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Sensemaking processes generated by human-HR chatbot interaction in the organization

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I dedicate my dissertation to those who feel their strength is running out. There is always something left to draw upon!

"To interact with technology, people have to make sense of it; and in this sense-making process, they develop particular assumptions, expectations, and knowledge of the technology, which then serve to shape subsequent actions toward it."

Wanda Orlikowski - Debra Gash
(1994, p. 175.)

1. INTRODUCTION

1.1 THE AIM OF THE THESIS

The study of human-chatbot interaction is a popular research area that focuses on both the technological perspective and the understanding of human attitudes (Murtarelli-Gergory-Romenti, 2021). The literature on human-chatbot interaction reveals that in a corporate environment, few studies have examined the phenomenon from the perspective of organizational members (Brachten-Kissmer-Stieglitz, 2021). From the sensemaking perspective that I apply in my thesis, in the databases I examined none of the available studies investigated it. This research gap, my concept of chatbots as defined by my philosophical standpoint, according to which I interpret interactive agents not as a reality that exists independently of us but as entities formed as a result of sensemaking processes, and the sensemaking perspective I have learned during reviewing constructivist theories (Weick, 1995) led to the definition of the *intellectual goal* of my thesis, which is to discover **what sensemaking processes are generated by the interaction between the individual and the HR chatbot** which I examine through the following research questions:

1. **What sensemaking processes does the interaction between the individual (employees/HR professionals/managers) and the HR chatbot generate in the organization?**

   1.1 What sense do individuals (employees/HR professionals/managers) make of the HR chatbot used in their organization?

   1.2 How does the sensemaking of the HR chatbot affect the behavior of individuals (employees/HR professionals/managers) towards the HR chatbot itself?

The empirical study took place at the Hungarian organizations of a multinational company that applies an HR chatbot. I conducted twenty semi-structured interviews. For data analysis, I applied interpretive phenomenological analysis. To ensure data triangulation, I also performed web content analysis and document analysis with inductive content coding.

As a result of my empirical research, I have enriched the **literature on making sense of technology with the following:**

1) I revealed nine meanings made of chatbots,
2) I identified the actions related to these meanings.

So far, no studies have been conducted on HR professionals' perspectives on HR chatbots used to automate internal communication in an organization. My research findings contribute to the **research area of human-chatbot interaction with the following:**

1) I examined HR professionals' perspectives on the HR chatbot,
2) I discovered employees' (organizational users) perspectives on the HR chatbot.

The practical objective of the thesis is to discover whether **a gap can be identified between the actions of the organization members towards the HR chatbot, and the strategic goals of the managers related to the digital assistant. I also aim to present how this gap can be narrowed or eliminated.**

On the one hand, my results provide practical insights for the experts of the examined organization to facilitate the organizational acceptance and the daily use of the HR chatbot, and on the other hand, they may also help HR professionals by revealing the challenges of automating internal organizational communication.

1.2 Structure of the thesis

The introduction is followed by presenting the relevance of the research topic (2.) and my philosophical standpoint (3). The next chapter (4.) focuses on the theoretical background of the research problem, including the definition (4.1.1) and types of chatbots (4.1.2; 4.1.3), the definition of human-chatbot interaction (4.1.4), the presentation of sensemaking perspective (4.2), and the sensemaking processes generated by organizational technology introduction (4.3).

The following subchapter (5.1) discusses the literature search's plan and method and the descriptive analysis results (5.2). The systematic literature review is structured based on the topics that emerged as a result of the literature search (5.3). The next subchapter (6.1) deals with my presuppositions, while the following subsection (6.2) presents my qualitative research which is based on Maxwell's (1996) qualitative research model. Subchapter 6.3 focuses on the conceptual framework which is followed by the discussion of the personal, intellectual, and practical research goals (6.4), and the research questions (6.5). The next subsections present the data collection (6.6.1) and the data analysis methods (6.6.2). The quality criteria of the research are discussed in Subsection 6.7. In the following sections the examined organization (7.1), the conditions of the chatbot's introduction to the examined organization (7.2), the operation of the chatbot (7.3), the data collection process (7.4), the sample selection (7.5) and the data analysis process (7.6) are presented.

The presentation of the results (8.) is followed by the scientific evaluation of the empirical findings (9.) and the practical implications (10). Finally, I present the limitations and further research directions (11.).

2. RELEVANCE OF THE RESEARCH TOPIC

The investigation of the effectiveness of tools used to automate organizational processes was examined by several international (Willcocks-Lacity-Craig, 2015; Fernandez-Aman, 2018; Papageorgiou, 2018) and Hungarian (Kő-Fehér-Szabó, 2019; Marciniak-Móricz-Baksa, 2020; Demeter et al., 2020; Horváth, 2020) studies, however, the consideration of social aspects are also becoming more widespread in technology-related research, based on the theory of social interface, according to which people react to technology-mediated communication as if it were their partner (Mehra, 2021, p.1.). Such artificial interactions are also carried out by chatbots, which can create the feeling of a social situation during the interactions (Nass-Moon, 2000), thus generating several challenges for both the interface developers (Følstad-Brandtzæg, 2017) and the organizations in terms of the chatbots' adaptation (Brachten-Kissmer-Stieglitz, 2021).

One of the research challenges of the near future is to understand the impact of human-chatbot interaction on the behavior of individuals, as Skjuve et al. (2019) argue that in the future it may be impossible to distinguish between the natural and AI-based interaction partners. The concept of chatbots was inherently generated by the dilemma of whether it is possible to create an interactive agent that can mimic human interaction, which also raises several ethical issues for organizations, including whether a company can implement such chatbots without being transparent to the employees that they communicate with a chatbot. Even today, competitions are held, including the Loebner Prize, to test the capabilities of the most popular chatbots. However, Skjuve et al. (2019) ask whether people need such anthropomorphic interactive agents.

Within the literature on human-chatbot interaction, several publications have examined attitudes toward chatbots, including expectations, satisfaction, attitudes, perceptions, trust, acceptance, and motivation to use a chatbot (Rapp-Curti-Boldi, 2021; Kenesei-Bognár, 2019; Seer-Vizeli, 2019), but most of these articles studied the phenomenon from the perspective of the general user (experimental subject in a laboratory environment) and the consumers (customers of existing companies). In an organizational context, from the perspective of managers (Jang-Jung-Kim, 2021) and employees (Brachten-Kissmer-Stieglitz, 2021), the phenomenon is underexplored. Managers play a central role in decision-making and communication about the organizational adaptation of chatbots, thus incorporating their point of view is important

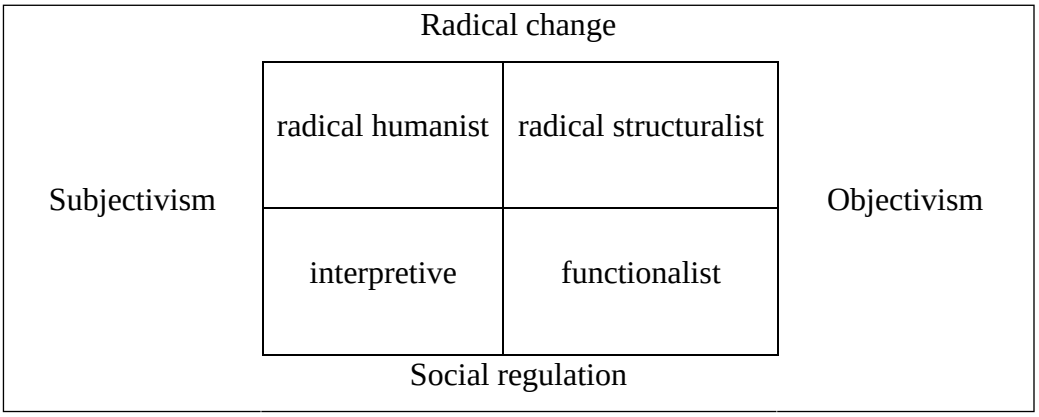
(Jang-Jung-Kim, 2021). It is also crucial to understand employees' perspectives, as factors influencing their willingness to use the technology play a key role in the success of the organizational implementation of chatbots.

In addition, it is important to emphasize that examining the phenomenon through a sensemaking perspective captures the dynamics and evolution of chatbot-related interpretations by including, in addition to interpretation, the investigation of actions toward the agent that induce changes in meanings as a result of recent experiences gained during the interactions with the chatbot. Thus, compared to the factors presented above (Rapp-Curti-Boldi, 2021), the sensemaking perspective may contribute to a deeper understanding of the behavioral effects of human-chatbot interaction, as it considers the iterative nature of meaning-making and not just reveal a momentary state.

3. PHILOSOPHICAL STANDPOINT

Due to the epistemic nature (paradigm dependence) of knowledge about organizations, paradigm-conscious theory building, and organizational research are paramount (Gelei, 2006, p.81.). Based on this statement, this subchapter aims to present my philosophical standpoint, which justifies the approach used in my thesis to examine human-chatbot interaction. To describe this, I apply Gibson Burrell and Gareth Morgan's (1979) model, which places the four paradigms of cognition of social and organizational reality along two dimensions (*Figure 1*) (Gelei, 2006).

Figure 1 Burrell-Morgan matrix (1979)



Source: own edition

The horizontal axis of the matrix indicates an objective or subjective presupposition of the nature of reality. According to the objectivist position, the world exists independently from us, and the relationships between phenomena can be described by causal relationships. In contrast, the subjectivist position represents the framework of thought that the world does not exist independently from us but is constructed by individuals along with their interpretations and interactions. For organizations, this means that organizational reality is not visible and cannot be directly examined, "*the essence of organizations is the underlying meanings and interpretations that exist in the consciousness and intersubjective processes of organizational actors, i.e. through their interactions and communication* (Gelei, 2006, p.82.).

The vertical dimension of the model shows the approach used in social sciences. The "social regulation" presupposes that different class interests are compatible, i.e., consensus is possible. In contrast, "radical change" perceives reality as full of tensions and contradictions. Concerning its cognition of organization, the theories belonging to social regulation examine the existing reality from an objectivist (*functionalist*) or subjectivist (*interpretative*) point of view. The paradigms of radical change, on the other hand, criticize the existing organizational reality from an objectivist (*radical structuralism*) or subjectivist (*radical humanism)* philosophical standpoint.

In my thesis, I apply the **interpretive approach to organizational theory** that considers organizational reality to be a social construction, and the formation of the meaning of things to be the result of social interpretive processes. According to the paradigm, the main questions to be formulated in organizational research are *what has a meaning in organizations*, how members of an organization define organizational reality, and what are the patterns of meaning that persist and shape reality. Organizational *reality* does not exist independently of its members, but is constructed, shaped, and changed *along the the actions and interpretations of individuals.* The members of the organization *give meanings* to the elements of their environment, the outside world, themselves, and others, which are formed during the interactions and influence each other, so the organizational events, actions, and objects receive a symbolic meaning that is not directly visible to the outside observer as the elements of the organization have underlying meanings (Gelei, 2006).

Consequently, I do not interpret the **organizational presence of chatbots** as an organizational reality that exists independently from **the members of the organization, but as they exist along the meanings attributed to them**. Therefore, in my thesis, I examine these meanings attributed to chatbots and the actions directed towards them to understand the reality constructed by the members of the organization.

4. THEORETICAL BACKGROUND

This chapter aims to conceptualize the elements of the research question by presenting the definitions and taxonomies needed to understand the research problem. Thus, in the following subsections, I describe the history (4.1), definition (4.1.1), types and areas of application of chatbots (4.1.2), the characteristics of HR chatbots (4.1.3), and the definition of human-chatbot interaction (4.1.4)). Then I discuss the definition (4.2.1), the process (4.2.2), and the research directions (4.2.3) of the sensemaking perspective, and finally, I present the theoretical background of the organizational sensemaking caused by the introduction of technology (4.3).

4.1 HISTORY OF CHATBOTS

The idea of creating a chatbot was induced by the concept of the Turing test proposed by Alan Turing in 1950 to find out if a computer program can communicate in a way that a person would believe it to be a living entity (Adamopoulou-Moussiades, 2020). The first chatbot was developed by MIT researcher Weizenbaum in 1966 and was named ELIZA. This chatbot was created to mimic a psychotherapist, whose working principle was based on retrieving predefined, keyword-related answers stored in a database along with information analysis. The chatbot Parry was created in 1972 to mimic a patient with paranoid schizophrenia. In a 1979 experiment, it succeeded in deceiving two psychiatrists who believed it to be a real patient based on its interaction with them (Heiser et al., 1979). In the historical overview of chatbots, the authors also regularly mention the chatbot ALICE, which already used 41,000 templates and associated patterns - as opposed to ELIZA, which knew only 200 keywords.

2001 was a turning point in the development of technology, with the advent of chatbots that could help people with practical information provided to them. The advent of voice-based personal assistant chatbots with artificial intelligence, including Apple Siri (2006), IBM Watson (2011), Google Assistant (2012), and Amazon Alexa (2014), is also another milestone in the evolution of chatbots. The mass emergence of chatbots began in 2016 due to the development of machine learning, (which means the ability of an algorithm to discover patterns from experience and generate new knowledge on its own or with human help), as well as the social platforms that allowed companies to develop chatbots for their own platforms (Adamopoulou-Moussiades, 2020).

4.1.1 The definition of the chatbot

The name chatbot was derived from the word "chatterbot" first used in a computer game in 1991, where chatterbot embodied a virtual player, and its function was to chat with other players (Mauldin, 1994). "Bot" stands for the "robot" in this context (Selamat-Windasari, 2021). A bot is a software that performs automated tasks according to a defined algorithm. Another meaning of a bot is a physically incarnate robot. Many of the synonyms for chatbot are used in the literature, including the terms *chat robot, bot, interactive agent, artificial conversational entity, virtual assistant, conversational agent, conversational interface, digital assistant, intelligent assistant, talkbot,* and *conversational system* (Rapp-Curti-Boldi, 2021).

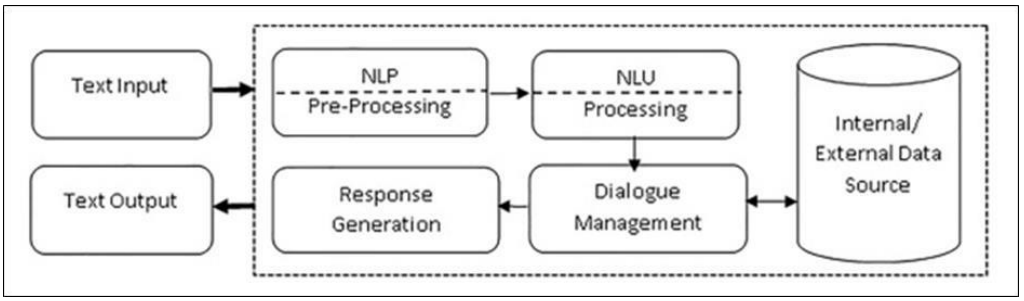
The definitions of chatbots in the literature do not differ markedly, they differ only in one element: some terms refer to chatbots as an AI-based technology (Selamat-Windasari, 2021; Youn-Jin, 2021), others as a computer program (Sheehan-Jin-Gottlieb, 2020; Suhaili-Salim-Jambli, 2021). Some authors also refer to the way chatbot communicates, whether text-based or voice-based (Ashfaq et al., 2020; Adamopoulou-Moussiades, 2020), while others highlight the main aspect of developing a chatbot, namely the need to provide more accurate and personalized responses (Selamat-Windasari, 2021). In some definitions, the component of the chatbot architecture natural language processing (NLP) is also included (Shawar-Atwell, 2005; Adamopoulou-Moussiades, 2020).

In my thesis, based on Brandtzaeg-Følstad (2017) and Kenesei-Bognár (2019), I define chatbots as follows. **Chatbots are computer programs that can communicate with users without human intervention based on pre-written scenarios and rules through a chat interface.** This definition does not exclude that the chatbot is AI-based, nor does it limit the concept of a chatbot to a group of agents operating on such a principle. It also does not detail the way the chatbot communicates, but it does emphasize the automation of communication along pre-written rules, which is in line with the definition of a bot presented above.

Figure 2 presents the mechanism of how chatbots work. The chatbot's components are natural language processing (NLP), natural language understanding (NLU), dialogue management, data sources, and the response generator (McTear-Callejas-Griol, 2016).

During natural language processing, the chatbot transforms user questions into structured data. The NLU interprets user questions and intentions based on data from structured NLP. Data sources provide information to the dialogue manager, which can be internal (templates and rule structures) or external (external databases and services). The dialog manager loops back to the data sources to analyze the structured data. If this process fails, the chatbot can ask the user back to keep the dialogue context-specific. Chatbots' response generation methods can work according to two models: based on retrieval or generative principle. While in the former case, the chatbot selects the answer that best fits the user's question from a pre-constructed database, in the latter model the chatbot is artificial intelligence-based, being able to learn from previous interactions that function as the input of its responses (Suhaili-Salim-Jambli, 2021).

Figure 2 The main components of a chatbot



Source: Suhaili-Salim-Jambli (2021, p.3.) and McTear-Callejas-Griol (2016)

4.1.2 Chatbot types and application areas

I present the types of chatbots based on Adamopoulou-Moussiades' (2020) classification, which groups chatbots along seven dimensions (*Table 1*). The taxonomy provided by the authors is sufficiently detailed, but it can be supplemented with one aspect, namely, that of the virtual appearance of chatbots, according to which the chatbot can have an avatar head, an avatar, or it can be created without a visual character. Adamopoulou-Moussiades's (2020) grouping principles include the knowledge domain, the service provided by the chatbot, the goals of the chatbot's operation, the method of response generation, the level of human-aid, the permissions, and the communication channel used by the chatbot.

The knowledge domain as a classification dimension refers to the information available to the chatbot. The generic chatbot can answer any user question. An open domain indicates that the chatbot is working from more than one database, while a closed domain refers to a single specific area. Chatbots that help a person as a friendly social actor by answering frequently asked questions or booking services represent the interpersonal category. The intrapersonal chatbot knows the user's personal needs well and responds to them. Inter-agent service indicates that the chatbot can communicate with other chatbots.

The goals of creating a chatbot can be to provide information, chat, entertain, and perform certain tasks, such as making a room reservation, or to provide assistance in searching the webshop. The key element of a chatbot's architecture is the response generation method, which can be rule based - the chatbot works from predefined responses selected by pattern matching algorithms-, retrieval based – the chatbot uses a neural network to generate the most appropriate response-, or generative, which means that the chatbot applies natural language generation (NLG). In the latter case, a significant knowledge base is needed to give grammatically and substantively correct answers.

Human-aid as a grouping criterion indicates whether human intervention is required for a chatbot to function, or the agent works autonomously. The chatbot can be open-source or commercial in terms of permission. Open-source means that the code is available, so the developer has complete control over the design of the interface, while for commercial platforms, the developer does not have complete control over the chatbot. Finally, the chatbot can communicate via text, voice, or image. Text-based chatbots can communicate with freehand text input or text bubbles. Many chatbots work in a hybrid way, which means that they use multiple communication channels at once.

Chatbots can also be grouped according to their application areas, which include healthcare (Laumer-Maier-Gubler, 2019; Oh et al., 2017), education (Ranoliya-Raghuwanshi-Singh, 2017; Fryer-Nakao-Thompson, 2019), and several industries and corporate areas, such as tourism (Ukpabi-Aslam-Karjaluoto, 2019), hospitality (Leung-Wen, 2020; Dash-Bakshi, 2019), banking services (Schmidtová, 2019; Alt-Vizeli-Săplăcan, 2021), marketing (Van den Broeck-Zarouali-Poels, 2019; Baris, 2020), and customer service (Xu et al., 2017; Cui et al., 2017).

