precisely to employee needs, there may be negative references to its use. In turn, this affects the attitudes and intentions to refuse to use the HR chatbot. Employees can have a variety of personal expectations, such as those generated by experience, advertising, and word of mouth, before making a decision [65]. Therefore, the hypotheses regarding employees of private companies in Thailand are as follows:

H4. *Personal innovation (PI) has a positive influence on the attitude (ATT) of employees in refusing to use the HR chatbot.*

H5. *Word of mouth (WoM) has a positive influence on the attitude (ATT) of employees in refusing to use the HR chatbot.*

3.4. Attitude toward (ATT) Factor

Humans have an evaluation plan for the consequences of certain behaviors, called the attitude toward (ATT) [66]. Behavior is in a direct relationship with attitude, which is similar to intention in behavior, arising from the individual's attitude. In this context, attitude is the negative or positive feelings of the user towards the use of chatbots. From the TRA and TAM, the beliefs of each individual about the consequences of their behavior have a significant impact on their attitude towards acting in that manner [8].

Thus, the attitude toward (ATT) in this study describes the attitude toward the intentional rejection of the use of HR chatbots, which has an effect on behavioral change. Therefore, the hypothesis regarding employees of private companies in Thailand is as follows:

H6. *Attitude toward (ATT) has an influence on the intention to reject (ITR) the HR chatbot.*

3.5. Intention to Reject (ITR) Factor

The intention to reject (ITR) describes the rejection of HR chatbots by employees in private corporations in Thailand, taking into account the factors that impact their acceptance at a later stage. This study refers to later factors that improve attitudes toward the HR chatbot, which then change attitudes from rejection to later adoption. Therefore, the hypotheses regarding employees of private companies in Thailand are as follows:

H7a. *Intention to reject (ITR) has an influence on people (PP) for the later usage adoption of the HR chatbot.*

H7b. *Intention to reject (ITR) has an influence on the process (PC) for the later adoption of HR chatbot usage.*

H7c. *Intention to reject (ITR) has an influence on technology (TE) for the later adoption of HR chatbot usage.*

H7d. *Intention to reject (ITR) has an influence on policy statements (PCs) for the later adoption of HR chatbot usage.*

3.6. Later Adoption Factors

This section provides an explanation of the subsequent acceptance following initial refusal to use the HR chatbot by a private company's employees in Thailand. This is followed by confirmation adoption (CA), which changes the behavior of the employees toward the HR chatbot from an early refusal to a later acceptance.

3.6.1. People (PP)

People (PP) are the company's representatives in technology implementation, focusing on readiness, clarity, roles and responsibilities, development and training, and the stability of human resources during implementation [67].

3.6.2. Process (PC)

Process (PC) refers to the ability to take advantage of IT, sharing knowledge, designing, improving business processes, training, learning, project planning, and sharing information [59].

Once technology becomes accessible, there will be procedures that will utilize these technologies in the individual work system. Adapting work processes to new technology will be ineffective, and there may be a necessity to modify the roles of specific work functions to ensure they align, suitably and appropriately, with the evolving processes.

3.6.3. Technology (TE)

Technology (TE) refers to the integration of IT infrastructure/facilities, ERP capabilities and compatibility, analysis, and data transformation to make an organization more efficient [68]. In [60], the authors described how technology is implemented in organizations and how it influences acceptance and implementation. Because business activities adhere to the principles of sustainable development, this means that in addition to helping employees, organizations also need to take into account the working environment to promote long-term corporate growth for a sustainable society.

3.6.4. Policy (PC)

Policy (PC) is an important factor in supporting both people's decision-making and sustainable development. Furthermore, corporate policy and objectives must originate with the board of directors or senior executives to demonstrate to stakeholders the guiding direction of the company's principles, vision, mission, and purpose [59].

Therefore, the later adoption factor refers to the employee acceptance factor that influences the confirmation adoption of HR chatbots. In total, it comprises four components: 1. people (PP), 2. process (PC), 3. technology (TE), and 4. policy (PC). The following hypotheses regarding employees of private companies in Thailand are made:

H8a. *People (PP) have a positive influence on HR chatbot usage confirmation (CA).*

H8b. *Process (PC) has a positive influence on HR chatbot usage confirmation (CA).*

H8c. *Technology (TE) has a positive influence on HR chatbot usage confirmation (CA).*

H8d. *Policy (PC) has a positive influence on the usage confirmation (CA) of the HR chatbot.*

3.7. Confirmation Adoption

Confirmation adoption (CA) is a user's affirmation that the HR chatbot for employees in private companies in Thailand is an option that will continue to be used to improve the performance of the organization.

4. Research Methodology

Study Participants and Setting

This study employed a structural questionnaire to address research inquiries, gathering data from employees in private corporations in Thailand who have utilized HR chatbots. The aim was to examine the factors that impact the decision-making process and acceptance of using HR chatbots. The collected data were then analyzed using structural equation modeling (SEM) to establish and evaluate the relationship between these factors (Figure 7).

Figure 7. The steps of the research process.

The researchers used SmartPLS Software version 4.0 to measure the research results, modeling the questionnaires on reliability and accuracy. The experimental details and results are discussed in Section 5.

The population used in this study was randomized using the Thai private employee population group with experience using HR chatbots, with a population of approximately 39,565,991 people [69]. Therefore, the researchers used the sample size method, employing the Yamane (1973) calculation formula by selecting a 95% confidence level. The sample group was approximately 400 people. In case the research participants withdrew, and if the respondents to the survey filled in incorrect information, the researchers collected data from the group to complete the survey, adding 5% or approximately 20 people out of a total of 400 people. In addition, a questionnaire was prepared following the research methods and research tools for consideration by the Mahidol University Ethics Committee. The questionnaire was subsequently approved by the Mahidol Institute Research Review Committee and received approval number COE No. MU-CIRB 2023/110.3006. This questionnaire consisted of a series of questions, divided into four sections, as follows.

Part 1: General information of the respondents.

Part 2: General information about using HR chatbots.

Part 3: Factors affecting the decision to refuse to use HR chatbots, as shown in Table A1 (Appendix A).

Part 4: Factors affecting the subsequent adoption of HR chatbots, as shown in Table A1 (Appendix A).

Participation was deemed complete by the submission of an online questionnaire using "Google Form" and after a period of 30 days.

A total of 400 questionnaires were collected, of which 149 were invalid. In total, there were 251 useable questionnaires. A total of 121 participants were aged between 21 and 30 years, representing 48.2% of the participants; 191 were single, representing 76.1% of the participants; 163 had attained educational qualifications at the level of a Bachelor's degree, accounting for 64.9% of the participants; 69 had a monthly income of TBH 50,001–75,000, accounting for 27.5% of the participants; 205 had experience using a chatbot from mass media communications (such as a web page, Facebook, website, X, email, company websites, TV, company public relations letters, etc.) representing 81.7%; 175 were aware of the use of chatbots via the internet (web pages, Facebook, websites, X, email, online materials of the company, etc.), accounting for 69.7%. In addition, 205 participants gained awareness of chatbots from interpersonal communications through an unspecified channel, accounting for 81.7%. A total of 109 participants used the chatbots during the most popular time period of 8:00 p.m. to 12:00 p.m., which accounted for 43.4% of the participants. For more information, see Table 3.

Table 3. The demographic data of main testing respondents.

Questions	Quantity	Percentage
Gender		
Male	138	55
Female	113	45
Nationality		
Thai	251	100
Age		
21–30	121	48.2
31–40	104	41.1
41–50	24	9.6
51–60	2	0.8
Status		
Married	59	23.5
Single	191	76.1
Engaged	1	0.4
Educational qualification		
Bachelor's degree	163	64.9
Master's degree	86	34.3
Doctoral degree	1	0.4
Associate's degree or equivalent	1	0.4
Salary		
15,001–30,000 THB	20	8.0
30,001–50,000 THB	58	23.1
50,001–75,000 THB	69	27.5
75,001–100,000 THB	65	25.9
100,001–150,000 THB	28	11.2
150,001–200,000 THB	8	3.2
More than 200,000 THB	3	1.2
Have you had any experience using an HR chatbot?		
Interpersonal communication (Ex: colleague, relatives at work, HR training)	46	18.3
Mass communication (Ex: web page, Facebook, website, Twitter, email, line, etc., TV, company public letter)	205	81.7
Have you ever been aware of the use of HR chatbots through which channel?		
HR training	29	11.6
Internet (web page, Facebook, website, Twitter, email, line, etc.)	175	69.7
TV	1	0.4
Others	46	18.3

Table 3. *Cont.*

Questions	Quantity	Percentage
From interpersonal communication, what is the channel that you know most about using HR chatbots?		
HR training	44	17.5
Colleague	2	0.8
-	205	81.7
When do you use the HR chatbots application the most?		
Period 04:00–08:00	4	1.6
Period 08:00–12:00	21	8.4
Period 12:00–16:00	39	15.5
Period 16:00–20:00	76	30.3
Period 20:00–24:00	109	43.4
Period 00:00–04:00	1	0.4

5. Results

The reason of a change from negative to positive of later adoption using the innovation decision process for HR Chatbots of private Companies in Thailand model, explains the imported factors: Staff perceptions, Perceived Risk and Barrier that influence the decision-making intentions of employees in private enterprises to refuse the use of HR Chatbot, and bring people, processes, technology, and policy factors into development. Based on the Technology Acceptance Model (TAM), as well as the decision-making process of individuals who subsequently accept the technology, a multi-stage process involves the following: (1) knowledge, (2) persuasion, (3) decision-making, (4) implementation, and (5) confirmation. There were 251 respondents, estimated 100 percent, 121 of whom were between 21 and 30 years of age (48.2 percent). There were 191 live videos (76.1 percent). A total of 163 respondents had an undergraduate education (64.9 percent) and 69 percent of respondents had a monthly income of 50,001–75,000. A total of 205 people had experience using HR chatbots from mass communication (e.g., Page, Facebook, website, Twitter, email, corporate line, TV, company press, etc.) (81.7 percent). A total of 175 people (69.7 percent) were aware of using HR chatbots through interpersonal communication channels. There were 205 unidentified people (81.7 percent), and the most active time was between 8:00 and 24:00. A total of 109 people, estimated at 43.4 percent by the researchers, used SmartPLS Software version 4.0 for the measurement of research results, modeling, and the questionnaire on reliability and accuracy. The experimental details and results are as follows. The questionnaire is divided into parts, consisting of 44 questions. Part 1 includes the general information of the respondents and Part 2 includes general information about using HR Chatbots; these parts consist of 10 questions. Part 3 includes the factors affecting the decision to reject the use of the HR chatbot system, and is made up of 19 items. Part 4 includes the factors affecting the later acceptance of the use of the HR chatbot system, and is made up of 15 items. The results of checking the quality of the variables and question items in the questionnaire's measurement found that all composite reliability (CR) values were between 0.753 and 0.976, which is consistent with the criteria, which is not less than 0.7; the Cronbach's α value is present between 0.751 and 0.902, and the value corresponds to the criteria, which is not less than 0.7. The average variance extracted (AVE) value is between 0.634 and 0.860; the value corresponds to the criteria, which is not less than 0.5, and the weight value of the elements (Outer Loading) has a value between 0.728 and 0.974; the value corresponds to the criteria, which is not less than 0.7, according to Table 4.