Table 1 Classification of chatbots

Knowledge domain	▪ generic ▪ open domain ▪ closed domain
Service provided	▪ interpersonal ▪ intrapersonal ▪ inter-agent
Goals	▪ informative ▪ chat based/conversational ▪ task based
Response generation method	▪ rule based ▪ retrieval based ▪ generative
Human-aid	▪ human-mediated ▪ autonomous
Permissions	▪ open-source ▪ commercial
Communication channel	▪ text ▪ voice ▪ image

Source: Own edition based on Adamopoulou-Moussiades (2020, p.5.)

Chatbots can be used not only to automate communication with consumers but also for internal company use, including providing information to employees. The benefits of using chatbots are *availability*, as chatbots are available 24/7, *efficiency*, providing the right information quickly, and the relatively *low cost of implementation*. When using a chatbot within a company, it is important to consider whether it helps to make communication more effective, by considering what other internal communication channels can be used to support members in accessing information, and how effective these tools are. These communication channels include employee applications, email, chat, video, voice, intranet, and digital signage. *Table 2* illustrates the advantages and disadvantages of these communication channels Sinclair, 2021).

Regarding the internal communication channels presented *in Table 2*, it can be seen that one of their most common disadvantages is the lack of feedback. Compared to this, the use of chatbots allows two-way communication, as well as the storage of topics searched for by organizational users and the keywords they use, along which the exact directions of development can be defined, and the technology can be tailored to the needs of the users. In the case of some channels organizational presence is required to access them, but communication with the chatbot can take place from anywhere.

It must be also taken into account, that in the early stages of technology adaptation, a chatbot can often misunderstand the user or not understand complex issues, resulting in a stuttering, less humane dialogue that can be annoying to the individual and negatively affect subsequent intentions to use the technology (Selamat-Windasari, 2021; Sinclair, 2021).

Table 2 Advantages and disadvantages of corporate internal communication channels

Communication channel	Advantages	Disadvantages
Employee applications	▪ It requires little effort from the workers ▪ Fast	▪ Users are lost among the numerous apps ▪ The introduction is time-consuming
Email	▪ Fast ▪ Up-to-date ▪ It reaches a large audience	▪ One-way communication ▪ Many employees don't even open such emails ▪ Retrieving them is time-consuming
Chat	▪ It ensures the exchange of information between employees who are far apart	▪ Time differences between message exchanges ▪ It does not allow organization-level communication
Video	▪ Cost-efficient ▪ You can send a video message without using other software	▪ One-way communication, no feedback provided ▪ Employees' watching longer videos is unlikely
Voice (podcasts, audio recordings)	▪ They can be listened to while pursuing other activities ▪ Authenticity is stronger than in the case of a written text	▪ One-way communication ▪ It does not get the full attention of the employee
Intranet	▪ Up-to-date information ▪ Allows for two-way communication	▪ In remote work or while traveling, an employee does not access the information ▪ In the absence of constant updating, employees will stop using it
Digital signage	▪ Information published on external devices, strengthening identity ▪ Visible without using a computer	▪ Improper design is counterproductive ▪ The news displayed requires constant updating
Chatbot	▪ Available anytime, anywhere ▪ Low costs ▪ Speed ▪ Stores employee searches	▪ No results will be found if the keyword is not known ▪ It does not understand complex issues ▪ The interaction is not humanlike ▪ Requires continuous development

Source: Own edition based on Sinclair (2021)

4.1.3 The HR chatbot

The application possibilities of chatbots are wide in the field of HR. Regarding the *recruitment process*, providing information on the organization and the job to applicants, interview scheduling (Majumder-Mondal, 2021; Esch-Black, 2019; Gärtner-Kern, 2021; Mohan, 2019; Chérif-Aránega-Sánhez, 2021), and conducting (Kurek, 2021) are tasks that a chatbot can perform. Chatbots are available 24/7 and can communicate with all applicants at once. Therefore, their introduction allows for improving candidate experience by answering questions right away, adapting to potential candidates' preferred communication channel when contacting, and informing applicants of the status of the application throughout the entire recruitment process. (Esch-Black, 2019; Venusamy-Rajagopal-Yousoof, 2020), and thanks to chatbots, the applicant can also receive feedback on the negative decision, which the HR department often cannot provide due to its workload (Nawaz-Gomes, 2019; Esch-Black, 2019; Chérif-Aránega-Sánchez, 2021).

During pre-screening, a chatbot can compare the answers given by candidates with the answers of the high-performing employees of the organization (Black-Esch, 2019), and analyzes their sentence structure and vocabulary, which is combined with content analysis to determine the candidate's score rating (Black-Esch, 2019; Mohan, 2019). The chatbot thus allows HR to focus only on candidates who passed the pre-screening (Chérif-Aránega-Sánhez, 2021). In addition, chatbots can be used to search for talent (Hristova, 2019; Gärtner-Kern, 2021). To improve candidate experience, it is essential to evaluate the applicants' feedback and incorporate it into the recruitment process, which is also made possible by implementing a chatbot (Majumder-Mondal, 2021).

The use of chatbots can also strengthen *employer branding* by allowing the organization to treat candidates for open positions in a unified manner, helping to differentiate the company in the market (Majumder-Mondal, 2021), and conveying the message that the organization is open to innovation. The employer brand can play a decisive role when an applicant has to choose between several job opportunities (Sivertzen et al., 2013). The applicant's interest in the organization is often negatively affected by poor responsiveness and low interpersonal communication (Chérif-Aránega- Sánchez, 2021), but chatbots can interact with all applicants and keep them informed (Chérif-Aránega-Sánchez, 2021), thus creating a positive image of the organization.

After selecting the candidates, the *onboarding process* begins, which the HR chatbot can also support well. During organizational orientation, with the help of a chatbot, the new employee does not feel lost, as they can turn to the chatbot with questions at any time (Majumder-Mondal, 2021; Venusamy-Rajagopal-Yousoof, 2020; Hristova, 2019; Kurek, 2021). The onboarding chatbot also facilitates the social integration of new employees and the acquisition of knowledge about the job and the organization (Kurek, 2021).

Chabots can also be used in *training and development*. As already mentioned in connection with the onboarding chatbot, the knowledge that employees need to acquire to fulfill their jobs can be well supported by chatbots (Majumder-Mondal, 2021; Venusamy-Rajagopal-Yousoof, 2020) providing step-by-step guidance for the employee to learn (Hrist 2019) through videos, tutorials (Mohan, 2019). Measuring knowledge can also be accomplished with chatbots, which gain information about which learning modules employees have fulfilled based on the evaluation of responses (Mohan, 2019).

Chatbots can also be used to support *performance evaluation* (Majumder-Mondal, 2021), as they can provide immediate feedback to employees on the outcome of their work, allowing the employee to correct their mistakes and strive for better quality work (Hristova, 2019).

Chatbots can also be used in the field of *organizational internal communication*. By quickly answering frequently asked questions from employees, HR can be relieved of a significant burden (Claus, 2019; Majumder-Mondal, 2021). Questions regularly asked by these employees may arise in connection with leave, payroll accounting, benefits, organizational procedures, regulations, career opportunities, and the skills required to fill positions (Raj, 2019; Hristova, 2019; Jitgosol-Kasemvilas-Boonchai, 2019), for which the chatbot can be immediately available to employees.

Thus, the introduction of chatbots in the field of HR has several benefits for the organization, employees, and applicants for open positions, including the continuous availability of HR chatbots, immediate information, and feedback, which shortens process times, allowing for the standardization of responses as well as the reduction of mistakes caused by human fatigue (Kurek, 2021). The current emotional state of human employees is not a relevant factor in the interaction with the chatbot, so it should not negatively affect

the candidate's experience. Thanks to the use of chatbots in pre-screening, candidates can participate in the interview in their own homes, in a safe environment, so they do not have to monitor the interviewer's verbal and nonverbal reactions (Majumder-Mondal, 2021), thanks to which, they can participate in the first round of the process anxiety-free, thus being able to provide a better performance.

Employee interactions with HR chatbots can be stored, the lessons of which can be used to obtain information about the topics that concern employees the most (Kurek, 2021). The chatbot can also measure an employee's happiness index, and level of commitment, and infer the potential workforce-related challenges by analyzing the information available to them (Mohan, 2019), which indicates the need for intervention to the management. All this provides an opportunity to reduce dropout.

The use of HR chatbots saves significant cost and time (Chérif-Aránega-Sánchez, 2021) and their introduction is not too costly for companies. However, one also needs to see the challenges that the use of chatbots generates for the organization. These include ensuring privacy and developing a chatbot that behaves ethically with the interaction partner, paying attention to their social, professional, and emotional needs (Kurek, 2021). The success of implementing chatbots is influenced by several factors, including the willingness of the HR department to collaborate with them, which the management can facilitate by communicating clearly and consistently about what the chatbots' organizational presence means regarding the HR professionals' role (Hristova, 2019).

4.1.4 Human-chatbot interaction

Ciechanowski et al. (2019) classify human-chatbot interaction studies as a research area of human-computer interaction (HCI), which is also justified by the definition of a chatbot (a chatbot is a computer program capable of communicating with the user without human intervention (Brandtzaeg-Følstad, 2017; Kenesei-Bognár, 2019). Hence, it calls for an interdisciplinary approach using research in the fields of cognitive psychology, behavioral science, anthropology, computer science, engineering, sociology, and communication science. HCI's research initially looked at how the use of technology could be tailored to users' needs as much as possible. However, with the advent of personal computers, HCI's research also focused on psychological aspects: instead of utility, user experience has come to the forefront of research, including the exploration of

how an individual feels during interaction with a computer (Waddell-Zhang-Sundar, 2015). These early studies show that individuals react to the computer as if they were social actors despite being aware that they had interacted with a machine (Reeves-Nass, 1996; Nass-Moon, 2000). Using the CASA (Compters Are Social Actors) paradigm, researchers have studied what social responses people give to machines (Araujo, 2018).

According to the definition of Jaimes-Sebe (2006, p.116.), the study of human-computer interaction aims to make technology more usable for humans, based on knowledge of three factors: the *user* who interacts, the *system* he or she uses, and finally the understanding of the *interaction* that takes place between the user and the system. I have already discussed the possible interaction partners of a chatbot in connection with the discussion of the types and application areas of the chatbot, as well as the technological definition of a chatbot. However, defining the interaction is still necessary to understand the concept of human-chatbot interaction. Interaction is often used as a synonym for communication in common parlance, but it is important to emphasize that interaction means more than communication, as it includes all manifestations of action (including communication) between the parties (Buda, 1986; Buda, 1992), which is based on the mutual interpretation of behavior by partners. The interaction is influenced by the self-image and the image formed of the other (Forgó, 2011).

In addition to the above-mentioned aspects, my definition of human-chatbot interaction was also influenced by Dautenhahn (2012) and the importance of emotions related to the use of technology defined by Pavliscak (2018). According to Dautenhahn's (2012) definition, the aim of studying human-robot interaction is to develop systems that are acceptable to humans, respect their values, and consider their social and emotional needs, and are in line with Pavliscak's (2018) view that humans form emotional bonding with technology, making the development of ethical artificial systems even more important. From these points of view, the goal for the researcher - with which I also identify - arises, to find out how all this can be implemented during human-machine interaction.
Based on the definitions of human-computer interaction and human-robot interaction, I define the human-chatbot interaction as follows: **the human-chatbot interaction research area explores people's attitudes towards chatbots intending to use the acquired knowledge to develop chatbots that enable efficient functioning, and at the same time, are acceptable for people, consider their social and emotional needs, and**

respect their values when interacting with them.

Studies in the field of human-chatbot interaction examined among others the motivation for using chatbots (Brandtzaeg-Følstad, 2017), attitudes towards chatbots (Kasilingam, 2020), perception of chatbots (Zamora, 2017), user experience (Skjuve et al., 2019), satisfaction (Ashfaq- Yun-Loureiro, 2020), the development of trust (Følstad-Nordheim-Bjørkli, 2018), user expectations (Chaves-Gerosa, 2021), acceptance (Laumer-Maier-Gubler, 2019) and the role of the anthropomorphic nature of chatbot in human-chatbot interaction (Araujo, 2018; Rietz-Benke-Maedche, 2019; Sheehan-Jin-Gottlieb, 2020; Adam-Wessel-Benlian,2020; Go-Sundar, 2019; Seeger-Pfeiffer-Heinzl, 2017; Schanke-Burtch-Ray, 2020; Schuetzler-Grimes-Giboney, 2020; Assink, 2019; Biller et al., 2020; Donkelaar, 2018).

4.2 SENSEMAKING

The evolution of the concept of sensemaking was influenced by interactionism, ethnomethodology, cognitive psychology, and phenomenology (Brown-Colville-Pye, 2015). The literature on sensemaking roots back to the early 20th century and its beginning is linked to the work of James' (1890) *The Principles of Psychology* and Dewey's (1922) *Human Nature and Conduct - An Introduction to Social Psychology* by Maitlis-Christianson, (2014). However, it only appeared as an independent research topic in the 1960s. Garfinkel (1967) was the first to use the term "sense making" to describe interpretations and interactions that result from experiencing reality. Polanyi (1967) also used terms related to sensemaking, including the terms "sensegiving" and "sense-reading," in discussing what meaning people give to rhetorical speeches. The sensemaking perspective has had a significant impact on socio-constructive, interpretative, phenomenological, and process-oriented approaches to organizational science (Holt-Sandberg, 2011; Sandberg-Tsoukas, 2020; Brown-Colville- Pye, 2015).

4.2.1 Definition of sensemaking

The fragmented literature on sensemaking becomes apparent during a review of publications in the field. Some authors refer to it as a *theory* (Jensen-Kjærgaard-Svejvig,

2009; Holt-Cornelissen, 2014; Stein, 2004), others as a *lens* (Blatt et al., 2006; Sonenshein, 2009; Stensaker-Falkenberg, 2007; Vough, 2012), as *an approach* (Mills-Thurlow-Mills, 2010), as a *framework* (Sc-Costello-Sankaran, 2013; Mills, Weatherbee, Colwell, 2006; Mikkelsen, 2013) or *as a concept* (Fiss-Hirsch, 2005). However, Weick (1995) calls it *sensemaking perspective* (SP) - with the explanation that interpreting sensemaking as a perspective allows it to be used more widely, with which other researchers (Drazin-Glynn-Kazanjian, 1999; Schultz-Hernes, 2013; Vaara, 2000; Brown-Colville-Pye, 2015; Hsieh et al., 2011) also agree. The first description of the definition of sensemaking in an organizational context can also be traced to Karl E. Weick (1969), who defined it in their book *The Social Psychology of Organizing* as the intention of organizational actors to reduce ambiguities caused by discontinuities generated by ecological change in the organizational environment. As a result of the rich literature on sensemaking, several approaches to the definition of sensemaking have emerged, but no single consensus definition has emerged among researchers (Brown-Colville-Pye, 2015; Maitlis-Christianson, 2014) (*Table 3)*.

Contradictions appear as to whether sensemaking is merely an interpretation of meaning (Berger-Luckmann, 1967; Gioia, 1986; Gephart, 1993; Gioia-Thomans, 1996) or whether it also includes the action (Weick, 1995; Thomas et al., 1993, Taylor-Van Every, 2000; Cecez- Kecmanovic-Dalmaris, 2000; Klein et al., 2006; Seligman, 2006); should it be liaised with events causing ambiguity and discrepancy (Cornelissen, 2012; Maitlis-Christianson, 2014) or not (Gioia, 1986; Berger-Luckmann, 1967; Louis, 1980; Mandler, 1984); and should it be understood as an individual process (Cornelissen, 2012; Maitlis-Christianson, 2014) or a result of social construction (Berger-Luckmann, 1967; Balogun-Johnson, 2004; Gephart-Topal-Zhang, 2010). The retrospective nature of sensemaking also appears in some of the concepts (Weick-Sutcliffe-Obstfeld, 2005), but other research approaches suggest that sensemaking may be prospective (Gioia et al., 1994).

According to Weick (1995), at least seven characteristics of sensemaking can be identified despite differing definitions that distinguish sensemaking from processes of interpretation such as comprehension, interpretation, or attribution. The features mentioned by the author (1995, pp. 17-42.) are shown in *Table 4*.

Table 3 Definitions of sensemaking

Author	Definition
Weick (1979)	In the continuity of events experienced by individuals and their activity often appear those attention-grabbing changes, which provide an opportunity to attempt to remove equivocality by stating the importance or simplicity of the changes.
Louis (1980, p.241.)	"Sense making can be viewed as a recurring cycle comprised of a sequence of events occurring over time. The cycle begins as individuals form unconscious and conscious anticipations and assumptions, which serve as predictions about future events. Subsequently, individuals experience events that may be discrepant from predictions. Discrepant events, or surprises, trigger a need for explanation, or post-diction, and, correspondingly, for a process through which interpretations of discrepancies are developed. Interpretation, or meaning, is attributed to surprises."
Mandler (1984)	Sensemaking occurs when there is an interruption in events' continuity. This interruption brings the feeling of unfamiliarity.
Starbuck-Milliken (1988. p.16.)	„What is common to these processes is that they involve placing stimuli into frameworks (or schemata) that make sense of the stimuli (Goleman, 1985)."
Gephart (1993, p.1485.)	"Sensemaking has been defined as the discursive process of constructing and interpreting the social world".
Thomas et al. (1993, p.240.)	"The reciprocal interaction of information seeking, meaning ascription, and action."
Weick (1995, p.2.)	„First someone notices something, in an ongoing flow of events, something in the form of a surprise, a discrepant set of cues something that does not fit. Second, the discrepant cues are spotted when someone looks back over elapsed experience. The act of looking is retrospective. Third plausible speculations are offered to explain the cues and their relative rarity."
Cecez-Kecmanovic-Dalmaris (2000)	„Sensemaking involves processes of perceiving, believing, interpreting, explaining, predicting and acting both individually and collectively in a given organisation." (Parry, 2003, p.243.)
Taylor-Van Every (2000, p.75.)	"Sensemaking is a way station on the road to a consensually constructed, coordinated system of action."
Balogun-Johnson (2004, p.524.)	„Sensemaking is a conversational and narrative process through which people create and maintain an intersubjective world."
Weick-Sutcliffe-Obstfeld (2005, p. 409.)	„Sensemaking involves the ongoing retrospective development of plausible images that rationalize what people are doing."
Klein et al. (2006, p.71.)	"Sensemaking is a motivated, continuous effort to understand connections (which can be among people, places, and events) in order to anticipate their trajectories and act effectively."
Seligman (2006, p.109.)	„The cyclical process of taking action, extracting information from stimuli resulting from that action, and incorporating information and stimuli from that action into the mental frameworks that guide further action."
Gephart-Topal-Zhang (2010, pp.284-285.)	"Sensemaking is an ongoing process that creates an intersubjective sense of shared meaning through conversation and non-verbal behavior in face to face settings where people seek to produce, negotiate, and sustain a shared sense of meaning."
Cornelissen (2012, p.118.)	"Sensemaking refers to processes of meaning construction whereby people interpret events and issues within and outside of their organizations that are somehow surprising, complex, or confusing to them."
Maitlis-Christianson (2014, p.57.)	„Sensemaking is the process through which people work to understand issues or events that are novel, ambiguous, confusing, or in some other way violate expectations."

Source: own edition

Table 4 Characteristics of the sensemaking perspective

Typical	Description
(1) Identity is central	Sensemaking begins with the actor who makes sense. An individual's thinking about themselves shapes their interpretations of events.
(2) Retrospective	Individuals look back at the results of events to fit them into their own cognitive framework.
(3) People enact the environments	The individual and their environment interact to construct reality.
(4) Social activity	Interactions with other individuals play a key role in sensemaking. Knowledge is created during the sharing of experiences with each other.
(5) Ongoing	Sensemaking is an iterative process: explanation leads to action. During the action, new stimuli reach the individual, to which they make sense again. The more actions and explanations are born, the less equivocal the event will be for the individual.
(6) People extract cues from the context	The key question in sensemaking is which stimuli we perceive from the environment. This is influenced by several factors, including context.
(7) Plausibility over accuracy	The explanation of events cannot be done with complete accuracy, which stems from the retrospective nature of sensemaking and the fact that an individual completes their narrative of recalled events based on their previous experience.