Table 4. The reliability and validity of the results.

Component	Variable	Weight Value (>0.70)	Cronbach's α (>0.70)	Composite Reliability (>0.70)	AVE (>0.50)
Hesitant Perceived usefulness (HPU)	HPU1	0.861	0.777	0.781	0.692
	HPU2	0.790			
	HPU3	0.844			
Hesitant Perceived ease-of-use (HPEOU)	HPEOU1	0.898	0.783	0.824	0.693
	HPEOU2	0.811			
	HPEOU4	0.783			
Intention to reject (INJ)	ITR1	0.922	0.758	0.798	0.822
	ITR3	0.891			
Perceived Risk (PR)	PR1	0.728	0.758	0.951	0.637
	PR2	0.775			
	PR4	0.884			
Personal Innovativeness (PI)	PI2	0.926	0.837	0.837	0.860
	PI3	0.923			
Word of mouth (WOM)	WOM2	0.896	0.757	0.757	0.804
	WOM3	0.898			
Attitude toward (ATT)	ATT1	0.795	0.809	0.832	0.634
	ATT3	0.749			
	ATT4	0.812			
	ATT5	0.826			
People (PP)	PP1	0.974	0.902	0.976	0.836
	PP2	0.859			
	PP3	0.907			
Process (PC)	PC1	0.907	0.815	0.925	0.721
	PC2	0.881			
	PC3	0.752			
Technology (TE)	TE1	0.937	0.858	0.911	0.778
	TE3	0.884			
	TE4	0.821			
Policy (PL)	PL1	0.892	0.751	0.753	0.670
	PL2	0.779			
	PL3	0.779			
Confirmation (CA)	CA1	0.817	0.824	0.825	0.742

According to Fornell–Larcker's criterion, which evaluates the relationship between variables using a diagonal matrix, it was determined that the square roots of the average variance extracted (AVE) in each variable are more significant than the values in the parallel and consistent rows. This suggests that the variable has a traditional equivalent, which can facilitate the examination of the structural model, as outlined in Table 5.

Table 5. Construct reliability and validity.

Factor	Correlation Matrix											
	ATT	CA	ITR	PC	HPEOU	PI	PL	PP	PR	HPU	TE	WOM
ATT	**0.796**											
CA	0.203	**0.861**										
ITR	0.059	0.129	**0.907**									
PC	0.103	0.317	0.256	**0.849**								
HPEOU	0.165	0.040	0.206	0.019	**0.832**							
PI	0.303	0.059	0.263	0.297	0.016	**0.927**						
PL	0.070	0.268	0.304	0.250	0.141	0.071	**0.819**					
PP	0.033	0.075	0.290	0.077	0.243	0.223	0.585	**0.915**				
PR	0.211	0.180	0.298	0.161	0.106	0.350	0.084	0.138	**0.799**			
HPU	0.267	0.156	0.111	0.000	0.175	0.084	0.009	0.059	0.145	**0.832**		
TE	0.040	0.183	0.375	0.214	0.166	0.060	0.202	0.165	0.018	0.129	**0.882**	
WOM	0.179	0.024	0.158	0.157	0.155	0.193	0.157	0.003	0.120	0.165	0.090	**0.825**