Source: Own edition based on Weick (1995, pp.17-42.) and Szőts-Kováts (2012)

I define sensemaking following the definitions of Weick (1969, 1995), Louis (1980); Cornelissen (2012), and Maitlis-Christianson (2014) as follows. **Individuals reduce the ambiguity caused by the discontinuity resulting from ecological changes in the organization with retrospective sensemaking. That is, individuals interpret the discrepant cues from their environment and place these cues into their existing cognitive schemes, seeking to create plausible explanations for a new, unknown, confusing organizational phenomenon. This, in addition to reducing uncertainty, is also shaping their actions**. Thus, when individuals encounter novelty, a phenomenon that brings change in the organization that creates uncertainty for them, they look back to find explanations for the ambiguity generated by the event that reassures them and allows them to continue their activities. To do this, they place on their mental map the unknown event that is influenced by their previous experiences, knowledge, and beliefs.

Based on the integrated definition presented earlier, I highlight the key concepts of the sensemaking perspective. The **ecological changes** that trigger the sensemaking process

(triggering events) are events that are **new**, **unexpected**, **unknown**, **confusing, causing discontinuity, disruptive ambiguity, and equivocality** thus **forcing** members of the organization **to interpret the discrepant cues and stimuli from the environment** to find **a plausible but not necessarily accurate interpretation** to **reduce and rationalize ambiguity and contradiction** so that **their continuity becomes restored.** In this **individual or social process** (which is **retrospective**, that is, looking back at the organizational event to clarify it) individuals or groups organize **stimuli into mental patterns**, and **cognitive frameworks** - in abstract representations of things and events - so that they make **sense to them**. Sensemaking goes beyond interpretation, as it also affects the **actions of individuals**, and **their enactment**, by perceiving and responding to cues that interrupt their continuity (Weick, 1995; Weick-Sutcliffe-Obstfeld, 2005; Bogner-Barr, 2000; Szőts-Kováts, 2012).

A good example of the practical appearance of the process mentioned above is the research of Hsiao-Wu-Hou (2008), which examined what the introduction of the GPS system means for taxi drivers. The authors found that some taxi drivers experienced the introduction of the technology as a novelty that interrupted their continuity, as they believed it would strengthen their professional identity and social status. One sense they made to the GPS system was a *"beacon*" and they interpreted themselves as *"sailor"* finding that using the technology made it much easier for them to find the passengers waiting for them. Using GPS, they could reduce costs and plan their days more efficiently. Thus, the novel event had a positive meaning for them, which brought with it the action that they were happy to experiment with the use of the GPS system during their work.

The condition of sensemaking is therefore the occurrence of an event that interrupts the continuity and permanence of the individual by creating ambiguity. For an individual to continue his or her activities, he or she must find a reassuring explanation for the event that is disturbing him or her. The focus of research on sensemaking aims also to explore why an individual perceives a particular event that causes him or her to be discrepant and how he or she organizes it into his or her cognitive framework. An individual's knowledge of the world is called into question when there is a discrepancy between his or her expectations and his or her experience, and that discrepancy is important enough for him or her to ask himself or herself the question, *"What is going on here?", "What should I do"?*

From a sensemaking perspective, the individual constructs his or her world by snatching from the environment an event that is important enough to him or her and naming it as he or she acts along those names (interpreting along and arranging into existing mental schemas). Existing mental schemas — dynamic knowledge structures that enable the individual to encode information effectively (Markus, 1977; Harris, 1994, p. 310.) - are important in sensemaking, as the individual's prior interpretations have a significant impact on environmental interpretation. Schemes not only influence information processing as pre-existing knowledge systems but also determine the search for and acquisition of information and the behavior that subsequently emerges in response to it (Weick, 1969; Lord-Foti, 1986).

As I have discussed above, sensemaking can be interpreted as an individual or social process (Brown-Colville-Pye, 2015). In social sensemaking, individuals interpret their environment and make meaning to their experiences in their interactions with other individuals, to create a meaning that is accepted by all (Hsiao-Wu-Hou, 2008; Mesgari-Okoli, 2019), i.e., the narrative of a particular community shapes the meanings given by individuals (Currie, 2010), which is influenced by organizational attributions (Harvey et al., 2014). Organizational phenomena are thus constructed along local knowledge (Glózer-Gelei, 2011). Collective sensemaking has an impact on how they form their response strategy to an organizational event that causes discrepancy (Lewis-Mathiassen-Rai, 2011). A common understanding of the organizational event that causes discontinuity is key to collaboration, which is derived from, but at the same time transforms, individual sensemaking. The individual and collective levels of sensemaking are thus interrelated (Mesgari-Okoli, 2019).

In addition to the interpretation of other individuals, other sources of the individual sensemaking process can be identified. Mesgari-Okoli (2019, pp. 3-5.) identified the following four sources: individual, organizational, networking, and resources specific to managers (*Table 5*). In terms of *individual resources*, the identity-forming selves (professional, psychological, socio-psychological, physiological, financial self), the individual's cognitive sources (existing knowledge structures (schemas),

past experiences, predispositions, and purposes) and their affective states are named as factors influencing the sensemaking processes of organizational situations. *Organizational resources* are factors influencing the context-specific sensemaking process, which include functional integrity, that is, achieving goals that ensure the survival of the organization, and consensus, that is, conforming to the behavior of organizational members, including following organizational rules, hierarchy, and job descriptions and style, i.e., the informal norms that define acceptable behaviors within an organization. Organizational resources, however, include contextual characteristics, including demographic patterns, organizational culture, and the characteristics of management.

Network resources are the social network of the individual, which includes the centrality of the network, the proximity of power, and the interpretations of other individuals. Sensemaking is a social process (Weick, 1995), so the schemas and interpretations of other individuals affect individual sensemaking. In addition, an individual's position in the social network, and their proximity to power — along with the people they come in contact with — can also influence the sensemaking process. The fourth group of individual sensemaking sources are factors related to *management*. These include knowledge of opportunities and threats, desired organizational image, and identity, which play an important role in change management. In addition, organizational strategies and the information processing structure also have an impact on the sensemaking of management.

Table 5 Sources of sensemaking in an organizational context

Individual resources	Organizational resources	Network resources	Resources specific to managers
▪ professional self ▪ social-psychological self ▪ physiological self ▪ financial self ▪ schema, predispositions, purposes ▪ past experiences ▪ affective status	▪ functional integrity ▪ compliance ▪ style ▪ contextual cues ▪ qualities of organizational culture ▪ qualities of management	▪ network centrality ▪ proximity to power ▪ others' interpretations	▪ awareness of opportunities and threats ▪ organizational image and identity desired ▪ organizational strategies ▪ information processing structures

Source: Own edition based on Mesgari-Okoli (2019, p.4.)

4.2.2 Sensemaking process

The sensemaking process starts when the **perceived situation deviates from what is expected**. At this point, individuals do not yet know exactly what is causing them discrepancies and whether they need to act differently to reduce uncertainty, or whether this event was a one-time event and caused only a momentary interruption in their activities. In this phase, the individual begins to break down the event into smaller parts and organize them into their existing mental patterns so that they fit into their cognitive framework. The individual then **notices the cues coming from the environment**, a process that is driven by his or her previously constructed mental models, that is, he or she captures certain stimuli and ignores others based on his or her existing knowledge. It names the **unknown cues** and links them to its existing knowledge elements.

Once the individual has named the new stimuli, differentiating them, they try to find **plausible explanations for the events**. In this step of the sensemaking process, it is not the accuracy that is important to the individual, but rather the acceptability, as the explanation seeks to allow the activity to continue, for which a **reassuring** explanation is sufficient. Sensemaking goes beyond the interpretation of the event *("What's the story here"?),* as "*What should I do?"* is just as important to the individual. Interpretation and action are cyclical, the process is iterative, and sensemaking can both begin and end with **action** (Weick-Sutcliffe-Obstfeld, 2005; Szőts-Kováts, 2012. p.71.).

Sandberg-Tsoukas (2015) divided the sensemaking process into three stages (creation-interpretation-action) and grouped the events that caused the sensemaking, the possible outcomes of the process, and the factors that affect the sensemaking (*Table 6*). Within the *events that trigger the sensemaking process*, the authors distinguish between major planned organizational events, by which are meant strategic and organizational changes. In addition, significant but unplanned events include crises and disasters. Minor planned organizational events may include changes to existing policies or the introduction of new policies, updates to software programs, or discussions with individuals from different disciplines that require actors to work together to solve a specific problem or task. Unforeseen events of minor significance that result in a sensemaking process include minor misunderstandings between members of the organization during daily operations. In the case of mixed events, more than one of the options presented earlier will appear at the same time.

The outcome of sensemaking may be a restored sense or action that allows the individual to continue their activity, i.e., to restore continuity, by finding a plausible explanation. However, there may be non-sense or no restored action, which could have serious consequences in some cases, such as disasters. Group dynamics and social impact affect which events an individual notices (whether they consider them important enough to make them meanings).

Factors influencing sensemaking include contexts, language, identity, cognitive frames, the role of emotions, politics, and technology. The context refers to the specific environment of sensemaking, as sensemaking does not take place in isolation, but in a specific context, so the role of the environment should be taken into account when examining the sensemaking process. The context includes the action, social, and institutional (historical, cultural, epistemic, industry environment) environment. Language - which means discourse, narratives, rhetoric, word pictures, and stories - also plays an important role in sensemaking. The use of metaphors is common on the part of individuals as they seek to find connections between their existing and new, unknown experiences. Identity is also important for the sensemaking process, as the snatching of signals from the environment is determined by the self. Furthermore, it should be noted that the interrupted activity makes sense because the individual asks himself the question, "*Who have I become in the face of a new situation"* (Weick, 1995, p.24.).

Cognitive frameworks - abstract representations of events and things - like identity affect what individuals perceive, extract, or combine from the environment, how they form a coherent interpretation of the interrupted situation, and how they act to recover from an interrupted situation. Sensemaking research has previously ignored the role of emotions in the sensemaking process, but this factor has also become increasingly important in recent years. Negative emotions often occur during the sensemaking process, especially when routine activities that contribute to individuals' sense of security are interrupted as a result of an event. During crises and organizational change, strong negative emotions emerge, such as fear, anxiety, despair, and panic, which hinder the sensemaking process as they reduce individuals' cognitive skills, including the ability to process information.

Politics, as a factor influencing the sensemaking process, refers to the hierarchical level of sensemaking that determines the power of an organizational individual, as this may lead to conflicting interpretations by organizational members. Furthermore, when

examining sensemaking processes, it is important to consider that certain departments want to control the sensemaking of members of the organization. Situational factors influencing sensemaking include technology. Griffith (1999) examined the sensemaking processes brought about by the introduction of different technologies, namely, what technology means to members of the organization, how they respond to it, and how they commit to it. However, the presence of technology, in addition to causing discrepancy, thus inducing sensemaking intentions, can also affect how members of an organization interpret their professional relationships and professional identities, i.e., can be interpreted as a factor that triggers and influences the sensemaking process.

Table 6 Specific components of the sensemaking perspective

EVENTS	PROCESS	OUTCOMES	FACTORS INFLUENCING SENSEMAKING
major planned events major unplanned events minor planned events minor unplanned events hybrids of events	creation interpretation action	restored sense restored action non-sense no restored action	contexts language identity cognitive frames emotions politics technology

Source: Own edition based on Sandberg-Tsoukas (2015, p.12.)

4.2.3 Directions of the sensemaking research

Maitlis-Christianson (2014, pp. 60-62.) distinguishes four streams of sensemaking research. The *first period*, which dates to the 1960s and 1970s, was favorable for the development of sensemaking literature, as it was then that the interpretation of reality as a social construct came to the fore (Berger-Luckmann, 1966). The development of the field during this period was significantly influenced by the cognitive revolution in psychology that began in the 1960s, with the aim of interdisciplinary study of mental processes using scientific methods. Thus, at this stage of sensemaking studies, researchers have focused on how sensemaking can be examined methodologically (Cicourel, 1974; Heap, 1976), and Festinger's (1957) research on cognitive dissonance has been extended

to explore how individuals make sense of their conflicting beliefs, expectations, and experiences (Bugental-Tannenbaum-Bobele, 1968; Manis, 1978; Staw-Ross, 1978; Weick, 1967).

The 1980s represent the *second phase of sensemaking research*. During this period, the focus of organizational behavior and strategic management research shifted to cognitive processes (Walsh, 1995), which also influenced the sensemaking literature. Researchers have focused on examining how individuals interpret stimuli from their environment and why certain cues receive more attention from them than others (Kiesler-Sproull, 1982; Daft-Weick, 1984; Starbuck-Milliken, 1988). Research has also included the study of actions taken as a result of the environment's sensemaking (Porac-Thomas-Baden-Fuller, 1989).

The 1990s are the *third period in the sensemaking literature*, marked by Weick's (1995) book *Sensemaking in Organizations*. Empirical research has included the study of critical events (Weick, 1990; 1993), crises (Gephart, 1993; Gephart-Steier-Lawrence, 1990), and strategic changes (Barr, 1998; Gioia-Chittipeddi, 1991; Gioia- Thomas, 1996; Thomas et al., 1993), and sensemaking was also connected with language (Boyce, 1995; Hill-Levenhagen, 1995), organizational culture (Bloor-Dawson, 1994; Drazin et al., 1999), and social influence (Ibarra-Andrews, 1993).

The 2000s, represent the *fourth phase of sensemaking research*, characterized by the social process of sensemaking (Maitlis, 2005), the relationship between sensemaking and language (Cornelissen, 2012; O'Leary-Chia, 2007), narratives (Brown-Humphreys, 2003; Dunford-Jones, 2000; Patriotta, 2003; Sonenshein, 2010) and discursive practices (Balogun, 2003; Balogun-Johnson, 2004, 2005; Rouleau, 2005; Rouleau-Balogun, 2011). Exploring the impact of emotions and power (Schildt-Mantere-Cornelissen, 2020) designated by Weick (2005) as further research (Maitlis-Christianson, 2014) on sensemaking has also become the focus of sensemaking studies during this period.

Different approaches and certain topics in the field are outlined along the sensemaking research streams separated by Matilis-Christianson (2014) presented above. In addition, other organizational phenomena have come to the fore in sensemaking studies, including identity (Humphreys-Brown, 2002), strategy (Pye, 1995), organizational learning

(Catino-Patriotta, 2013), and organizational knowledge (Patriotta, 2003), innovation (Drazin-Glynn-Kazanjian, 1999), CSR (Basu-Palazzo, 2008; Nijhof-Jeurissen, 2006), diversity management (Mikkelsen-Wåhlin, 2020), the meaning of work (Wrzesniewski-Dutton-Debebe (2003); Szőts-Kováts, 2012), leadership (Pye, 2005), and organizational introduction of technology (Griffith, 1999; Sinoo-Hinds, 2004; 2005; Hsiao-Wu-Hou, 2008; Mesgari-Okoli, 2019).

4.3 TECHNOLOGY AND SENSEMAKING

The study of the sensemaking processes caused by the technology introduced into the organization dates back more than two decades (Faraj-Kwon-Watts, 2004; Griffith, 1999; Maitlis, 2005; Orlikowski-Gash, 1994; Weick, 1990; Jensen-Aanestad, 2007; Mesgari-Okoli, 2019; Barrett, 2020). The focus of this research has been on several technologies, including the organizational introduction of the computer (Prasad, 1993), the use of the previously mentioned GPS-based system by taxi drivers (Hsiao-Wu-Hou, 2008), implementation of hospital delivery robots (Siino-Hinds, 2004; 2005) and hotel service robots (Gretzel-Murphy, 2019), electronic accounting system (Beaudry-Pinsonneault, 2005), and electronic medical record system (Lapointe-Rivard, 2005; Savoli-Barki, 2013). However, no research has so far explored the sensemaking processes in the organizational context that were triggered by the introduction of HR chatbots, which is the goal of my thesis.

As discussed in *Section 4.1*, the process of sensemaking begins "when the continuity of activities is interrupted, something surprising happens, or people perceive discrepant signals from their environment" (Siino-Hinds, 2004, p.1.), which may be caused by the organizational introduction of new technology (Siino-Hinds, 2004), according to Weick (1990, p. 2.), because technology is equivocal and therefore generates several plausible interpretations. Sense made to technology also influences the use of technology and the way of working (Hsiao-Wu-Hou, 2008). It is important to note that the implementation of a new technology that causes discontinuity can not only cause the sensemaking process of the technology but can also generate other sensemaking processes in the organization (Maitlis-Christianson, 2014) or affect them as a situational factor (Sandberg-Tsoukas, 2014), thus, it can encourage members of the organization to reinterpret their organizational role and identity (Korica-Molloy, 2010).

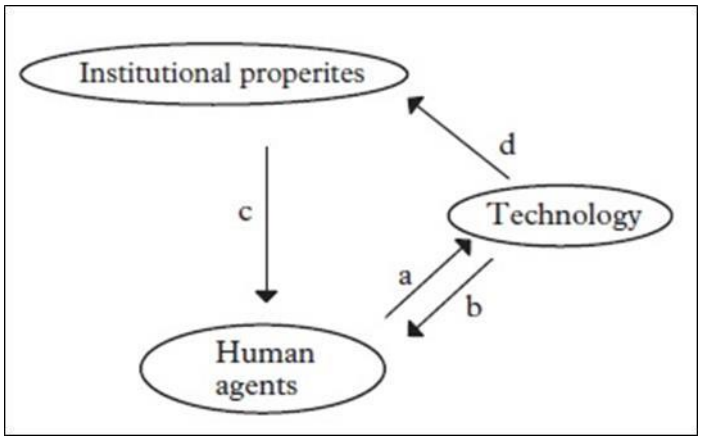
When exploring the sensemaking processes generated by the technology used in an organization, the factors that affect sensemaking should be considered. Orlikowski's (1992) structural model illustrates well (*Figure 3*) the dynamics of human-technology-organization interaction, which is an important starting point for examining the meanings made to technology. The components of the model are (1) *humans*, including technology developers, users, and decision-makers, (2) *technology*, that is, the material artifacts that mediate the execution of tasks in the workplace, and (3) *organizational characteristics* that are the structure, business strategy, culture, ideologies, control mechanisms, daily operating procedures, division of labor, communication patterns, and the external environment including regulations, competitors, supplier strategy, professional standards, and knowledge of technology and socio-economic conditions (Linderoth, 2017, p.326.).

Thus, based on Orliskowski's (1992) model, it can be seen who the organizational actors are who come into contact with technology - and may have different interpretations of technology from different perspectives - and which organizational characteristics influencing human-technology interaction should be considered in sensemaking research. The relationships between the components of the model are indicated by arrows. There is a two-way relationship between human and technology: (a) technology is the result of human activities like design, development, customization, and modification that (b) can facilitate and limit human action. Organizational characteristics (c) influence people in terms of their interactions with technology, but (d) this interaction simultaneously has repercussions on the organization by, among other things, strengthening or transforming structures, power, and legitimacy (Linderoth, 2017, p.326.).

Linderoth (2017) incorporates sensemaking into Orlikowski's model (1992) and complements it with the role of organizational practices in sensemaking processes (*Figure 4*). According to the author, organizational characteristics are only one of the inputs to individual sensemaking, (a) other sources are organizational practices, (d) which are developed along organizational characteristics. Thus, the sense made of technology and the use of technology are shaped by organizational characteristics and practices. The previous models emphasize the role of context in understanding sensemaking processes. It should be clear though, that the existing schemas of individuals - to which Linderoth (2017) also refers in his model (b) "does the individual perceive technology" (p.327.) - is it important enough for him, (c) which signs he pulls out of the environment - nature

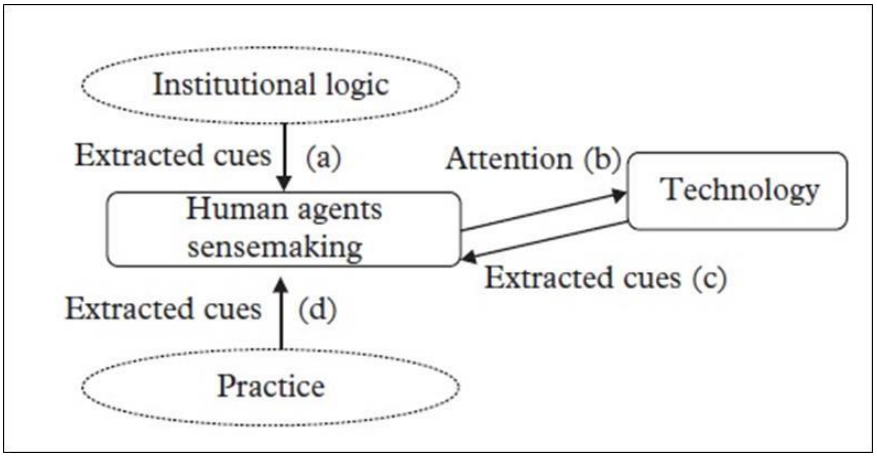
of their relation to the technology (developer, user, or decision maker), as well as the peculiarities of the technology - the role of which according to Mesgari-Okoli (2019) in technology sensemaking research is little examined – also influence the technology sensemaking.

Figure 3 Structural model of the technology



Source: Orlikowski (1992, p.410.)

Figure 4 Individual sensemaking of technology in an organizational context



Source: Linderoth (2017, p.327.)

Hiso-Wu-Hou (2008) distinguishes three stages of sensemaking processes triggered by organizational technology introduction. In the first phase of technology introduction, the *initial technology adoption stage* members become familiar with the technology, gain initial tangible experience with it, make primary sense of it, and decide whether to

accept or reject the technology. The next stage is the *transitional adoption stage*, characterized by new meanings individuals make of the technology during use. Finally, in the *post-adoption stage*, technology becomes institutionalized and unnoticed in the organization, the technology becomes meaningless to individuals and is part of the work practices.

4.4 SUMMARY

The aim of *Chapter 4* was to conceptualize the elements of the research problem. In my thesis, I examine what kind of individual sensemaking processes a human-chatbot interaction generates in an organization. Accordingly, I defined the chatbot, human-chatbot interaction, and sensemaking. Based on Brandtzaeg-Følstad (2017) and Kenesei-Bognár (2019), I define chatbots as computer programs that can communicate with users without human intervention based on pre-written scenarios and rules through a chat interface. In connection with the application areas of the chatbot, I have presented that the interactive agent can be used in education, healthcare, and business areas to automate external or internal communication.

Based on the definitions of human-computer interaction and human-robot interaction, I have defined human-chatbot interaction as follows. The human-chatbot interaction research area explores people's attitudes towards chatbots intending to use the acquired knowledge to develop chatbots that enable efficient functioning, and at the same time, are acceptable for people, consider their social and emotional needs, and respect their values when interacting with them.

Finally, the integrated definition of sensemaking I defined based on Weick (1969, 1995), Louis (1980); Cornelissen (2012), and Maitlis-Christianson (2014) sounds as follows. Individuals reduce the ambiguity caused by the discontinuity resulting from ecological changes in the organization with retrospective sensemaking. Individuals reduce the ambiguity caused by the discontinuity resulting from ecological changes in the organization with retrospective sensemaking. That is, individuals interpret the discrepant cues from their environment and place these cues into their existing cognitive schemes, seeking to create plausible explanations for a new, unknown, confusing organizational phenomenon. This, in addition to reducing uncertainty, is also shaping their actions.

Thus, in line with Orlikiwski's (1992) structural model of technology that also includes the role of context, my research aims to explore **the sensemaking process** triggered by **the humans'** (employees, HR professionals, managers) **technology use** (HR chatbot used for internal organizational communication) **in an organizational context,** following the procedure of Hiso-Wu-Hou (2008), which I detail in the methodological chapter (6.6.2.), using the interpretive phenomenological analysis (IPA).

5. SYSTEMATIC LITERATURE REVIEW

5.1 METHODOLOGY OF LITERATURE SEARCH

5.1.1 Literature research plan

I constructed the plan for the literature search along the steps outlined by Randolph (2009), which is illustrated in *Table 7.*

Table 7 Literature research plan

ELEMENT OF THE RESEARCH PLAN	CONTENT
(1) The purpose of the literature review.	▪ Based on Cooper's (1988) taxonomy.
(2) Formulation of research questions or hypotheses that lead the literature search.	▪ What do we know about the perspective of individuals (general users/members of organizations / HR professionals) on chatbots in general / business / organizational contexts?
(3) An explicit data collection plan showing how the units of analysis have been selected.	▪ Method of systematic literature search ▪ Search strategy
(4) Explicit plan for data analysis.	▪ The process of selecting studies ▪ Criteria for the selection of studies
(5) Result presentation plan.	▪ Descriptive analysis ▪ Content analysis

Source: Own edition based on Randolph (2009)

5.1.2 Aim of the literature review

To determine the aim of the literature review, I use Cooper's (1988) taxonomy as a basis (*Table 8*). In his classification, literature reviews are grouped along six characteristics: (1) focus, (2) goal, (3) perspective, (4) coverage, (5) organization, and (6) audience.

The focus of literature reviews may be on research findings, methodology, theories, and practical application. The present review has a *research outcomes-oriented* and *theoretical* **focus**, as it aims to explore the results of research examining the perspective of individuals on chatbots to identify research gaps and to map theories emerging in the field. Concerning the aim of literature reviews, integration, critical analysis, identification of central topics, and arguments for a position may appear. Along this aspect, the literature review **aims to identify** the *central topics*.

Perspective is a way of presenting research results that is *neutral* in this review, i.e., the author seeks to raise awareness and avoid individual biases in literature research, which is also supported by its systematic approach. **Coverage** refers to which research is included in the search base of the literature review. This overview is *exhaustive with selective citation,* as its search base includes all journal articles focusing on individuals' perspective on chatbots. The **organizational principle** of literature reviews can be chronological, theoretical, or methodological. The structure of the present review follows the theoretical logic. The primary **audience for** literature reviews in the case of the thesis is the supervisor as well as the reviewers. The secondary audience is researchers in the field.

Table 8 Placement of the literature review of the thesis in the taxonomy of Cooper (1988)

CHARACTERISTIC	CATEGORIES
Focus	▪ Research outcomes ▪ Existing theories
Goal	▪ Identification of central topics
Perspective	▪ Neutral representation
Coverage	▪ Exhaustive review with selective citation
Organization	▪ Conceptual
Audience	▪ Supervisor ▪ Reviewers ▪ Researchers in the field

Source: own edition

5.1.3 Research questions of the literature review

The thesis aims to explore what individual sensemaking processes are generated by the human-HR chatbot interaction in the organization. A preliminary review of the literature on chatbots has shown that no research has so far addressed the sensemaking processes generated by (HR) chatbots in the organizational environment, so this area has been

identified as a research gap. However, within the literature on human-chatbot interaction, there are studies examining the users' perspectives on chatbots. As a result of their systematic literature search, Rapp-Curti-Boldi (2021) identified 83 publications *examining individuals' perspective on chatbots*, including the acceptance of chatbots, user experiences based on human-chatbot interactions, expectations towards chatbots, perception of chatbots, user satisfaction, commitment, trust, and emotional reactions during the interaction. The consideration of these research findings may be relevant to my research, as the sensemaking process is influenced by the aforementioned factors: expectations, attitudes, and perceptions affect attention to signals from the environment; along with the perception and experience of human-chatbot interaction, the expectation becomes comparable to experience, which, if they do not coincide, develops a discrepancy that induces the sensemaking process. Understanding the factors that determine the acceptance of a chatbot and the satisfaction with its use can contribute to understanding what ensures that ambiguity about the interactive agent is avoided.

Thus, in the absence of a literature background on the research of sensemaking processes induced by human-chatbot interactions, the results of the previously presented research are the closest to supporting the research objective of the thesis along the following research questions: *(1) What do we know about the general users' perspectives on chatbots in general/business context? (2) What do we know about the organizational members' (general users, managers, HR professionals) perspective on (HR) chatbots in an organizational context?*

The differentiation of research questions is based on the consensus of HCI researchers that human-chatbot interaction is the result of the interaction of three factors (user, system, context) (Lallemand-Gronier-Koenig, 2015). Accordingly, regarding the research on users' perspectives on chatbots, I distinguish between the *context* (the interaction took place in an experimental setting/ the interaction took place in a corporate environment between the chatbot and the consumer (client)/the interaction took place in an organizational environment and the chatbot was used to automate internal communication), the *chatbot* (experimental chatbot/existing corporate chatbot used for external communication/existing corporate chatbot used for internal communication), and the *user* (general user, experimental participant/company consumer/customer or member of the organization (employee, manager/HR professional for whom the HR chatbot assists).

5.1.4 Data collection method: systematic literature search

I applied systematic literature search as a data collection method for the literature review. A systematic literature review is an "explicit, comprehensive, and reproducible" (Fink, 2005, p.3.) method that aims to identify, evaluate, and synthesize the publications of researchers and practitioners (p.4). For the literature search, I follow the methodological recommendation of Okoli-Schabram (2010, p. 10.), which suggests the following steps:

1) **Defining the purpose:** defining the purpose of the literature review as well as presenting it transparently.

2) **Protocol and training:** a detailed description of the research process.

3) **Search strategy:** a detailed description of the search strategy and how the search strategy ensures the comprehensive nature of the literature review.

4) **Practical screen:** to show the criteria according to which the articles that are part of the literature review were selected.

5) **Quality appraisal:** presentation of the quality criteria used in the selection of articles.

6) **Data extraction:** systematic extraction of applicable information.

7) **Synthesis of studies:** synthesis of information obtained from studies.

8) **Writing the review** with a detailed description of the search method to make the research repeatable.

5.1.5 Search strategy

The present systematic literature search aims to identify all relevant journal articles related to individuals' perspective on chatbots, which, according to the taxonomy of Cooper's (1988) literature review, is an exhaustive review with selective citation. Thus, peer-reviewed, English-language scientific journal articles formed the search base. At the date of publication, the release until 2021 was set, while the subject areas were narrowed to *'Computer Science'*, *'Social Sciences'*, *'Psychology'*, *'Business, Management and Accounting'*. I searched SCOPUS and Science Direct in August 2021 using the following keywords: *"chatbot" AND "expectation" OR "motivation" OR "attitude" OR "experience" OR "satisfaction" OR "perception" OR "trust" OR "acceptance "; ''human-chatbot interaction''*. The keywords were defined based on different topics examined by studies focusing on individuals' perspective on chatbots outlined in the preliminary literature search. Table *9 shows* the number of search results by database and keyword.

Table 9 The number of search results by database and keyword

Database	Keywords	Number of results
SCOPUS	*"chatbot" AND "expectation" OR "motivation" OR "attitude" OR "experience" OR "satisfaction" OR "perception" OR "trust" OR "acceptance"*	197
	"human-robot interaction"	10
Science Direct	*"chatbot" AND "expectation" OR "motivation" OR "attitude" OR "experience" OR "satisfaction" OR "perception" OR "trust" OR "acceptance"*	778
	"human-robot interaction"	16
Altogether		1001

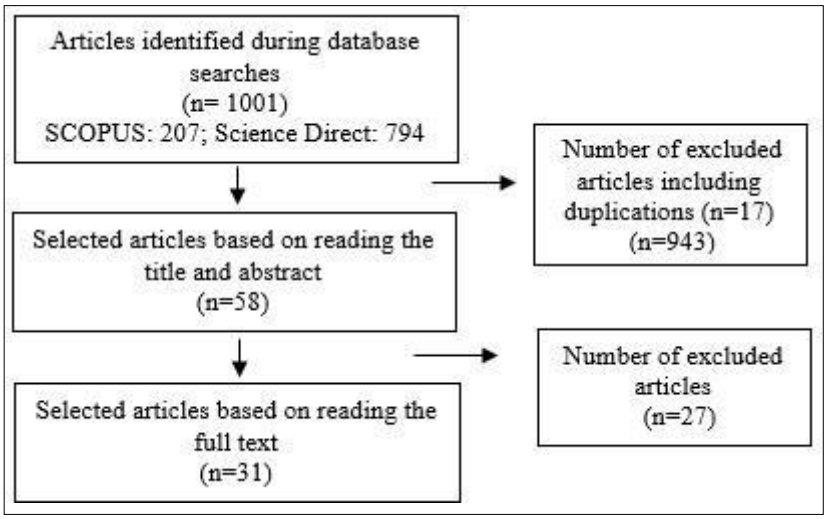
Source: own edition

5.1.6 Selection process

The total number of search results in the databases was 1001 articles. Based on a review of titles and abstracts, 926 publications and 17 additional articles (the duplications) were disregarded. As a result, 58 studies remained in the analysis base, and a further 27

publications were excluded after reading the full texts. Thus, as a result of the systematic literature search, a total of 31 journal articles were identified (*Figure 5*), the data of which are included *in Appendix I.*

Figure 5 Flowchart for selecting the corpus articles



Source: own edition

The criteria to be used in the process of selecting the items that make up the corpus are illustrated in *Table 10.* Concerning the *inclusion criteria*, a distinction has been made between the conditions for classifying publications as closely related and partially related articles. Articles defined as closely related are used to examine the perspective of organizational members (employees, HR professionals, managers) on chatbots used to automate internal organizational communication or the consumers' perspective on chatbots used in the external communication of the companies. The partially related articles also explore users' perspectives on chatbots, but not in an experimental setting instead of a real context. It has been defined as an *exclusion criterion* whether the article does not discuss the perspective on the chatbot or examine the phenomenon in a non-business/organizational context (the latter includes publications examining the user experiences of interactions with chatbots used for health, education, or therapeutic purposes).

5.1.7 Presentation plan

The results of the systematic literature search are discussed in two main chapters: first, the results of the descriptive analysis (*5.2*), and then the results of the content analysis (*5.3*) are presented. The descriptive analysis includes a presentation of the data on the appearance of the journal articles that make up the corpus (5.2.1), a description of the methods used in the publications, in particular the qualitative data collection and data analysis methods (5.2.2), and a discussion of the chatbots' application areas (5.2.3). The subchapters of the content analysis are the main topics outlined during the review of the literature. The presentation of the content of the selected articles has a research result and a theoretical focus.

Table 10 Criteria for inclusion and exclusion

I/E	Criterion	Criterion description	Database	Number of publications
INCLUSION	Closely related	It discusses the perspective of the consumer/organization member on the chatbot in a business/organizational context.	Science Direct	4
			SCOPUS	13
	Partly related	It discusses the user's perspective on chatbots in general.	Science Direct	5
			SCOPUS	9
EXCLUSION	Not related	The users' perspectives on chatbots is not discussed. It is not in a business /organizational context and does not discuss the users' perspectives on chatbots in general.	Science Direct	772
			SCOPUS	181

Source: own edition

5.2 DESCRIPTIVE ANALYSIS

5.2.1 Date of the publications

Most of the journal articles that make up the corpus have been published in the last two years. 42% (n = 13) of articles were published in 2021 and 32% (n = 10) in 2020. 19% of them were published in 2019, while one article was published in 2018 and 2015, respectively (*Table 11*). 16% (n = 5) of articles were published in *Computers in Human Behavior*, and 9.6% (n = 3) in the *International Journal of Human-Computer Interaction.* Articles identified in a systematic literature search have been published in a total of 25 different journals.

Table 11 Distribution of selected articles by date of publication

Year	2015	2018	2019	2020	2021
Number of articles	1	1	6	10	13

Source: own edition

5.2.2 Applied research methods

Most of the selected articles (n=25) used a quantitative research method. Three articles applied mixed methods (Mehra, 2021; Ciechanowski et al., 2019; Skjuve et al., 2019), and two studies (Jang-Jung-Kim, 2021; Skjuve et al., 2021), applied qualitative methods for examining user experiences related to human-chatbot interaction. A literature review was also included in the corpus (Chaves-Gerosa, 2020). Given that I do qualitative research in my thesis, I consider it important to review the methods used by qualitative articles. Regarding the data collection methods, Jang-Jung-Kim (2021) and Skjuve et al. (2021) used an in-depth interview, Skjuve et al. (2019) and Ciechanowski et al. (2019) used a questionnaire (providing free text answers with open-ended questions). Data analysis was performed with content analysis (Jang-Jung-Kim, 2021), inductive thematic analysis (Skjuve et al., 2019; Skjuve et al., 2021), and semantic thematic analysis (Mehra, 2021).

5.2.3 Application areas of chatbots

Twelve articles of the corpus used an experimental method to examine users' perspectives on human-chatbot interaction in a laboratory setting, and in most cases, chatbots were developed for the research. Two publications (Croes-Antheunis, 2021; Skjuve et al.,

2021) explored user experiences of interaction with existing social chatbots (Mitsuku, Replica). Regarding the application areas of the chatbots e-commerce (n = 7), customer service (n = 3) (Ashfaq et al., 2020; Nordheim-Følstad-Bjørkli, 2019), tourism (n = 1), (Li et al., 2021), telecommunications (n = 1) (Shumanov-Johnsom, 2021), B2B communication (n = 1) (Behera-Bala-Ray, 2021), and banking services assistance (n = 3) (Eren, 2021; Richad et al., 2019; Jang-Jung-Kim, 2021) were discovered. In the systematic literature search, only two articles (Brachten-Kissmer-Stieglitz, 2021; Jang-Jung-Kim, 2021) were identified that examined the perspective of organizational members on chatbots used to automate internal coporate communication.

5.3 CONTENT ANALYSIS

5.3.1 Users' perspectives on chatbots

During the review of the corpus articles, seven topics were outlined that define the structure of this chapter. These topics are user expectations related to chatbots (5.3.1.1), attitudes towards chatbots (5.3.1.2), experience gained during interaction (5.3.1.3), satisfaction (5.3.1.4), user perceptions (5.3.1.5), trust in chatbots (5.3.1.6) and technology acceptance (5.3.1.7).

5.3.1.1 Expectation

User expectations about chatbots affect the perception of chatbots during interaction, and satisfaction can also occur relative to expectations. *"When expectations are undefined, users seem to compare the chatbot with alternative technology services"* (Rapp-Boldi-Curti, 2021, p. 12.) and judge its usefulness accordingly. Understanding the expectations is also a starting point for exploring the sensemaking processes, as their deviation from the individual's experience generates sensemaking. Of the publications selected as a result of a systematic literature search, one journal article (Chaves-Gerosa, 2020) was identified that summarizes user expectations for chatbots.

Chaves-Gerosa (2020) reviewed 56 articles that explored the important social characteristics of equipping chatbots to avoid experiencing frustration and dissatisfaction during human-chatbot interaction. As a result of the literature search, 11 attributes were identified, which were organized into the following three main groups: *conversational*

intelligence, *social intelligence*, and *personification*. The conversational intelligence property group includes features that help the chatbot manage its interactions. Standard social protocols represent social intelligence. Finally, personification refers to the chatbot's perceived identity and personality.

Conversational intelligence includes proactivity, conscientiousness, and communicability. **Proactivity** can be embodied in the fact that the chatbot asks the user follow-up questions, provides additional information, and suggests new topics, thus keeping the conversation alive and contributing to a more natural interaction. **Conscientiousness** refers to the fact that the chatbot provides the user with attention, i.e. it gives them meaningful answers, ensures the continuity of the conversation, directs it in a productive direction, manages the complexity of the task, keeps the conversation in check, uses visual elements and makes his identity transparent. **Communicability** means that the user's needs are met as a result of message exchanges. This includes properly managing user expectations, demonstrating the features available, offering the next steps, and providing assistance.