5.1. Structural Model

After that, the testing of the structural equation model from the sampling (resampling) data using bootstrap was conducted, totaling 5000 items, by generating an approximate estimation to increase confidence in the analysis of the relationship between the constructs and checking the multicollinearity with the VIF value. It was found that the causal variables were not related higher than the threshold of 5.0 when considering the path coefficients (path coefficients), p-value, and t-value, which were consistent with the criteria, with the t-value being higher than 1.96 (significance level = 5%), 2.58 (significance level = 1%), and 3.29 (significance level = 0.1%). As a result, hypothesis H1 is accepted: HPU $\rightarrow$ ATT at a significance level of 0.05 (β = 0.247, t = 2.415). Hypothesis H3b is accepted: PR $\rightarrow$ ITR is at a significance level of 0.05 (β = 0.299), t = 3.212). Hypothesis H5 is accepted: PI $\rightarrow$ ATT at a significance level of 0.05 (β = 0.222, t = 2.153). Hypothesis H7a is accepted: ITR $\rightarrow$ PP at a significance level of 0.05 (β = 0.290, t = 3.156). Hypothesis H7b is accepted: ITR $\rightarrow$ PC at a significance level of 0.05 (β = 0.256, t = 2.482). Hypothesis H7c is accepted: ITR $\rightarrow$ TE at a significance level of 0.05 (β = 0.375, t = 3.950). Hypothesis H7d is accepted: ITR $\rightarrow$ PL at a significance level of 0.05 (β = 0.304, t = 3.485). Hypothesis H8b is accepted: PC $\rightarrow$ CA at a significance level of 0.05 (β = 0.241, t = 2.192). Finally, hypothesis H8d is accepted: PL $\rightarrow$ CA at a significance level of 0.05. (β = 0.250, t = 2.001). The results are detailed in Table 6.

Table 6. A summary of hypothesis testing results.

Hypothesis	Path	Coefficient (β)	t-Value	p-Value	VIF	Results
H1	HPU $\rightarrow$ ATT	0.230	2.222	0.026 *	1.083	**Yes**
H2a	HPEOU $\rightarrow$ HPU	0.166	1.207	0.228	1.000	No
H2b	HPEOU $\rightarrow$ ATT	0.152	1.406	0.160	1.061	No
H3a	PR $\rightarrow$ ATT	0.048	0.407	0.684	1.177	No
H3b	PR $\rightarrow$ ITR	0.299	3.253	0.001 *	1.047	**Yes**
H4	WOM $\rightarrow$ ATT	0.225	2.261	0.024 *	1.105	**Yes**
H5	PI $\rightarrow$ ATT	0.218	2.082	0.037 *	1.176	**Yes**
H6	ATT $\rightarrow$ ITR	-0.005	0.056	0.956	1.047	No
H7a	ITR $\rightarrow$ PP	0.290	3.156	0.002 *	1.000	**Yes**

Table 6. *Cont.*

Hypothesis	Path	Coefficient (β)	t-Value	p-Value	VIF	Results
H7b	ITR → PC	0.256	2.482	0.013 *	1.000	**Yes**
H7c	ITR → TE	0.375	3.950	0.000 *	1.000	**Yes**
H7d	ITR → PL	0.304	3.485	0.000 *	1.000	**Yes**
H8a	PP → CA	−0.106	0.819	0.413	1.542	No
H8b	PC → CA	0.241	2.192	0.028 *	1.111	**Yes**
H8c	TE → CA	0.099	0.934	0.350	1.081	No
H8d	PL → CA	0.250	2.001	0.045 *	1.638	**Yes**

Remark * = Statistically significant at the 0.05 level.

According to Table 7, the R2 value should exceed 0.1, which is higher than the recommended threshold. This suggests that the model is a good fit. Furthermore, the Stone–Geisser Q^2 value analysis, conducted using a blindfolding method, has yielded a result greater than 0. This demonstrates the predictive significance of the model. The size effect test (f^2) demonstrates that the ITR is deemed satisfactory at the maximum level, as indicated in Table 8.

Table 7. A summary of hypothesis testing results with R-square values.

Construct	R-Square	R-Square Adjusted	Q^2
ATT	0.204	0.161	0.035
CA	0.153	0.118	0.013
ITR	0.149	0.123	0.061
PC	0.066	0.056	0.015
PL	0.132	0.102	0.003
PP	0.144	0.120	0.012
HPU	0.131	0.111	0.002
TE	0.140	0.132	0.011

Table 8. Effect size.

Constructs		Effect Size (f^2)	Signification
ATT	ITR	0.000	No effect size
ITR	PC	0.070	Small effect size
	PL	0.102	Small effect size
	PP	0.092	Small effect size
	TE	0.163	Medium effect size
PC	CA	0.062	Small effect size
HPEOU	ATT	0.024	Small effect size
	HPU	0.032	Small effect size
PI	ATT	0.052	Small effect size
PL	CA	0.045	Small effect size
PP	CA	0.009	No effect size

Table 8. *Cont.*

Constructs		Effect Size (f^2)	Signification
PR	ATT	0.004	No effect size
	ITR	0.093	Small effect size
HPU	ATT	0.071	Small effect size
TE	CA	0.011	No effect size
WOM	ATT	0.042	No effect size

5.2. Model Fit

The model fit of the structural equation model was assessed based on the criteria set by [70]. The evaluation was performed using the standardized root mean square residual (SRMR), which should ideally be below 0.08. The test results of this model indicate a value of 0.073, which demonstrates a good model fit. Additionally, the model's fit with the data has been tested using the goodness-of-fit (GoF) [71], revealing a GoF value of 0.28 (Medium). The details will be explained in Section 6.