The next group of attributes is *social intelligence*, which includes the **ability to repair damage** (handling unfriendly users, identifying abusive sentences, ignoring offensive sentences), **thoroughness** (showing humanity, authenticity, consistency in interaction), the **way of behaving** (politeness, expressing gratitude, continuing small talk), **morality** (avoiding stereotyping, building a diversity-conscientious database, avoiding alienation)**, emotional intelligence** (reciprocity, use of social-emotional expressions, making the identity of the interactive agent transparent, displaying emotional reactions), and **personalization** (learning from the user, recommending custom services, data security).

Finally, the third group of user expectations identified by the authors is *personification*, which is the anthropomorphizing of the chatbot (attribution of human characteristics), i.e., attributing the interactive agent an **identity** (balance of identity and technical skills) and a **personality** (appropriate language use, user-adapted sense of humor, balance of personality traits).

5.3.1.2 Attitude

Attitude is an internal mental process defined by several factors and circumstances in which an individual evaluates the entities around them positively or negatively (Kohlmann, 2018). Attitude influences an individual's actions, which explains the relevance of examining the attitude towards chatbots, as discovering their attitudes makes it possible to predict users' behavior acceptance and behaviors towards chatbots. As a result of a systematic literature search, two journal articles were identified (Zarouali et al., 2018; Kasilingam, 2020) that examined the factors that influence user attitudes towards chatbots.

Based on the factors of the Consumer Acceptance of Technology Model (CAT) and the PAD dimensions (pleasure, arousal, dominance) of the Environmental Psychology Model (EPM) of Mehrabian-Russel's (1974), Zarouali et al. (2018) examined users' attitude development towards a chatbot assisting in ticket reservation. The authors' model of unified technology acceptance considers not only *cognitive* factors (perceived usefulness, perceived ease of use, perceived helpfulness) but also the role of *affective* factors (pleasure, arousal, dominance), through which the study aimed to discover users' intention to use the technology.

In terms of cognitive factors, *perceived usefulness* refers to the extent to which a user is likely to interact with a chatbot to increase its efficiency or performance. *Perceived ease of use* is how simple (effortless) a user finds to use a chatbot. Finally, *perceived helpfulness* means the user's perception of the relevance of the responses given by chatbots, i.e., the extent to which the chatbot meets the information needs of individuals. Among the affective factors, *pleasure* refers to whether the interaction is fun and satisfying for the user, while *arousal* means how exciting the conversation with the chatbot is for individuals. The third element of the PAD dimension is *dominance*, which is the user's perception of control and freedom of action during interaction.

As a result of their research, the authors found that there is a positive relationship between two cognitive factors (perceived usefulness, perceived helpfulness), all affective elements of the unified consumer technology acceptance model (pleasure, arousal, dominance), and attitudes towards chatbots. It has also been shown that attitudes and intentions to use technology are also linked. Zarouali et al. (2019) also pointed out that acceptance of

chatbots depend not only on the role of cognitive factors but also on how users feel about technology.

Kasilingam (2020) also examined user attitudes and intent to use related to a chatbot that provided online shopping assistance. The author has included seven factors in his research model that may influence consumer attitudes and intentions to use the technology. These factors included perceived usefulness and perceived ease of use, which were also examined by Zarouali et al. (2018), as well as perceived enjoyment, price awareness, and perceived risk, including financial, performance, psychological, social, and physical risk. (Jacoby-Kaplan, 1972), trust, and personal innovation. The latter element is the extent to which an individual is ahead of others in his social system in terms of adapting to novelty (Rogers-Schoemaker, 1971). The research results showed that perceived usefulness, perceived ease of use, perceived enjoyment, price awareness, perceived risk, and personal innovation influenced attitudes toward chatbots. However, in addition to attitude, the intention to use was only directly influenced by trust and personal innovation.

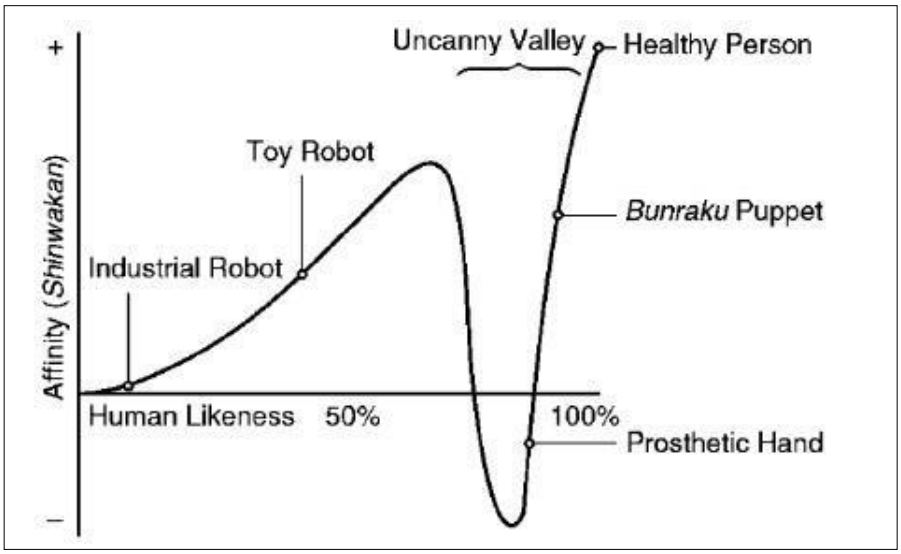
5.3.1.3 Experience

According to Rapp-Curti-Boldi (2021), there is a consensus within the HCI literature that human-chatbot interaction is determined by the user, the system, and the context (Lallemand Gronier-Koenig, 2015), from which it follows that user experience is *"a consequence of a user's internal state, the characteristics of the designed system and the context within which the interaction occurs"* (Hassenzahl-Tractinsky, 2006, p.95.). Numerous studies have been conducted to examine user experiences with chatbots, Rapp-Curti-Boldi (2021) refers to 41 such publications in their systematic review. The user experience related to the technology is often examined through the consumer perception of usability (Denecke et al., 2018; 2020), however, in this subsection, I focus on what users experienced when they interacted with chatbots and how they see their relationship with chatbots.

User experiences were studied by two of the corpus articles (Skjuve et al., 2019; Ciechanowski et al., 2019), which used the Uncanny Valley theory described by Mori (1970) to examine the phenomenon. Although Mori (1970) did not formulate his theory on robots, human-robot interaction, and human-chatbot interaction

research also regularly incorporates this theory as a factor shaping user experiences gained during interaction. According to the Uncanny Valley theory, impressions of pleasantness are determined by the degree of realism, in such a way that a higher level of similarity to humans brings with it an increase in affinity for the artificial entity, but only for one point, because when the similarity is very high, the artifacts become unsettling and repulsive to people. At this point, the level of positive impressions about artificial entities drops abruptly (its level on the y-axis falls in the negative range), and Mori (1970) named the theory after the "valley" thus formed (Seyama-Nagayama, 2007) (*Figure 6*).

Figure 6 Uncanny valley



Source: Skjuve et al. (2019, p.32.)

Skjuve et al. (2019) examined whether not revealing a chatbot's identity evokes the phenomenon of the uncanny valley. Their results showed that the lack of transparency did not induce the "uncanny valley" effect, however, the authors identified the long waiting time during the conversation as a factor similar to the uncanny valley phenomenon that caused discomfort for users.

Ciechanowski et al. (2019) also addressed this phenomenon. Their findings have shown that a simple, text-based chatbot has caused fewer anxious feelings in the user compared to a more advanced chatbot with an avatar. The simple chatbot also elicited less intense

reactions from the subjects and received more positive evaluations. These research findings support Mori's (1970) theory.

Hill-Ford-Farreras (2015) compared the evolution of interactions between people and humans and chatbots in terms of quality (word uniqueness, word simplicity, shorthand, use of emojis) and quantity (number of words per message, number of words per conversation, number of messages per conversation). The results of the study showed that messages sent to chatbots contained on average fewer words than those sent to the human interaction partner, however, the subjects sent more than twice as many messages to the chatbot as to the human interaction partner. It was also found that individuals used vulgar and negative terms several times in their interactions with the chatbot.

Skjuve et al. (2021) examined along what phases human-chatbot interaction evolves- in the case of chatbots designed to conduct humanlike interactions. To achieve this research goal, the Social Penetration Theory has been used to understand how social relationships develop. The theory describes four stages of relationship development, including *(1) orientation*, i.e., initial interactions with the other individual, during which interaction partners share superficial information about themselves, *(2) exploratory affective information exchange*, in which individuals act as if they were friends and want to know more and more about each other during that time. At this stage, the information is still superficial, but interactions are becoming more direct and frequent. The third stage of relationship development is (3) *affective exchange*, in which interaction partners are characterized by behaving as if they were close friends or in a romantic relationship, sharing more sensitive personal information, and expressing their feelings towards each other, yet they try to protect themselves emotionally. Finally, the fourth stage, named by the theory of social penetration, is (4) *stable exchange*, that is, better understanding of each other, honesty, and openness between the parties, and this phase is characterized by individuals being less willing to protect themselves, transparent about their emotions (Altman-Taylor, 1973).

Skjuve et al. (2021) found that the evolution of the human-chatbot relationship bears similarities to the process of interpersonal relationship development described by the theory of social penetration, but also has specific conditions, including the disclosure of the chatbot identity, to build trust, which plays a central role in

establishing the human-chatbot connection. The stages of development identified by the authors are as follows:

(1) **Exploratory phase:** users are not yet familiar with the technology; they have not developed trust in the chatbot. At this stage, the curiosity towards the chatbot and the desire to experience the novelty keep the interaction alive.

(2) **Affective phase:** Trust develops at this stage, to which the chatbot's accepting, supportive, understanding, and non-judgmental behavior, as well as making its identity transparent, contribute significantly.

(3) **Stable phase:** in this phase of relationship development, the user already shares everyday events with the chatbot and enjoys the benefits of regular interaction, including self-reflection facilitated by conversations with the social chatbot.

Croes-Antheunis (2021) also examined the human-chatbot relationship, namely, whether the longer-term use of the chatbot could lead to a social connection — more specifically, friendship — from the human to the chatbot. The authors based their research on the ABCDE relationship development model, which can be attributed to Levinger (1980), and describe five phases of relationship evolution, including (A) the *initial interaction*, (B) *build-up*, (C) the *continuation of the relationship,* (D), *decline*, and (E) *ending*. Social relationship is characterized by cooperation, support, and care. Friendship is based on a similar interest, emotional attraction, trust, security, loyalty, honesty, support, understanding, and acceptance (Tillam-Healy, 2003), and this social relationship is characterized by assistance, the existence of support, care, entertainment, and shared experiences (Rawlins, 1992). The predictor of friendship formation is social attraction (McCroskey et al., 2006), which is key in the first two phases of Levinger's (1980) model. Reaching the third stage requires opening and sharing personal information with others (Archer-Burleson, 1980) – intimacy, an emotional reaction to each other during the interaction (Edinger-Patterson, 1983), and the quality of the interaction that is determined by continuity, coordinated conversation, friendliness, and pleasantness. Empathy as well as a lack of communication skills can lead to the last two stages.

Subjects interacted with the social chatbot seven times during the research, after which they completed a questionnaire about their experiences. The results of the study showed that the sense of friendship was increasingly reduced in the users during the interactions. Although the novelty experience appeared at the time of the first interaction, later the chatbot became predictable, and as a result, the individuals found the interactions less enjoyable. Subjects became less socially attracted to the chatbot over time, and after a while were reluctant to open up and found the chatbot less empathic or competent, which, according to the ABCDE model, necessarily brought about the decline or termination of the relationship. The authors concluded that research subjects did not develop an emotion towards chatbots and chatbots did not become their friends.

5.3.1.4 Satisfaction

The main goal in the development of HCI systems is to achieve user satisfaction with the artifact, which has long been based solely on usability and efficiency but has recently been supplemented with the need to experience the entertainment provided by the interaction. The condition for the development of satisfaction is the coincidence of the user's expectations and experiences (Hassenzahl, 2003; Mahlke, 2008; Lallemand-Gronier-Koenig, 2015; Rapp-Curti-Boldi, 2021). From the point of view of my research, it is important to map out in advance, based on the literature, what contributes to and hinders the satisfaction of individuals with chatbots, as the process of sensemaking is induced by differences in expectations and experiences. In this subchapter are presented the articles on user satisfaction identified as a result of the literature search.

Based on the Similarity-Attraction Theory, Shumanov-Johnson (2021) formulated their hypothesis of satisfaction with the chatbot, according to which the similarity of the personality of a person and a chatbot has a positive effect on the experience of personalization and, through it, satisfaction. According to the Similarity-Attraction Theory, people prefer to interact with individuals with a personality similar to theirs (Byrne, 1997). This theory can also be extended to human-computer interactions, which is also supported by the research results of Nass-Moon (2000). The authors' study demonstrated that users attribute a personality to a computer based on verbal and nonverbal cues perceived through the interface, and the congruence between the user's personality and the interaction style of the technology results in a more positive

assessment of the technology (Ruijten, 2020). Therefore, people use the same model when interacting with technology as they do when talking to a person.

Shumanov-Jonhnson (2021) tested the effect of a congruent human-chatbot personality on satisfaction based on the Big Five Personality Test. The personalities of the research subjects, more precisely one of its dimensions, namely that of extraversion/introversion, were determined using machine learning. The interaction style of the chatbots was adapted to this: the introverted chatbot engaged in efficient, goal-oriented communication, while the communication of the extroverted chatbot was characterized by the pursuit of a user experience. The authors have concluded that the language used by chatbots contributes to a sense of personalization, commitment, and satisfaction, and thus sales.

Ashfaq et al. (2020) developed their analytical framework based on several models to examine the determinants of user satisfaction with chatbots, including the Expectation-Confirmation Model and the Information System Success Model, based on the Technology Acceptance Model, and the Need for Interaction with a Service Employee was included in the variables, given that the intention to use of chatbot may be influenced by the fact that an individual would prefer to interact with a human employee. The *Expectation-Confirmation Model* can be attributed to Bhattacherjee (2001), which describes user satisfaction with a product and service and behavior during post-purchase use. Its factors include confirmation, perceived usefulness, satisfaction, and continuance intention. DeLone-McLean (2003) developed the *Information System Success* (ISS) *model*, which combines six factors: service quality, information quality (IQ), satisfaction, and personal and organizational impact. The *Technology* Acceptance Model (TAM) by Davis (1987) is also referred to in the literature on human-chatbot interaction, with elements of perceived usefulness, perceived enjoyment, and perceived ease of use.

The authors' integrated model includes perceived enjoyment (PE), perceived usefulness (PU), perceived ease of use of technology (PEOU), quality of information (IQ), quality of service (SQ), satisfaction, and continuance intention (CI) and the need to interact with human service personnel (NFI-SE). Ashfaq et al. (2020) found that continuance intention

is positively influenced by perceived enjoyment (PE), perceived usefulness (PU), and perceived ease of use (PEOU).

Chung et al. (2020) examined whether personal assistance in selling luxury may be provided by chatbots and whether user satisfaction may be created. They identified two groups of factors that can affect satisfaction: *the effort made by the chatbot* (interaction, entertainment, fashion, personalization, problem-solving), and the *quality of communication* (accuracy, authenticity, communication competence). Their results show that the chatbots used to sell luxury brands can also contribute to the acquisition of a favorable shopping experience that supports the establishment of a consumer-company relationship.

Li et al. (2020) investigated the factors that determine user demand for the subsequent use of chatbots to automate the provision of information related to travel services. The authors examined user satisfaction along the following quality dimensions that determine intent for further use: understanding, reliability, responsiveness, security, and interactivity. *Understanding* users' questions and answers is the starting point for proper interaction. *Reliability* is the perception of the service provided by the chatbot that the chatbot can perform its function accurately when providing the promised service (Parasuraman et al., 1988). *Responsiveness* is the user's perception that the chatbot answers questions quickly. *Security* means that the user develops trust in the chatbot. Finally, *interactivity* as a quality dimension suggests that the chatbot can communicate as if it were a human employee. The results of the research showed that all quality dimensions except responsiveness had an impact on user satisfaction and, through this, the intention to use it later. The authors explain the lack of a link between responsiveness and satisfaction by stating that in China, consumers are accustomed to quick responses from the human workforce, so this did not play a key role in creating their need for later use.

Eren (2021) studied user satisfaction with a chatbot used in banking services based on Oliver's (1980) *Expectation-Confirmation Theory*, which examines consumer behavior before purchasing (consumer expectations) and purchasing decisions based on perceived performance. The model describes the following phases: (1) consumer expectations about the product, service, or service provider, (2) fulfillment, (3) perceived fulfillment and the coincidence or gap of expectations between them, (4) the emergence of satisfaction or dissatisfaction, based on *perceived trust* and the *bank's reputation*. The results show that

perceived performance, trust, and organizational reputation show a significant relationship with consumer satisfaction with chatbots. The role of the bank's reputation in the development of satisfaction with chatbots supports the previously mentioned finding that the experience of human-chatbot interaction is also significantly influenced by its context.

Cheng-Jiang (2020) examined how the use of chatbots, based on the *Uses & Gratification Theory,* affects overall consumer satisfaction. The goal of U&G Theory is to understand how individuals can be satisfied by media usage (Rubin, 1983). Cheng-Jiang (2020) identified four possible categories of user satisfaction stemming from chatbot use, which are the following:

(1) utilitarian: the usefulness and accuracy of the information provided by the chatbot.

(2) hedonist: the fun experienced during the interaction, emotional support.

(3) technology: ease and speed of technology availability.

(4) social: experiencing a social presence.

The research results confirmed that these categories have a positive effect on consumer satisfaction and, through this, the intention to use chatbots later.

Tsai-Liu-Chuan (2021) examined how the anthropomorphic nature and social presence of the chatbot — the ability of a communicator to appear as a real partner in a social and emotional sense (Garisson et al., 2000) —contribute to the consumer's brand commitment. The authors also incorporated an exciting perspective on the phenomenon, namely the concept of *parasocial interaction* as a factor influencing positive branding. Parasocial interactions are a central element of parasocial relationships. A parasocial relationship develops when an individual thinks that the famous person he or she has seen and heard in the media also knows him or her (Pál-Törőcsik, 2017). Parasocial interactions are when the relationship that people build with media people resembles an interpersonal relationship for them but is one-sided (Kassing-Sanderson, 2015). According to Munk (2009), this allows the individual to maintain within himself the appearance of publicity and to experience the other person as if he were close to him. In examining the experience of interactions with chatbots,

consideration of this phenomenon is relevant given that the signs of social relationships mediated by an artificial entity are intended to create the appearance of a real interaction that may convince the individual that the relationship is interpersonal. Tsai-Liu-Chuan's (2021) research revealed that the anthropomorphic nature of a chatbot positively influenced the perception of social presence through parasocial interactions, which also had a positive effect on user brand engagement.

5.3.1.5 Perception

The perception of human-chatbot interaction and the coincidence of chatbot-related expectations create user satisfaction (Rapp-Curti-Boldi, 2021), so examining the perception of chatbots plays an important role in marketing research to discover the determinants of consumer satisfaction. Numerous studies have been carried out on the topic and based on the results of the present literature search, this area proved to be the most significant, as seven journal articles dealing with perceptions were identified.