6. Discussion, Implications for Theories and Practices

The utilization of HR chatbots for the correspondence of human resources departments within corporate organizations is currently widespread among private companies in Thailand. This study was the inaugural investigation into the transition from rejection to the later adoption of an HR chatbot for private employees. Using the diffusion innovation theory, which describes the decision-making process for accepting innovation, the model was constructed. The following five processes are included in the model: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. Furthermore, the decision-making process for approving innovations was integrated into our delineated conceptual framework. The research examined the perspectives of individuals who had prior experience utilizing HR chatbots in private organizations. We also incorporated the decision-making process for accepting innovations into the framework of concepts that was then used to recruit studies for evaluating the views of people with experience in the use of HR chatbots as employees in private enterprises. In addition, people, process, technology, and policy factors were introduced to support personnel decision-making and sustainable development. As a result, this improved the HR operations and enterprise resources through the introduction of HR chatbot technology to reduce corporate management constraints; consequently, this enables enterprises to operate sustainably in today's highly competitive environment.

6.1. Comparisons between the Proposed Research Model and Previous Works

Knowledge process: The first purpose of this study was to explain the influence of the factors involved in the knowledge process on the rejection attitudes of private company employees relating to the HR chatbot, which identified how employee perception affects their ATT. From the results, this study discovered that HPU has a negative effect on ATT in rejecting the use of HR chatbots. This demonstrated that the recognition of the benefits of HR chatbots has no effect on attitudes to reject HR chatbot use, and HPEOU has a direct influence on the ATT, which reflects employees' attitudes towards HR chatbot use, which may be perceived as more complicated than direct conversations with the HR department. We also identified that PR has a denial effect on ATT in refusing to use an HR chatbot, which illustrates that risk perception still has no effect on employee attitudes to refuse using HR chatbots, but PR has a direct influence on ITR, which indicates that HR chatbot users remain concerned that their information may be collected and accessed during a conversation. They may also be unsure that the HR chatbot can respond to needs faster than human conversations. The anxiety about data also affects intentions to reject the use

of HR chatbots, and these issues may cause users to stop using the chatbot service, which is consistent with the findings of this and other studies [11,12,54].

Persuasion process: The second objective of this study was to explain the influence of attitudes associated with the rejection of HR chatbot use by employees in private companies. The associated factors provide the important barrier to the refusal attitude relating to the HR chatbots originating from WoM and PI. These have a direct influence on an employee's refusal to use the HR chatbots. This suggests that word of mouth and personal innovation have direct effects on attitudes to refuse to use the HR chatbots. Based on the results of this research, it was possible to analyze employees' experience with using HR chatbots in the past, which has a consequent impact on the attitude of refusing to use the HR chatbots. However, organizations are aware of the process and benefits of using the HR chatbots, and have focused on making them even more efficient and useful for employees.

Decision process: The third objective of this study focused on the attitude (ATT) that originates from the persuasive process of rejecting a HR chatbot. This study discovered that the behavior related to persuasion to encourage the rejection of use had a negative effect on the user's actual intention to refuse, all of which may be because the user may be in the midst of hesitation to continue using or refuse to use the HR chatbot at all.

Implementation process: The fourth objective of this study focused on the factors that influenced the re-use of HR chatbots (later adoption), which originated from the intention to reject (ITR) the use of the HR chatbots, where ITR had a positive influence on people (PP), policy (PC), technology (TE), and policy (PL). This indicated that it was from the intent to refuse to use the HR chatbots; however, if an organization had evolved in terms of personnel, processes, technology, and corporate policies, then it could have an even greater impact on private corporate employees re-using HR chatbots.

Confirmation process: The fifth objective of this study focused on the factors that influenced confirmation of HR chatbot usage from later adoption by developments in the people (PP), process (PC), technology (TE), and policy (PL) sections, resulting in PP and TE leading to a confirmation adoption (CA) rejection of validation. This may be due to the convenience of use for the individual. Additionally, the HR chatbot technology, which has already been developed, may not yet have been responded to in employee usage surveys; however, PC and PL have a positive influence on CA, which shows that the development of various processes of HR chatbots and the corporate vision policy have a significant impact on the validation of the resumed use of HR chatbots by employees in private companies.

6.2. Theoretical Implications

Based on the results of the studies mentioned in Sections 5.1 and 5.2, the analysis results supported all 10 assumptions that positively influenced the DOI in each process. As shown in Figure 8, HPU, PR, WoM, and PI are fundamental factors that have a positive relationship with the attitude of the rejection of HR chatbots. The results show that private company employees emphasized the risk, personal innovation, and experience of use. The attitude that will lead to the rejection of HR chatbots and the ITR (the intention to reject) have a positive relationship with PP, PC, TE, and PL. This reflects that organizations that have developed and supported staff, processes, technology, and have clear policies, have already seen the later adoption of HR chatbots. Both PC and PL are positive factors in the confirmation adoption (CA) of HR chatbot usage, which reflects that organizational processes and policy development have an impact on HR chatbot usage by private company employees. This study examined the process within the diffusion of innovation theory (DOI) for accepting the use of HR chatbots in all five of its stages, demonstrated the factors that influenced the rejection of HR chatbots in private corporate enterprises, introduced the TAM theory in the decision-making process for accepting or rejecting HR chatbots, and finally identified the factors that led to the later adoption of human resource technology-driven resources in a private enterprise, which has not yet been fully studied in any existing research. This study would be very useful in improving and developing the

future implementation of HR chatbots through enhancing the efficiency of communication between employees and corporate departments.
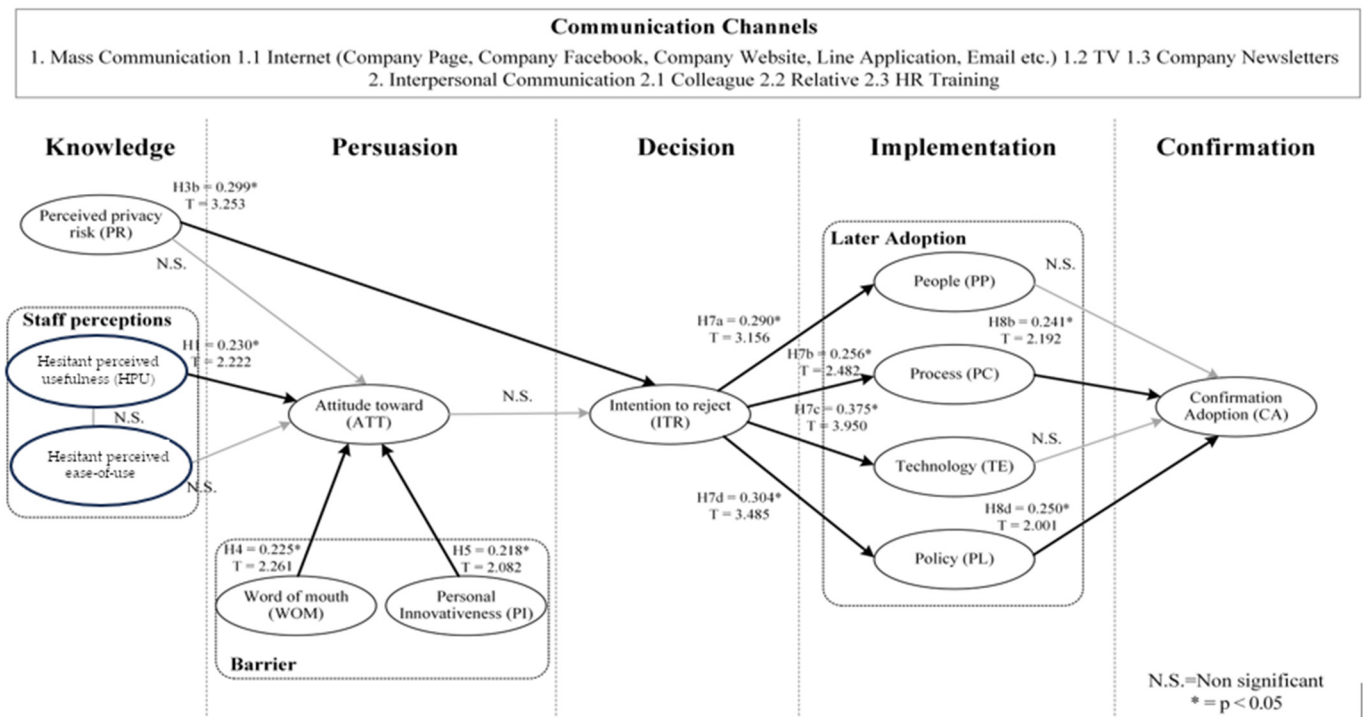

Figure 8. SmartPLS results of the structural model.

6.3. Practical Implications

The essence of this research study is the description of the factors that influence the decision-making process affecting the later adoption of an HR chatbot by employees. After a decision to refuse use, which is very beneficial to private organizations seeking to develop this application, the main factor in the employee's refusal to use the HR chatbot is due to it being a human resources chatbot, leading them to consider that conversations with the chatbots risk being incomplete. There are risks of breaches of privacy and wasting time in communication. Compared with direct conversations with individual staff, and from previous experience, as well as obtaining verbal information from colleagues in enterprises who have previously experienced unsatisfactory HR chatbots (the experience of word of mouth), it was therefore important to decide not to use HR chatbots. This study also examined the factors that influence the later adoption of HR chatbots, which are the main factors that organizations have to take into account in the later adoption of the HR chatbot. The research has reflected that processes and policies, mission, vision, and the clarity of an organization have a major influence on employees' decision to re-adopt HR chatbots. Furthermore, this study's findings indicate that personal development and technology are critical factors that executives should not disregard. In order to enable personnel to expedite the progress of adoption of technologies utilized to optimize individual performance, it is imperative that the development budgets allocated to the entire corporate workforce should be substantially augmented, in conjunction with technological advancements. This would maximize the advantages for sustainable corporate expansion, as summarized in Figure 9.
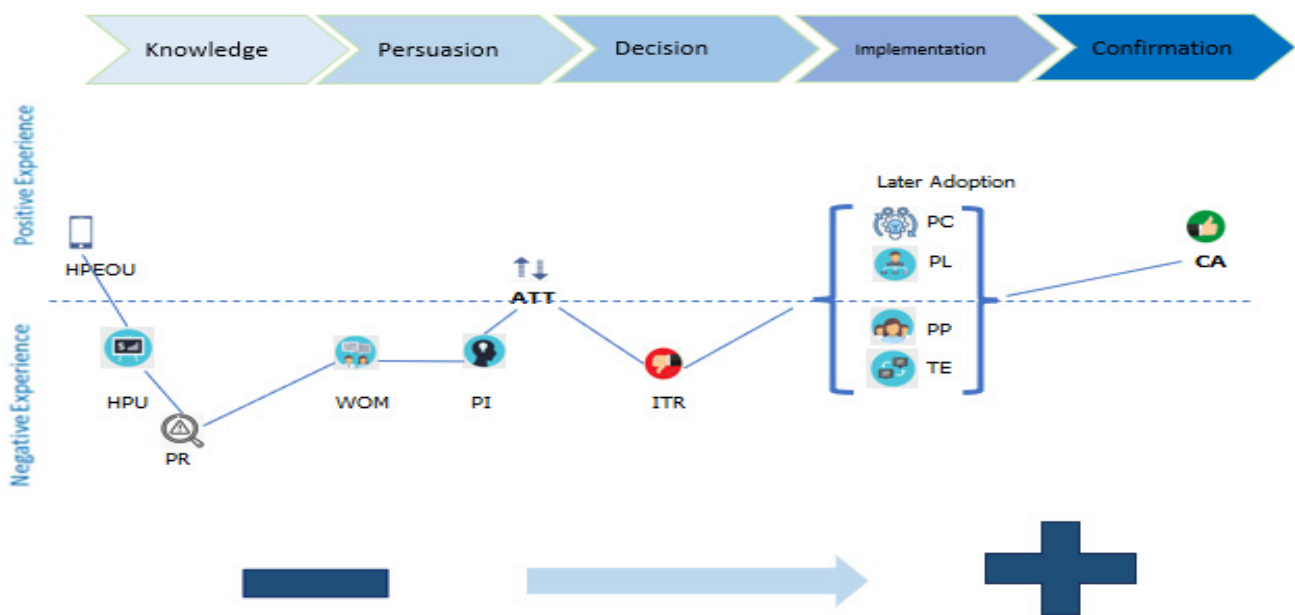
Figure 9. The Staff's journey of HR Chatbot using.