Mehra (2021) examined the perception of human-chatbot interaction in the case of chatbots with different personalities. Three chatbots were developed based on the Big Five Model. The dimensions of the model are (1) *openness* (tendency to try new things), (2) *conscientiousness* (readiness, responsibility), (3) *extraversion* (the outward focus of the individual), (4) *agreeableness* (altruism, cooperation), and (5) *neuroticism* (anxiety, anxiety in stressful situations). The authors developed chatbot personalities that are transactional, prosocial, and friendly. The *transactional chatbot was characterized* by efficient and focused task performance, as little interaction as possible, and seriousness. In contrast, the *prosocial chatbot* was anthropomorphic in nature and placed more emphasis on social interactions, however, this personality was also characterized by a degree of distance. The *friendly chatbot* has been developed to interact with users as if they were close friends. The results showed that the majority of the subjects preferred the friendly chatbot, as the users perceived the interaction with it as the most comfortable and the most effective.

Lee-Lee-Sah (2019) also examined user perceptions of anthropomorphic traits, but not in relation to personality but to the mind (mental state) of the chatbot, namely, whether the perception of the mental state of the chatbot contributes to the feeling of social presence, proximity, and intention to use.

Anthropomorphism refers to the attribution of human properties to living and artificial entities (Epley et al., 2007), which include mental state, intention, purpose, and emotion. According to Lee-Lee-Sah (2019), perceiving a mental state also has cognitive and emotional benefits for the user, as it contributes to a more meaningful experience of the interaction with the chatbot and to the feeling that the user is chatting with an intelligent entity. Based on their results, it was found that the more conscious the subjects perceived the chatbot, the stronger their sense of social presence and interpersonal closeness was.

Han (2021) also examined the perception of chatbots along with their anthropomorphic nature. The author studied whether perceptions of the human likeness of a chatbot affect the perception of social presence and entertainment. Perceiving a social presence is paramount because it provides a lack of personality in online commerce. The results of the study revealed that anthropomorphizing a chatbot has a positive effect on the perception of social presence and entertainment, which play an important role in purchasing decisions.

Schuetzler-Grimes-Giboney (2020) has investigated how a higher level of chatbot's conversational skills affects the perception of social presence and human likeness, as well as user engagement. The study found that chatbots with higher levels of conversational ability (which communicated with the research subject in a personalized manner and used a variety of terms in the interaction) had higher perceptions of social presence and anthropomorphic character, as well as engagement.

Beattie-Edwards-Edwards (2020) also conducted a study on users' perception of chatbot communication skills, focusing on how the use of emojis affects the perception of social attractiveness, competence, and authenticity. Social attraction is the degree to which an individual's interaction partner is attractive to him or her. Social attraction also affects the quality and quantity of communication (McCroskey-McCain, 1974) and the perception of persuasiveness and authenticity (McCroskey-Hamilton- Weiner, 1974). Competence indicates that the chatbot performs its tasks successfully and properly. Credibility means the existence of competence, goodwill, and reliability (McCroskey-Teven, 1999). The findings revealed that subjects found both the human interaction partner and chatbot

to be more socially attractive, competent, and authentic when they used emojis in their communication.

Go-Sundar (2019) investigated the effect of the appearance of anthropomorphic visual signals on the interface, the interactivity of the message, and the identity on the perception of human likeness. The authors concluded that message interactivity could compensate for the lack of visual character or identity of the chatbot, i.e., the chatbot was able to create a sense of social presence without being visible to the user or having an identity.

Park et al. (2021) investigated how the nature of communication with a chatbot is influenced by the perceived human likeness, social competence, and ideological background of the user. Forsyth (1980) distinguished between idealist and relativist types concerning ideological attitudes. Idealists believe in the original good and in following the morally correct directions at all times. Relativist individuals, in contrast, consider situation-specific circumstances and personal values when making ethical decisions (Forsyth, 1980; VanMeter-Grisaffe-Chonko-Roberts, 2013; Winter et al., 2004). Social competence refers to effective interactions perceived through relationships, well-managed interpersonal relationships (Rose-Krasnor, 1997), and the ability to adapt to different social contexts (Duck, 1989).

The research results revealed that the ethical orientation of the subjects influences the nature of their communication with the chatbot. Idealists were more likely to communicate kindlier with the chatbot, while relativists tended to use offensive terms. Furthermore, it became apparent that the more humane individuals perceived the chatbot, the more vulgar or hurtful the terms were used. The communication of individuals with a higher level of social competence with the chatbot developed in accordance with social expectations.

5.3.1.6 Trust

Trust is a cognitive assessment and a subjective sense that security as a psychological need is being met (Mayer et al., 1995). Trust in the chatbot plays an important role in the implementation of the human-chatbot interaction, especially if the user shares personal

information with the chatbot that is risky (Zamora, 2017). In several HCI publications, trust appears as a determinant of attitudes towards chatbots (Kasilingam, 2020), and researchers also examine the factors that influence the development of trust related to chatbots. The corpus includes four journal articles (Toader et al., 2019; Nordheim-Følstad-Bjørkli, 2019; Cheng et al., 2019; De Cicco-Silva-Alparone, 2020), which focus on exploring the aforementioned topic.

Toader et al. (2019) examined the effects of perceived social presence, perceived competence, and anthropomorphic character on the development of chatbot-related trust and positive consumer responses. To create their research model, the authors used the *Social Information Processing Theory*, the *Media Equation Theory*, and the *Computers As Social Actors* paradigm. Their findings have shown that the gender of the chatbot plays an important role in the development of trust and positive consumer responses, as consumer reviews of the anthropomorphic chatbot with a female identity were also positive when the chatbot made a mistake. The authors also concluded that subjects who interacted with the female chatbot were more likely to share personal information about themselves and had a higher intention to patronize, which is to recommend the use of the chatbot to other individuals. Toader et al. (2019) also found that errors of female chatbots were more often forgiven by users compared to errors of male chatbots. Finally, it has been shown in the case of chatbots that work without error, users are more likely to make a purchase, have a higher intent to patronize, and are also more satisfied.

Nordheim-Følstad-Bjørkli (2019) studied the determinants of trust in customer service chatbots and as a result of their research developed a model of trust in chatbots, which is referred to as *an initial model of trust in chatbots*. This is justified by the fact that the development of the capabilities of chatbots is expected to require the inclusion of other factors or the modification of existing ones in the future (*Figure 7*). To create the model, the factors determining the development of trust were collected based on the literature (*Table 12*), and new factors were identified based on their empirical research. The components of the model are perceived expertise and responsiveness (*factors related to chatbot*), perceived risk - for sensitive user data - and perception of the brand (*environmental factors*), and individual propensity to trust technology (*user-related factor*). Thus, it can be seen that in addition to the trust-determining elements revealed in the literature (expertise, predictability, human likeness, ease of use, risk, reputation,

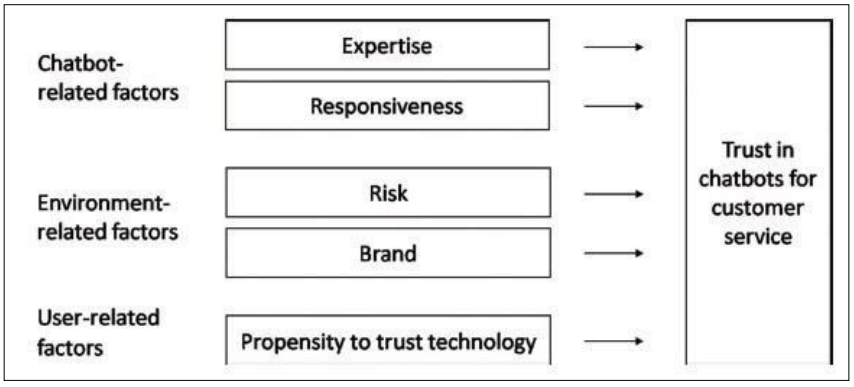
propensity to trust technology), the authors identified *responsiveness*, i.e. the ability of chatbots to respond quickly and efficiently as a new factor and the *perception of the brand*, in connection with which we can conclude that the trust of the users in the chatbot is also determined by the trust of the service provider.

Table 12 Factors influencing the development of trust in chatbots

GROUP	FACTOR	REFERENCE
Chatbot-related factors	expertise predictability human-likeness ease of use	Corritore et al. (2003) Ho-MacDorman (2010)
Environment-related factors	risk reputation	Corritore et al. (2003)
User-related factors	propensity to trust technology	Corritore et al. (2003) McKnight et al. (2011)

Source: Own edition based on Nordheim-Følstad-Bjørkli (2019, p.4.)

Figure 7 Initial model of trust in chatbots



Source: Nordheim-Følstad-Bjørkli (2019, p.13.)

Cheng et al. (2021) examined the effect of human attributes (empathy, friendliness) attributed to the chatbot, the disclosure of the identity of the chatbot, and the complexity of the task performed by the chatbot on the development of trust in connection with an e-commerce chatbot. Empathy is the *ability* to identify, understand, and respond to the thoughts, emotions, behaviors, and experiences of others (Murray et al., 2019). *Friendliness* is paramount on the part of the service provider, as it significantly influences the positive perception of the brand. Self-disclosure of a chatbot means that the chatbot makes its identity transparent from the beginning of its interaction with the

user. The results of the research showed that the perceived empathy and friendliness of the chatbot have a positive effect on the development of trust, of which empathy was more important than friendship. The complexity of the task had no significant effect on the relationship between empathy and trust, while it was moderately affected by identity disclosure.

De Cicco-Silva-Alparone (2020) examined how perceived social presence — that is, the feeling that we are present with someone else — affects the development of trust in the chatbot, the experience of the fun nature of the interaction, and the attitudes about the chatbot. The authors examined the perception of social presence along two variables, namely whether the chatbot has an avatar or not, and whether its interaction style is relationship-oriented or task-oriented. Their results have shown that a relationship-oriented style of interaction contributes to the perception of social presence. It has also become apparent that a sense of social presence plays a role in perceiving trust and the entertaining nature of interaction, which in turn leads to the development of positive attitudes towards the chatbot. However, the authors found no association between the appearance of the chatbot with an avatar and the perception of a social presence.

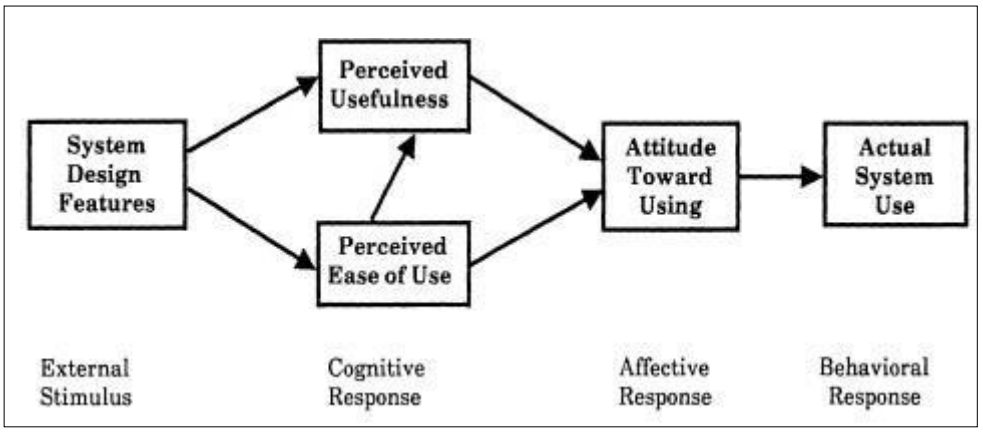
5.3.1.7 Acceptance

Acceptance is the assessment and attitude following the use of technology (Schuitema et al., 2010) and a condition for the success of an implemented system, so it is very important for companies to understand how technology characteristics affect user technology acceptance (Davis, 1987). 9.6% (n = 3) of the articles that make up the corpus (Richad et al., 2019; Rese-Ganster-Baier, 2020; Behera-Bala-Ray, 2021) examined the acceptance of chatbots. Research focusing on technology acceptance is popular, one of the most cited models is Davis's (1989) TAM (Technology Acceptance Model) (*Figure 8*). Researchers do not only use this model for studying the acceptance of a chatbot but also for studying users' perspectives on the interactive agents, as presented above.

The model describes the interaction between *external stimuli* (system characteristics), an *individual's cognitive responses* (perceived usefulness, perceived ease of use), *affective responses* (usage-related attitude), and *behavioral responses* (system use). A parallel can be found between the sensemaking process and the technology acceptance model, in that

sensemaking is triggered by external stimuli that individuals value and organize into their mental schemes to reduce their uncertainty, which will affect their behavior toward technology. The TAM model also incorporates the role of affective factors as a determinant of technology acceptance or rejection, which is also considered in some of the studies examining the sensemaking processes.

Figure 8 TAM model



Source: Davis (1989, p.3.)

Richad et al (2019) examined the acceptance of a chatbot used in a banking environment based on the TAM model. The authors also included innovation as an exogenous factor in the variables, which means the individual's attitude towards novelties. Their findings have shown that innovativeness, perceived usefulness, perceived ease of use, and attitudes toward using the chatbot have influenced users' behavioral intentions.

Rese-Ganster-Baier (2020) investigated the acceptance of an online shopping assistant chatbot. Their research was based on two models: the *Technology Acceptance Model* (TAM) and *Uses and Gratification Theory* (U&G). As discussed above, the goal of U&G theory is to understand behavior related to media use. The research revealed that the authenticity of the conversation (as a utilitarian satisfaction factor) and the perceived usefulness and entertainment (as a hedonistic satisfaction factor) positively influenced the acceptance of the chatbot. At the same time, safety and the maturity of the technology had a negative effect on the intention to use and the frequency of use.

Behera-Bala-Ray (2021) examined the acceptance of a chatbot used to automate B2B communication based on the *Technology Acceptance Model* (TAM) and the *Information Systems Success Model* (ISSM) (Delone-McClean, 2003). The ISSM model includes information quality, system quality, service quality, intent to use, user satisfaction, and utility of use. In addition to elements of the TAM and ISSM models, the authors also included perceived trust and perceived risk as possible determinants of acceptance. The research results showed that perceived ease of use (PEOU), perceived usefulness (PU), and perceived trust (PT) play an important role in the formation of user attitudes and intentions to use. It was also outlined that perceived information quality (PIQ), perceived system quality (PSYQ), and perceived service quality (PSEQ) have an impact on user satisfaction.

5.3.2 Users' perspectives on chatbots in an organizational context

Introducing a chatbot into an organization allows the human workforce to focus on more challenging activities rather than repetitive tasks that can contribute to their satisfaction (Besson-Rowe, 2012), however, it should be also considered that in an organizational context, individuals are not free to choose whether using a chatbot as opposed to general users, it is therefore worthwhile to discover the willingness of the human workforce to use chatbots before their introduction (Brachten-Kissmer-Stieglitz, 2021).

The articles presented in this subsection (examining users' perspectives on chatbots in an organizational context) are the closest to the research problem of the thesis in terms of both focus and applied methodology (Jang-Jung-Kim, 2021). However, only two such publications were identified as a result of the systematic literature search (Jang-Jung-Kim, 2021; Brachten-Kissmer-Stieglitz, 2021), so we cannot talk about a rich background on the topic. During the content analysis, it became clear that these articles examined the phenomenon from the perspective of the managers (Jang-Jung-Kim, 2021) and the general employees (Brachten-Kissmer-Stieglitz, 2021). The user experiences of the interaction with HR chatbots have not been addressed in any research, so the point of view of HR people does not appear in the journal articles that make up the corpus.

5.3.2.1 Managerial perspective

Jang-Jung-Kim (2021) examined the perceptions of chatbots from the perspective of managers. The authors used the *Social Representations Theory* (SRT) as the basis for their research which explores the collective interpretations of objects. According to the theory, given that individuals are part of communities, their interpretations and actions are influenced by their peers (Moscovici, 1984). Social representations about an object are made up of attributes, perceptions, emotions, and attitudes about the object. Jang-Jung-Kim (2021) used core-periphery analysis to explore the social representations of managers related to chatbots. This method aims to map the core elements that generate collective representations and the soft peripheral elements organized around them. While meanings and values are determined by the main elements, peripheral elements are soft factors that appear during adaptation to a changing environment (Abric, 2001).

In their analysis, the authors analyzed seven core and eight peripheral elements, including (1) *technological immaturity* (1 (a) significant costs, and 1 (b) strict regulations), (2) *increasing user satisfaction* (2 (a) providing an alternative communication channel for customers who prefer to avoid personal interactions), (3) *organizational resistance*, (4) the *lack of organizational skills* (4 (a) artificial intelligence), (5) the *supporting role*, (6) the *improvement of operational efficacy* (6 (a) by developing a new service model, 6 (b) by facilitating digital transformation, 6 (c) by a substitute role), and (7) *experimentation* (7 (a) collaboration with technology firms) were identified. Based on social representations discovered by the authors, it can be seen that the perception of managers regarding the use of chatbots is twofold: in addition to articulating the undoubted benefits of introducing the technology, they also perceive the challenges it generates.

5.3.2.2 Employee perspective

Brachten-Kissmer-Stieglitz (2021) pointed out that before introducing chatbots into organizations, it is crucial to understand what factors influence employees' acceptance of an interactive agent and their willingness to adapt to technology to avoid alienating them from the technology. The authors used the *Theory of Planned Behavior* as a basis for studying the phenomenon, which contributes to understanding the intention to use chatbots.

Their research revealed that attitude played a greater role in the formation of intent to use than external factors, including subjective norms and perceived behavioral control. It was also outlined that the influence of peers on intention to use was more significant than the influence of leaders.

5.3.3 Summary

The corpus articles mostly examined the users' perspectives on chatbots in general and the consumer's perspective on chatbots used by companies. Only two publications studied the phenomenon in an organizational context from the perspective of employees and managers. No research focused on users' perspectives on HR chatbots and the perspective of HR professionals. Most of the corpus articles that used quantitative methods and determined the variables they examined based on existing models. These models are summarized in *Table 13.*

Based on *Table 13*, it can be seen that the Technology Acceptance Model (TAM) appeared not only for studying users' acceptance but also in relation to attitude and satisfaction research. The Theory of Social Presence (SP), the Big Five Personality Test, the Uses and Gratification Theory (U&G), the Information Systems Success Model (ISSM), and the Expectation-Confirmation model (ECM) were also used several times. Two studies aimed at creating new models that describe trust in chatbots (Nordheim-Følstad-Bjørkli, 2019) and the development of the human-chatbot relationship (Skjuve et al., 2021).

Among the topics outlined during the content analysis appeared the examination of the *expectations related to the chatbot*. In their systematic literature review, Chaves-Gerosa (2020) identified three groups of expectations and 11 properties that are important for users when interacting with chatbots. Along these characteristics, in a cognitive and affective sense, a perfect entity emerges that rarely appears in human-human interactions. Based on this, the question arises as to whether humans need an artifact that is not characterized by human error and has superintelligence and moral superiority as articulated by Gladden (2016) in relation to robots. What sensemaking processes does this trigger, and how do they affect an individual's self-image?

Table 13 Models used by corpus articles

TOPIC	MODEL	NUMBER OF ARTICLES
Attitude	Consumer Technology Acceptance Model (CAT)	1
	Environmental Psychology Model (EPM, PAD)	
	Technology Acceptance Model (TAM)	1
Experience	ABCDE relationship development model	1
	Social Penetration Theory (SPT)	1
Satisfaction	Similarity-Attraction Theory (SAT)	1
	Big Five Model	
	Information Systems Success Model (ISSM)	1
	Technology Acceptance Model (TAM)	1
	Expectation Confirmation Model (ECM)	2
	User and Satisfaction Theory (U&G)	1
	Social Presence Theory (SP)	1
Perception	Big Five Model	1
	Social Presence Theory (SP)	1
	Theory of Social Attraction (SA)	1
	Theory of Social Representations (SRT)	1
Trust	Social Presence Theory (SP)	2
Acceptance	Uses and Gratification Theory (U&G)	1
	Planned Behavior Theory (TPB)	1
	Technology Acceptance Model (TAM)	2
	Information Systems Success Model (ISS)	1

Source: own edition

The next topic I identified during the content analysis was the examination of *attitudes*. Research has shown that in addition to cognitive factors, affective factors also play a role in the development of attitudes. This suggests that the feelings of individuals towards chatbots should also be considered when exploring the sensemaking of chatbots.