7. Implications for Sustainable Use of HR Chatbots in Private Companies in Thailand

Currently, the use of HR chatbots in corporate communication is critical for private company development in Thailand, as the HR department is an important department that can develop personnel and manage processes for private companies, resulting in long-term sustainable corporate development in the future, especially in the three core principles of sustainability, i.e., society, environment, and economics [59,72]. In order to be consistent with the dynamic decision-making process for accepting innovations (1. Knowledge, 2. Persuasion, 3. Decision, 4. Implementation, and 5. Confirmation) that forms the framework of this study, the introduction of people, processes, technology, and policies to support staff decision-making and the sustainable development of private companies in Thailand are shown in Table 9.

Table 9. The implications for sustainability for HR Chatbots of Private companies in Thailand.

Innovation Decision Process	The Implications for Sustainability for HR Chatbots of Private Companies in Thailand			Results (−/+)
	Social	Environment	Economics	
1. Knowledge	Perceived usefulness (PU), Perceived ease-of-use (PEOU) and Perceived Risk (PR) of HR Chatbot has a huge impact on the user. Consequently, the user may find that the chatbot takes longer than human conversations and eventually leads to rejection.	The anxieties of staff perceptions and Perceived Risk of HR chatbot haven't reduced the communication gap between the staff and human resource department. Resources and time are still required.	Impossible to develop a HR chatbot application and business.	−
2. Persuasion	Any use of technology that does not respond to the needs of employees and personal attitudes on the negative side will result in a wide range of denials of technology in the organization.	Inefficiency of communication that will be Impacted the company's resources (human, transportation, papers, electricity charge and time, etc.).	Increasing the expenses to develop platforms to support employee requirements.	−
3. Decision	The hesitation that using HR chatbots will impact HR departments and organization improvement.	Losing company's resources and time.	Lack of improvement in business and organization.	−

Table 9. *Cont.*

Innovation Decision Process	The Implications for Sustainability for HR Chatbots of Private Companies in Thailand			
	Social	Environment	Economics	Results (−/+)
4. Implementation	People, processes, technology, policies, and the clear direction (HR manager, head of HR) of an organization have a major influence on employees' decision to adopt HR chatbots again.	Utilizing HR chatbots to support a company's resources and time.	Reduce expenses and improve ROI (return of investment).	+
5. Confirmation	Later adoption of HR chatbot supports the sustainability of the HR department and organization development.	Long-term improvement and sustainable development of private company in Thailand.	Sustainability of ROI.	+

8. Conclusions, Limitation and Future work

8.1. Conclusions

This study developed a conceptual framework consisting of five distinct stages for the decision-making process of accepting technological innovations: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. The research was conducted to assess the perspectives of individuals who have utilized HR chatbots in private businesses. Additionally, this study aimed to examine the implementation of the elements of people, process, technology, and policy to enhance employee decision-making and promote long-term growth. The research revealed that employee perceptions significantly influence the attitudes formed through the process of persuasion, leading them to reject the utilization of HR chatbots. Empirical studies have demonstrated that the factors of hesitant perceived ease-of-use (HPEOU), word of mouth (WoM), and personal innovation (PI) significantly impact employees' attitudes of rejection towards using a chatbot. This underlines the perception that using a chatbot may be more complex than directly interacting with a human counterpart. Additionally, our research also revealed that the way people perceive the level of risk associated with using a HR chatbot also directly affects their intention to reject. This suggests that users of HR chatbots still have concerns about the potential collection of and access to their information during conversations. Furthermore, there may be uncertainty regarding the ability of HR chatbots to provide faster responses compared to human conversations. The apprehensions regarding the future also impact the employees' inclination to reject the proposed HR chatbots in light of these issues, which could potentially lead to users discontinuing their use of the chatbot service. The act of strongly rejecting the use of HR chatbots was discovered to have a detrimental impact. A user's decision not to use the HR chatbot may stem from either a lack of motivation to proceed or a complete refusal to use it.