User *experience* gained during the human-chatbot interaction was studied by the corpus articles through the uncanny valley phenomenon and the relationship development model. Surprisingly, during longer-term use of chatbots, individuals were less willing to interact with the agent because it became predictable for them, resulting in a loss of novelty experience related to the technology.

This raises the question of what is needed to create a need for multiple interactions with the chatbot. It may be particularly important to examine this in an organizational context where the tasks performed by the human workforce are taken over by the chatbot, so employees are forced to use it. It was also revealed that simpler chatbots elicited less strong reactions from individuals, with no “uncanny valley” effect in their case, as opposed to more complex interactive agents, which is in line with the question raised about expectations.

Satisfaction related to the chatbot was the next topic that came to the forefront of the corpus articles. Concerning the satisfaction-creating category types defined based on the U&G theory, the question arises as to whether hedonistic and social dimensions are also relevant in relation to chatbots used to automate internal communication in an organizational context. It may also be interesting to explore whether employees perceive a parasocial relationship with the organizational internal chatbot.

The research of *perceptions* has appeared in several articles, which in most cases examined user perception in terms of the anthropomorphic nature of the chatbot. It was surprising research finding that the individuals allowed themselves to use offensive, negative terms in their communication with the chatbot much more compared to their human interaction partners. It may be an interesting question whether this use of the language is typical of employees in an organizational context as well, given that they know the interactions are stored by the chatbot.

Trust in the chatbot was another topic in the articles that make up the corpus, which is determined by several factors, including the context and the reputation of the brand. From this, we can conclude that in the organizational context, the employee's perception of the management and the organization can be also relevant factors in building their trust in chatbots.

The *acceptance* of chatbots also emerged as a topic outlined as a result of content analysis. A parallel can be found between the TAM model used by articles in that, similarly to the TAM model, the sensemaking process begins under the influence of external stimuli.

These stimuli are evaluated by individuals, and to reduce their insecurity, they arrange in their mental schemas the signs of ambiguity — making meaning of them — that affect their behavior toward the technology.

Studies examining users' perspectives on chatbots in an organizational context have explored the phenomenon from the perspective of managers and employees. In the former case, it was found that in connection with the corporate introduction of chatbots, managers have articulated both benefits and challenges, suggesting that the organizational emergence of such technology brings with it ambiguity and thus triggers sensemaking processes. Concerning acceptance and intent to use the chatbot from an employee perspective, it has been found that members of the organization influence each other's perspective, which draws attention to the need to consider social impacts when examining individual sensemaking processes.

The findings of the selected studies provide an important input to my empirical research related to each stage of the sensemaking process (*Table 14*). Knowing the findings about user *expectations* towards chatbots, it becomes apparent which lack of properties of the agent can cause discrepancy in the individual. Understanding the *experiences* and *perceptions* of human-chatbot interaction also contributes to understanding what influences the perception of the experienced situation's deviation from the expectations which triggers sensemaking processes.

Attitudes towards chatbots also play an important role in the sensemaking process, as individuals perceive signals from the environment based on their existing knowledge and experience, which also shape their attitudes (evaluative findings), and place them in their existing mental schemes after naming unknown cues. Attitude, however, also reflects an affective orientation that aligns with the need to consider the emotions involved in sensemaking processes. *Trust*, *satisfaction*, and *acceptance* of chatbots presuppose clarity, that is, the restoration of continuity and the finding of plausible explanations. By exploring the literature on the factors that build trust, satisfaction, and acceptance, it became clear what was needed to resolve equivocality.

Table 14 The contribution of the research results of the areas explored during the systematic literature search to the understanding of the sensemaking processes triggered by chatbots

SCOPE OF INVESTIGATION	STAGE OF SENSEMAKING PROCESS	CONNECTION WITH MEANING MADE OF CHATBOT
Expectation	The sensemaking process starts when the **perceived** situation deviates from what is **expected**. (p.20.)	Expectations related to chatbots, which, if not met, discrepancies are experienced by individuals.
Experience		What shapes individuals' perceptions and experiences of human-chatbot interaction, the deviation of which from their expectations triggers the sensemaking process.
Perception		
Attitude	The individual pays attention to the signals coming from the environment, a process that is driven by their previously constructed mental models, that **is, they capture certain stimuli and ignore others based on their existing knowledge**. (p.20.)	Based on individuals' prior knowledge/experience - and attitudes (evaluative findings) formed based on these, they snatch signs that are unknown to them which they name afterward.
Satisfaction	For the individual, it is not the accuracy but rather the **acceptability** that is important, as the explanation seeks to allow the continuation of their activity, for which a **plausible** explanation is sufficient. (p.20.)	Trust, satisfaction, and acceptance presuppose clarity and reassurance to the individual so that its continuity can be restored. What contributes to the development of an individual's trust, satisfaction and acceptance towards chatbots?
Acceptance		
Trust		

Source: own edition

6. RESEARCH FRAMEWORK

6.1 THE ROLE OF RESEARCH PRESUPPOSITIONS IN QUALITATIVE RESEARCH

The hypotheses used in qualitative research are problematic according to most authors. According to the position of quantitative researchers, the hypothesis test cannot be solved, nor do the qualitative researchers have a unanimous opinion on the issue. Formulating hypotheses for qualitative research can hamper research flexibility, researcher openness, and creativity. This is contradicted by the concept that the researcher begins his research with a predetermined research plan and theoretical assumptions in both quantitative and qualitative research. In qualitative research, theoretical presuppositions are not synonymous with hypotheses, and the researcher does not aim to accept or reject them based on the research findings. Rather, presuppositions mean strengthening or expanding the issues that arise during research (Sántha, 2006).

6.2 QUALITATIVE RESEARCH PLAN

My philosophical standpoint determines the formulation of the research problem and the way I answer the research questions. In my thesis, I conduct qualitative research, the basic premise of which is that reality is a social construction, and its goal is a deeper understanding of a phenomenon or human behavior (Constantinou-Georgiou-Perdikogianni, 2017). Qualitative research aims to understand social events, roles, groups, or interactions through the analysis of context-sensitive and detailed data (Locke et al., 1998). The phenomenon is understood through the exploration of the subject's point of view and the meanings they give (Marshall-Rossman, 1989).

Qualitative researchers examine phenomena in their natural context to get to know them through human meanings (Denzin-Lincoln, 2003). Qualitative research aims at a deeper understanding of the phenomena, and one of its most important features is its interpretive nature. It should be noted, however, that according to Gummesson (2003), all research is interpretive, as interpretation permeates the entire research process (Horváth-Mitev, 2015). According to the author, even the formulation of the research question reflects how we interpret the world. Bruner (2004) is also in this position, according to the author, the meaning of the results of the calculations should also be determined by the researcher, which also requires interpretation.

Based on Creswell (2007) and Rossmann-Rallis (1998), Horváth-Mitev (2015) collected the characteristics of qualitative research, which are illustrated in *Table 15.*

Table 15 Characteristics of qualitative research

CHARACTERISTIC	CONTENT
1. Natural environment	Data collection in the natural environment of the participants.
2. Researcher as a key tool	The qualitative researcher constantly reflects on their role in the research.
3. Multiple data sources and methods	Qualitative research uses a variety of methods that are human-centered and interactive.
4. Inductive data analysis	In data analysis, the researcher builds from the bottom up, that is, they first explore the patterns and categories that emerge from the data and then organize and elevate them to a more abstract level.
5. Report by participants	The researcher aims to get to know the interpretations of the participants as thoroughly as possible.
6. An ongoing research plan following the ethical principles	The research plan may change at each stage of the research (including the research questions).
7. Theoretical lenses	The researcher uses filters that make them more sensitive to certain issues.
8. Interpretive research	The researcher constantly interprets what they see and describes the individual and the situation in detail.
9. Holistic account	The researcher aims to draw the most complex picture possible of the studied problem. The researchers do not aim to explore the strengths of the relationships between the factors, but the complex system of relationships between them.

Source: Own edition based on Horváth-Mitev (2015)

The sampling strategy of qualitative research is characterized by the fact that it is targeted and theoretical, i.e. the researcher chooses subjects whose information can contribute to a deeper understanding of the studied phenomenon (Klenke, 2008, quoted by Horváth-Mitev, 2015). Sampling lasts until the level of theoretical saturation is reached, i.e. until redundancy can be detected in the information provided by the subjects (Horváth-Mitev, 2015). Adherence to ethical principles is important during sampling, in connection with which Klenke (2008) summarized the following rules (Horváth-Mitev, 2015, pp.31-32.):

(1) Information and consent of the participants: The subjects of the research shall be informed in detail about the purpose of the research and the process by which the subject will decide to participate.

(2) Voluntary participation: It must be possible for the subject to withdraw from participation at any point in the research.

(3) Ensuring confidentiality and anonymity of the subject: The researcher must ensure that no information is written in the research report that could reveal the identities of the participants.

(4) Avoid harassment of participants: The researcher should avoid psychological harm to the subject.

I created my research plan based on Maxwell's (1996) interactive, qualitative research model. The elements of the model are the research goals, the conceptual framework, the research questions, the methodology, and finally the validity of the research, which components form an integrated unit. The two triangles shown in the model (*Figure 9*) indicate the main relationships between the elements. Research questions play a central role, which should be clearly related to the research objectives and should be formulated based on existing knowledge of the examined phenomenon. Research goals must reflect existing theories and scientific results. The lower triangle indicates the need to integrate methodology, research questions, and validity. The chosen methodology should be appropriate to answer the research questions and ensure the validity of the research. Research questions should be formulated in such a way that the methodology is feasible, and that the validity of the research is met. It is important to highlight that Maxwell's (1996) model is flexible, which means that elements of the research plan can be revised at any time during the research process. Typically, the research question is reformulated several times, for example during data collection or data analysis. According to Maxwell (1996, pp. 4-5.), qualitative research planning should be done by answering the following questions:

To articulate the **goals of the research**: *Why is your study worth doing? What issues do you want it to clarify, and what practices and policies do you want it to influence? Why do you want to conduct this study, and why should we care about the results?*

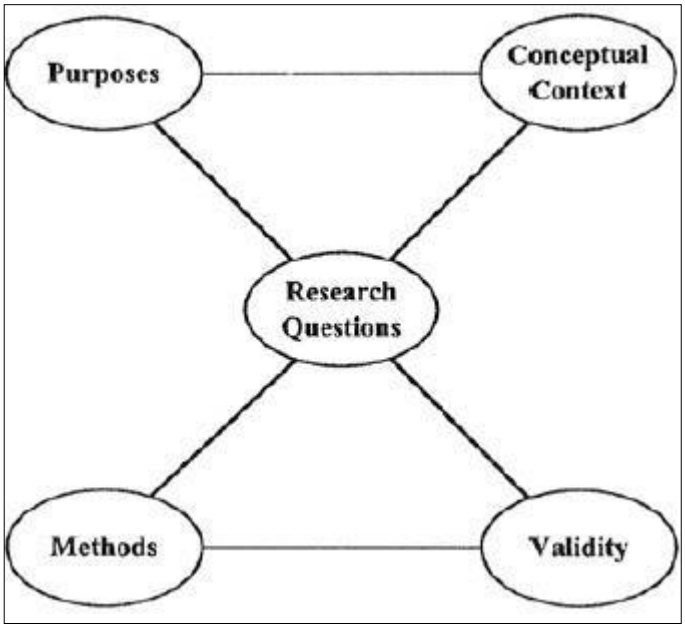
In creating the **conceptual framework**, we need to consider *the kind of knowledge that exists about the phenomenon we are studying*. We need to explore *which theories are relevant to our research, how the researchers approached the problem*, and what *results they had*.

To formulate the **research questions,** *What, specifically, do you want to learn or understand by doing this study? What do you not know about the things you are studying that you want to learn? What questions will your research attempt to answer, and how are these questions related to one another?*

To choose the **method:** "*What approaches and techniques will you use to collect and analyze your data, and how do these constitute an integrated strategy?"*

To ensure **validity**, it is necessary to consider what are the *threats to validity* that may arise when formulating conclusions and *how they can be addressed*.

Figure 9 Interactive model of a qualitative research plan



Source: Maxwell (1996, p. 5.)

6.3 CONCEPTUAL FRAMEWORK

The creation of a conceptual framework makes it possible to clarify the elements of the research question and to show how they are related to each other. The research aims to explore the sensemaking processes induced by the interaction between a human and an HR chatbot in an organizational context. Accordingly, in this subchapter, I present the definitions of chatbot, human-chatbot interaction, and sensemaking process.

I mean the following by the term chatbot based on Brandtzaeg-Følstad (2017) and Kenesei-Bognár (2019), **chatbots are computer programs that can communicate with a user without human intervention based on pre-written scenarios and rules through a chat interface.**

Based on Dautenhahn (2012), I define human-chatbot interaction as follows: **the human-chatbot interaction research area explores people's attitudes towards chatbots intending to use the acquired knowledge to develop chatbots that enable efficient functioning, and at the same time, are acceptable for people, consider their social and emotional needs, and respect their values when interacting with them.**

Finally, I define the sensemaking process following the definitions of Weick (1969, 1995), Louis (1980); Cornelissen (2012) and Maitlis-Christianson (2014) as follows. **Individuals reduce the ambiguity caused by the discontinuity resulting from ecological changes in the organization with retrospective sensemaking. That is, individuals interpret the discrepant cues from their environment and place these cues into their existing cognitive schemes, seeking to create plausible explanations for a new, unknown, confusing organizational phenomenon. This, in addition to reducing uncertainty, is also shaping their actions.**

According to the definition of chatbot I follow, a virtual agent is an artificial entity that can interact with individuals without human intervention. Due to this feature of the technology, its organizational appearance can be interpreted as an event causing equivocality that can induce a sensemaking process to reduce uncertainty. Exploring the meanings that emerge as a result of this process is important because it lets us know what characterizes effective human-chatbot interactions that respect people’s values, are acceptable to them, and take their social and emotional needs into account.

The research results of the areas explored concerning chatbots that have been explored as a result of systematic literature search are important inputs related to certain stages of the sensemaking process, so I also include them in the conceptual framework of the research. Knowledge of *expectations*, *perceptions*, and *experiences* makes the reasons for the sensemaking process visible, while *attitudes* play a role in what signs an individual perceives from their environment and show individuals’ emotional orientation toward

the chatbot. Understanding the factors that determine *trust*, *satisfaction*, and *acceptance* will reveal which factors ensure the elimination of equivocality.

6.4. RESEARCH GOAL

The literature review on human-chatbot interaction reveals that in a corporate environment, few studies have examined the phenomenon from the perspective of organizational members (Brachten-Kissmer-Stieglitz, 2021), and hitherto no study revealed the senses made of HR chatbots. This research gap, my concept of chatbots as defined by my philosophical standpoint, according to which I interpret interactive agents not as a reality that exists independently of us but as entities formed as a result of sensemaking processes, and the sensemaking perspective I have learned during reviewing constructivist theories (Weick, 1995) led to the definition of the *intellectual goal* of my thesis, which is to discover **what sensemaking processes are generated by the interaction between the individual and the HR chatbot.**

The practical objective of the thesis is to discover whether **a gap can be identified between the actions of the organization members towards the HR chatbot, and the strategic goals of the managers related to the digital assistant. I also aim to present how this gap can be narrowed or eliminated.** On the one hand, my results provide practical insights for the experts of the examined organization to facilitate the organizational acceptance and the daily use of the HR chatbot, and on the other hand, they may also help HR professionals by revealing the challenges of automating internal organizational communication.

Human-chatbot interaction raises several questions, including how to implement chatbot systems that, while ensuring efficiency, are acceptable to people, take their needs into account, and respect their values (Dautenhahn, 2012). Identifying with the thoughts of Dautenhahn (2012), the *personal goal* of my research is to discover under what conditions the use of chatbot technology complies with the principles listed above.

6.5. RESEARCH QUESTION

In formulating my initial research question (and sub-questions), I kept in mind that in qualitative research, research questions are often reworded and narrowed during the data collection and data analysis process and that data interpretation is expected to generate

additional sub-questions. My thesis aims to answer the following research questions and sub-questions:

1. **What sensemaking processes does the interaction between the individual (employees/HR professionals/managers) and the HR chatbot generate in the organization?**

   1.1 What sense do individuals (employees/HR professionals/managers) make of the HR chatbot used in their organization?
   1.2 How does the sensemaking of the HR chatbot affect the behavior of individuals (employees/HR professionals/managers) towards the HR chatbot itself?

6.6 METHODOLOGY

6.6.1 Data collection

To answer my research question, I use *qualitative interviews as a data collection tool*, which aims to learn about the interviewee's life through the exploration of their interpretations of the researched phenomenon (Kvale, 1983). The interview allows an understanding of the meaning of human behavior (Seidman, 2005). The basic conditions for the use of a qualitative interview are that the researcher is interested in the story of the interviewee and considers it important and that they can put their own assumptions and experiences in the background during the interview (Seidman, 2005). Schutz (1967) draws attention to the fact that it is never possible to fully understand the other individual during the interview, as their experiences have not been experienced by the researcher and the researcher does not have the subjects' consciousness.

Kvale (1996, p.145.) formulated six quality criteria for a qualitative interview:

(1) The amount of spontaneous, rich, concrete, and relevant responses given by the interviewee.
(2) Shorter questions and longer answers.
(3) The extent to which the researcher follows and clarifies the possible meanings of the responses.

(4) Interpretation of what the subject said throughout the interview.
(5) The researcher clarifies his own interpretations of the answers.
(6) The interview is “self-communication” - that is, a story in itself that hardly requires extra descriptions and explanations.

In my research, I *use the semi-structured interview*, which is the most common type of qualitative interview among researchers (Alshenqeeti, 2014). Similar to a structured interview, the topics and questions of a semi-structured interview are planned in advance by the researcher but may differ from the outline and need not be rigidly adhered to (Adhabi-Anozi, 2017). The semi-structured interview allows for the realization of reciprocity between the interviewee and the researcher (Galletta, 2013), as well as the asking of follow-up questions based on the answers given by the subject (Kallio et al., 2016).

Kallio et al. (2016) defined the process of conducting a semi-structured interview, the purpose of each step, the tools to achieve them, and the quality criteria that result from their implementation. The first step is to assess whether the semi-structured interview as a data collection method is appropriate to answer the research questions. Regarding my research goal, I do not think the unstructured interview is focused enough, while I find the structured interview too strict. The outline of the semi-structured interview, on the other hand, contains questions that allow me to access information relevant to my research but also provide space for follow-up questions arising from its flexibility, spontaneity, and openness to the subject’s life. The second step in developing an interview outline is to map and critically review the existing knowledge, based on which the interview outline can be created, which is the third step in the process. As a fourth step in preparing a semi-structured interview outline, the testing of the preliminary outline comes, which precedes the preparation of the final outline. The full outline of the interview should already ensure that the information relevant to the research is obtained by covering all the topics in one’s questions. The first two steps of the process aim at the credibility of the research, the way the preliminary interview outline is created, the verifiability, and finally the pilot testing and the preparation of the interview outline to establish reliability.

At the start of the interview, the researcher must create a comfortable environment for the subject, which requires the establishment of trust between the parties. The first step in building trust may be for the researcher and the interviewee to discuss the framework: ensuring anonymity, the interview process, whether the subject consents to the recording, and how the data will be analyzed. The researcher should assure the interviewee that they do not have to respond if a question is sensitive to them. The active listening shown by the researcher during the interview is also necessary to create a comfortable and empathetic atmosphere for the participant.