Thus, the researchers studied factors that would influence the later adoption of HR chatbots, which found that the intention to refuse use (ITR) had a more positive influence on people (PP), process (PC), technology (TE), and policy (PL), which further demonstrated that if an organization evolved in terms of people, processes, technology, and corporate policies, it could influence private corporate employees to re-adopt the HR chatbots. The researchers conducted further studies of confirmation adoption (CA), which revealed that the convenience of use for the individual and the technology that has already been developed may not have responded to the employees' use. However, the development of various processes in HR chatbots and the policy of the organizations have greatly affirmed the use of HR chatbots and provided conditions for their sustainable use in private companies in Thailand.

8.2. Limitation and Future Work

This study has some limitations. The first limitation is that the sample consisted only of employees of private companies in Thailand who have previously used HR chatbots.

The second limitation is the study of short-term usage behavior. The third limitation involves the use of self-assessment surveys to measure the experiences of individuals who have had some experience using an HR chatbot. However, it should be noted that some of the data collected through this survey method may be subjected to errors, as some users may be confused about or inaccurately recall past situations. Finally, as this study only examined HR chatbot platforms in private enterprises in Thailand, the results could not be generalized to user behavior on technology or other chatbot platforms within other organizations. Therefore, future research should evaluate the use of technology and other chatbot platforms in private organizations, and studies should be conducted over a longer period of time to store more data in order to ensure sustainable corporate development results.

Appendix A

Table A1. Source of Question Items.

Index	Question Items	Source
HPU1	I'm not sure the use of HR chatbots in Private company will help develop the operations of the HR department.	
HPU2	I'm not sure the use of HR chatbots in Private company will save you time asking for information from the HR department.	[12,30]
HPU3	I'm not sure the use of HR chatbots in Private company will enhance the channels of communication with the Human resource department.	
HPEOU1	I'm not sure the use of HR chatbots in Private company would make it easy to get information about the services of the Human resource department.	[12,73]
HPEOU2	I'm not sure it's easy to use private HR chatbots in Private company to ask for support from the HR department.	
HPEOU3	Overall, I'm not sure that using HR chatbots in private companies can connect me to the HR department.	
INJ1	I intend to refuse to use the HR chatbot for inquiries about personal services and support in private companies.	[12,30]
INJ2	I intend not to recommend that colleagues use HR chatbots to inquire about products, services and support from private companies.	
PR1	The security system to build the HR chatbots application is not strong enough to protect the user account.	

Table A1. *Cont.*

Index	Question Items	Source
PR2	I think a conversation through HR chatbots could cause personal information to leak to the public.	
PR3	I am well aware that disclosure of personal information through HR chatbots may have an adverse effect on me.	
PI1	I believe that my proficiency in utilizing HR chatbots is not superior to that of my fellow employees and colleagues.	
PI2	Generally, I'm reluctant to try HR chatbots.	
WOM1	My colleague talked about HR chatbots making it easier for me to decide not.	
WOM2	My colleague talked about HR chatbots, which prompted me to refuse.	[74]
ATT1	HR chatbots are not necessary for me to inquire about products, services and support requests from private companies.	
ATT2	I believe that the HR chatbots are not significant.	
ATT3	I don't think the HR chatbots are useful.	[12,75]
ATT4	Overall, I don't like using HR chatbots to ask for support from HR department.	
PP1	I believe that the staff should have a good attitude and experience about HR Chatbot.	[59]
PP2	I believe that HR Chatbot will make communication between employees and individuals more effective.	
PP3	I feel that the work between the staff and the department is much more efficient.	
PC1	I believe that employees should understand the process of using HR Chatbot.	
PC2	I believe that the organization should develop the process of communicating with the department.	[59]
PC3	I believe there is a need for a program to develop the process of using the HR Chatbot.	
TE1	I believe that HR Chatbot will have an effect on my daily life and make my life easier.	[59]
TE2	You believe that HR Chatbot is a straightforward and easy-to-use technology	
TE3	I believe I can the most success when using the HR chatbot again.	
PL1	If the company recommends you use a HR Chatbot, you will follow.	
PL2	I would recommend that friends and colleagues use HR Chatbot.	[76]
PL3	I didn't hesitate to use the HR Chatbot again to comply with the company's policies.	
CA1	I tend to use the HR Chatbot later after the upgrade because it improved my work.	[74]
CA2	I'm going to use the HR Chatbot next after an upgrade in the data process from the HR department.	[30]
CA3	In the future, I will continue to use the HR Chatbot after the updated version, in accordance with the company's policy.	[59]

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