For the data analysis, I use the interpretive phenomenological analysis (IPA), for which the semi-structured in-depth interview is the most appropriate (Rácz-Kassai-Pintér, 2016). According to the IPA, "the interview will be effective if the subject talks a lot" (Rácz-Kassai-Pintér, 2016, p.322.), but the researcher does little. The method also recommends having descriptive and narrative as well as interpretive and analytical sections during the interview. During the interview, the researcher should avoid interpretation and search for correlations and should be asked about the interviewee's experience of the phenomenon. Smith-Osborne (2007) suggests asking the subject to give a detailed explanation account of each example, and Wagstaff–Williams (2014) suggests that a second, clarifying interview should be conducted (Rácz-Kassai-Pintér, 2016).

To ensure the transparency of the data collection process, data such as the number of subjects participating in the research, the length of the interviews, and the length of the document resulting from the transcripts of the audio material should be documented. IPA suggests that the sample should not be too large. Smith-Flowers-Larkin (2009) recommends a sample of 3-6 people (a sample of 4-10 people for doctoral research), as the authors say that this sample size still allows for detailed analysis, and "still suitable to describe the similarities and differences between the cases" (Rácz-Kassai-Pintér, 2016, p.322.).

Kassai-Rácz-Pintér (2017) highlight that sample selection in IPA methodology research is theoretical and targeted. "The members of the sample provide access to study a special phenomenon that represents a 'perspective' rather than a population. IPA has an idiographic commitment, it examines the phenomenon in detail in a specific context, so it works with a small and homogeneous sample of the examined phenomenon"

(Pietkiewicz-Smith, 2014; Smith et al., 2009; Smith-Osborn, 2007 cited by Kasai-Rácz-Pintér, p.30.).

6.6.2 Data analysis

In my research, I apply the *interpretive phenomenological analysis* (IPA), which is a qualitative data analysis method aimed at exploring experiences in as much detail as possible and understanding how the individual interpreted them. The IPA stems from the UK, the first article is attributed to Smith (1996). Most of the IPA research was born in the field of psychology, but the method is also increasingly used in market research. Interpretative phenomenological analysis is related to hermeneutics and phenomenology, the essence of which is that "the experiences of individuals can only be interpreted in their context" (Kassai-Pintér-Rácz, 2017, p.28.).

Phenomenology is the *science of experience*, the most significant philosophical movement of the 20th century (Kassai-Pintér-Rácz, 2017, p.28). The focus of this approach is to examine "how an individual perceives the world, objects, themselves, how they remember their past, and how they experience their emotions and self-identity" (Rácz- Kassai-Pintér, 2016; Ullman-Olay, 2011 cited by Kassai-Pintér-Rácz, 2017, p.28.). Another root of the IPA is hermeneutics, which is the *science of interpretation*. According to Heidegger-Gadamer, "understanding is the way of human existence" (Kassai-Pintér-Rácz, 2017, p.28). The concept of the "hermeneutical circle" is related to this, according to which the text as a whole can be grasped only through its parts, but the meaning of each part depends on the whole. Along this line, interpretation is a circular process in which all new information and new meanings discovered affect the information revealed before it, as they gain new interpretations in the light of new information (Gadamer, 1960). Interpretation can only be achieved if the interpreter can enter the examined world by recognizing and reflecting on their own cultural, scientific, and personal background.

The IPA begins the data analysis with a literal transcript of the interview texts, in which individuals' reactions (laughter, silence, etc.) are also marked. The next step is to "immerse oneself in the data" by reading the texts multiple times, during which the researcher "picks up the subjects' shoes". During the reading, the researcher

“makes descriptive, explanatory, interpretive and conceptual notes on the right margin of the transcript” by making free content analysis line by line (Rácz-Kassai-Pintér, 2016; Smith- Flowers-Larkin, 2009 cited by Kassai-Pintér-Rácz, 2017, p.31.). A conceptual note aimed at a more general understanding of the interview follows this. In this phase, the Gadamer dialogue takes place, i.e. a dialogue between the researcher's prior knowledge and what the interviewee says, to understand the subject's interpretations. The next step in the analysis is to create the emerging topics, that is, what the subject tells the interviewer is broken down by the researcher from a different perspective than the point of view that appears in the interview. When creating the emerging topics, it is not the vocabulary of the subject that is used, but that of the researcher, which is written in the left margin of the transcripts. The researcher then has the opportunity to incorporate constructs that were not used by the interviewee. As the next step in the analysis, we look for connections between topics, identifying superior topics that cover multiple topics, and intending to explore patterns. The researcher should assign quotes from the interview text to the unfolding topics. Thus, IPA allows double interpretation, as the researcher interprets how the subject interpreted their experience of the given phenomenon, and then makes a conscious systematic interpretation to create the emerging themes (Rácz-Kassai-Pintér, 2016). The analysis is therefore performed according to the following steps:

(1) Verbatim transcription of interview texts (marking silence, laughter, etc.).
(2) Read the interview texts several times.
(3) Free content analysis: descriptive, explanatory, interpretive and conceptual notes to the right margin.
(4) Conceptual note.
(5) Create emerging topics and write them in the left margin.
(6) Assign quotes to unfolding topics.
(7) Exploring the relationships between topics through the arrangement of sub-topics assigned to the main topics.

The aim of my research is to explore the sensemaking processes induced by the human-chatbot interaction, for which interpretive phenomenological analysis is a relevant methodological tool, as this method “enables the understanding of personal experiences, the presentation of them, and thus the understanding of subjects’ interpretations” (Smith-Flowers-Larkin, 2009; Smith-Osborn, 2007 cited by Kassai-Pintér-Rácz, 2017, p.30.).

The context where my human-chatbot interaction takes place is important for my research, and the IPA is idiographic (Rácz-Kassai-Pintér, 2016), i.e. its essence is based on the consideration of the context, as according to the method "individuals' experiences can only be interpreted in their context" (Kassai-Pintér-Rácz, 2017, p.28.). In addition, its intention - stemming from the hermeneutic roots - is to understand the interpretations of the subjects which also proves that this data analysis method can be well applied to answer my research goal, as the focus of my thesis is to explore the senses made by individuals of chatbots.

Table 16 Procedure for exploring meanings generated during the technology adaptation process

RESEARCH PHASE	DATA ANALYSIS	TASKS	EXPECTED RESULT
Phase 1 *Source:* Method:	Exploring the initial sensemaking process generated by the introduction of the HR chatbot. Retrospective interviews with study groups. Applying IPA to identify meaning patterns.	(1) To explore what kind of event the study groups interpreted the organizational presence of HR chatbots (new, surprising, discrepant, etc.) and what initial meaning they made of the event. (2) To explore how the interviewees restored their continuity with their actions.	**Initial meanings of HR chatbots' by study groups.**
Phase 2 *Source:* Method:	Actions towards technology and exploring ongoing sensemaking process. Retrospective interviews with study groups. Applying IPA to identify meaning patterns and usage practices.	(1) To explore practices related to longer-term technology use by study groups. (2) To explore new meanings that emerged during technology use by study groups.	**Practices for using the HR chatbot by study groups.** **New senses are made while using the technology.**
Phase 3	Refinement and enrichment of the coding scheme.	(1) To get more information about HR chatbot usage practices.	**Revision of meaning patterns and usage practices.**
Phase 4	Verification of meanings and usage practices.	(1) To send the results to the study groups to review the patterns detected.	**Revision of meaning patterns and usage practices.**

Source: Own edition based on Hsiao-Wu-Hou (2008, pp.262-263.)

As discussed earlier (*4.3*), Hiso-Wu-Hou (2008) distinguish three stages in the sensemaking process of the technology implemented in the organization, including the

initial technology adoption phase, the *transitional adoption* phase, and the *post-adoption* phase. Based on this model, the authors developed their qualitative research plan to examine the senses made by taxi drivers to a GPS system. The procedure used by Hiso-Wu-Hou (2008) considers the retrospective nature of the sensemaking process, its continuity, and its impact on the actions of organizational actors. The method of learning about the sensemaking processes used by the authors during technology adaptation – adapted for my research - is shown in *Table 16*, which I also follow in my empirical study to explore the sensemaking processes caused by the organizational introduction of HR chatbots.

In addition to the primary data collected using semi-structured interviews, I also analyzed secondary data (with web content analysis and document analysis) to ensure data triangulation, namely the organizations' strategic objectives related to the HR chatbot that was available on IBM's website and in an online document published by the organization in German. During the preparation of the *web content analysis*, I applied the content-type restriction from the border removal aspects described by Géring (2014), i.e. I only included pages displaying information related to the HR chatbot in the analysis base. The process of *document analysis* begins with the preparation of the data, during which the researcher presents the characteristics of the document, including its type, physical characteristics, date of publication, author, responsible person, and characteristics of its content. It is also necessary to name the audience to which the document was written and to justify why the document is relevant to the research. It is then necessary to determine the unit analyzed, i.e., which chapters or pages represent the analysis base (Mayring, 2002).

After presenting the sample, the researcher defines the method of data analysis in the next phase of the process. Both web content analysis and document analysis were performed using *inductive content coding*. Content analysis is a research technique that draws reproducible and valid conclusions from texts (and other meaningful materials) about the context in which they are used (Krippendorf, 2004, p.18.). Following the methodological recommendation of Zhang-Wildemuth (2009), I started the process of content analysis by reading the texts several times, then first tested the resulting coding scheme on a part of the text, and only then coded the entire text. Finally, after evaluating the consistency of the coding, I drew conclusions from the coded data.

6.7 QUALITY CRITERIA FOR RESEARCH

The methods of qualitative research must be chosen so that the validity of the research is provided (Maxwell, 1996). Validity is only one of the quality criteria that must be met. There is a debate among qualitative researchers on how to define quality criteria for qualitative research. There is no doubt that the positivist criteria formulated for quantitative research cannot be applied to qualitative research. Horváth-Mitev (2015) compared based on LeCompte-Goetz (1982) and Lincoln-Guba (1985) the qualitative criteria for quantitative and qualitative research, which are illustrated in *Table 17*.

Table 17 Traditional and alternative criteria for assessing the quality of qualitative research

Traditional quality criteria for quantitative research (LeCompte-Goetz, 1982)	**Alternative quality criteria for qualitative research** (Lincoln-Guba, 1985)	**Definitions of alternative criteria**
Internal validity	***Credibility***	How believable or credible the results are from the participants' point of view.
External validity	***Transferability***	The extent to which the results can be transferred to another environment or set of conditions.
Reliability	***Certainty***	The extent to which independent researchers obtain the same result.
Objectivity	***Verifiability***	The extent to which the results were confirmed by others.

Source: Own edition based on Horváth-Mitev (2015, p.60.)

Validity, which appears as one of the key elements of the lower triangulum in Maxwell's (1996) model of qualitative research design, is approached differently in qualitative research than in quantitative research. This is because internal validity and external validity are different (Lincoln-Guba, 1985). External validity is more in line with positivist ideas; however, internal validity is closer to the interpretive philosophical paradigm of science by asking participants for their opinions on the authenticity and credibility of the results. In doing so, it reflects the essence of the paradigm, according to which every organization has its own reality, which is not directly visible, as it is a social construction, and the meanings in it are created by its actors.

In addition to the above-mentioned criteria, triangulation is also an important quality criterion in connection with qualitative research. Regarding triangulation, it should be noted that it is not a tool of validity, but an alternative to it in qualitative research (Horváth-Mitev, 2015).

Triangulation means that qualitative research uses several methods to understand the studied phenomenon. Denzin (1989) identified four types of triangulations, which are the following:

1. *Data triangulation*: the use of multiple data sources from different locations and times.

2. *Researcher triangulation:* data is collected and analyzed by multiple researchers. This makes it possible to avoid and reduce the distortions arising from subjectivity.

3. *Theoretical triangulation:* applying multiple perspectives and theoretical approaches to interpret data.

4. *Methodological triangulation:* the use of multiple methods to analyze data simultaneously.

The essence of triangulation is that the application of multiple perspectives contributes to a deeper understanding that drives qualitative research. In addition to *triangulation,* Creswell (2003) also describes other aspects that contribute to the quality of qualitative research. I will list these briefly below. Under *member-checking*, the researcher shows the results to the subjects to ask them how accurate the results are. The aim of a *rich, dense description* of the results is for the reader to see the conditions of the research as detailed as possible. In addition, the quality of qualitative research is also ensured by the *identification of the distorting factors* that the researcher brings to the research with their own beliefs and experiences. This can be achieved through researcher self-reflection and its transparency. The presentation of *negative, contradictory information* also makes the research more credible. Finally, *spending more time in the field* also increases the achievement of a higher quality of research by allowing a deeper understanding of phenomena through the acquisition of more detailed information (Horváth-Mitev, 2015, p.75.).

Richardson (2000) has criticized triangulation for not being accurate enough regarding qualitative research. He explains this by saying that it is not enough to use just three

perspectives to understand the phenomena. For this reason, the author prefers to use the crystal metaphor, which is more sensitive in its view because it is multidimensional and rich in form. “Crystallization” suggests that the researcher seeks to “cleanse the valuable material of contaminants” (Horváth-Mitev, 2015, p.74.). Qualitative researchers therefore strive for thoroughness by trying to apply as many aspects, data sources, and data analysis methods as possible, and to describe their interpretations and contextual information in as much detail as possible. In addition, they seek to eliminate any distortions arising from their role as researchers by identifying and reflecting on them.

For the data analysis, I use the interpretive phenomenological analysis, which draws attention to various principles to create *validity (Rácz-Kassai-Pintér, 2016).* Given that IPA is context-sensitive, homogeneous sampling is required (Yardley, 2000). The key role of the context should be provided by both the analysis and the context. The text of the data analysis should be “strong”, i.e. it should be able to represent the experiences of the research participants with appropriate citations and explanations. “The sensitivity of the researcher to the context must also be shown through the relationship between the knowledge of literature and the research” (Rácz-Kassai-Pintér, 2016, p.325.). Yardley (2000) even highlights the importance of commitment and strict regularity. The former means the responsiveness of the interviewee as well as the researcher's efforts to create a comfortable, empathetic atmosphere.

In addition, the researcher must continuously develop the skills needed for qualitative research. Strict regularity implies that the researcher must achieve the idiographic nature of the analysis, i.e., use citations and detailed descriptions. In addition to the previous principles, transparency, and coherence also strengthen validity. In terms of transparency, the researcher must describe the criteria used to select the sample, the circumstances of the interview, how the transcripts were made, and the method of analysis (primary notes, emerging topics, and their relationship to each other). Coherence is important from the reader’s perspective: whether he or she understands the subjects’ experiences and the researcher’s interpretations of individual experiences. Finally, Yardley (2000) cited the effectiveness and importance of research as tools to ensure validity that can also be decided from the reader’s perspective (Rácz-Kassai-Pintér, 2016).

According to Rodham-Fox-Doran (2015), in research using IPA, *reliability* is ensured by a common analytical process, an accepting environment, and transparency. The joint analysis process means that all participants in the research (if more than one researcher is involved in the process) listen to the audio recordings of the interview so that those who were not present during the interview can also hear the verbal tools used by the subject (intonation, emphasis, volume), as they are also part of the analysis. The accepting environment refers to the participating researchers, more specifically to be able to freely share their different interpretations. The authors also emphasize that the researcher must remain open and curious or self-reflective in the research (i.e., be aware that they are part of the research so they can influence it). Finally, transparency implies that the reader should be allowed to learn about the analysis process.

Table 18 Ensuring research quality criteria

Author	Quality assurance element	Criterion	The way to provide a criterion in my research
Yardley (2000)	**VALIDITY**	context sensitivity	homogeneous sample
		commitment	creating an empathic, comfortable environment (with active listening)
		strict regularity	quotes and detailed description
		transparency	a detailed description of the research process
		coherence	*reader*
		impact and importance of research	*reader*
Rodham-Fox-Doran (2015)	**RELIABILITY**	joint analysis process	-
		accepting environment	-
		transparency	a description of the analysis process
Lincoln-Guba (1985)	**OBJECTIVITY**	member checking	show the results to the subjects
		identification of biases	data triangulation
		dense description of results	
		presentation of negative/contradictory information	

Source: Own edition based on Rácz-Kassai-Pintér (2016, pp. 324-326.) and Horváth-Mitev (2015, pp.75-75.)

I try to ensure the quality criteria of my research using different techniques to create the impact and importance of the research. To achieve *reliability*, I make the analysis process transparent, that is, I describe in detail how my interpretations of the experiences of individuals were born. Regarding the researcher's openness and curiosity, I need to put my prior knowledge of the topic aside and, as a self-reflective researcher, I need to know that I am part of the research so I can influence it.

To achieve *objectivity*, I use member-checking, identification of biases, data triangulation, rich, dense description of results, and presentation of negative or contradictory information. To establish *validity*, I conduct the study on a homogeneous sample based on the context sensitivity of the IPA, and I try to achieve the commitment of the interviewees by creating a safe, comfortable, empathetic environment for them. To achieve this interviewees' mutual agreement on the framework (including anonymity) and active listening to what the interviewee says. Given the idiographic nature of the IPA, I make a concise description during the analysis and illustrate the subjects' experiences with quotes. To achieve transparency, I dedicate a separate subchapter to the description of the research process, including its timeliness, how the sample was selected, the characteristics of the sample, the circumstances of the interview (time, duration, location), how the transcripts were made and the data analysis method (*Table 18*).

Certain *risks* were associated with the research plan, one of the most important of which is that in both expert and employee interviews, interviewees may want to portray the organization positively, and conceal the existence of problems and conflicts, reporting their experiences one-sidedly. As a researcher, this should be noticed, and during the longer time spent in the research field, the phenomena that did not appear explicitly in the subjects' statements should be identified. In addition, during the interview, the researcher should seek to create a situation that dampens the subjects' compulsion to comply. This is possible, among other things, by creating an atmosphere of trust that depends to a large extent on the transparency and personal credibility of the researcher. Trust may develop later between the parties, so it may be worthwhile to have a second interview with the subjects.

7. EMPIRICAL ANALYSIS

7.1 PRESENTATION OF THE EXAMINED ORGANIZATION

I conducted my empirical research at Siemens AG's Hungarian organizations (Siemens Zrt, Healthcare, Mobility, Evosoft, Energy). The Munich-based German multinational company's three focus areas are digitalization, automation, and electrification. Siemens is one of the world's leading technology companies, with a presence in 200 countries and nearly 400,000 employees (Siemens official website, 2022).

7.2 THE PURPOSE AND CIRCUMSTANCES OF THE INTRODUCTION OF THE HR CHATBOT IN THE EXAMINED ORGANIZATION

In November 2019, Siemens' Hungarian organizations introduced a pilot version of the currently used HR chatbot. Siemens AG launched its HR chatbot called **CARL** (**C**ognitive **A**ssistant for interactive user **R**elationship and continuous **L**earning) in 2016 to provide a digital assistant to meet modern information retrieval needs by replacing the previously existing corporate intranet pages. The need for an HR chatbot has also been triggered in the organization to significantly reduce the number of inquiries received by the HR department, thus contributing to the reduction in the workload of HR professionals arising from responding to redundant inquiries.

7.3 OPERATION OF CARL

When employees visit CARL, they first see a page with an integrated search function in the middle that can redirect them to the right interface based on the keywords they enter. The chat function of CARL became available in Hungary in September 2021. Filling the chatbot with content is a constant challenge and requires regular teamwork, as the chatbot's knowledge needs to be regularly updated based on changes in various policies and lessons learned from employee interactions with the chatbot, thus ensuring that it is up to date. The CARL's development team reviews the chatbot usage reports monthly, along with the digital assistant is constantly being improved.

7.4 Circumstances and process of data collection

Before the data collection process, which took place between September 2021 and March 2022, I conducted a pilot interview with an employee in the HR department whose responsibilities included developing CARL. The purpose of the pilot interview was to review and supplement the questions in the preliminary interview outlines (*Appendix II*), as Kallio et al. (2016) suggested for the semi-structured interview outline preparation. I started the data collection process with the HR professionals, then I interviewed the managers, and finally the general users (employees). As part of the data collection, I conducted 20 interviews that took place on the MS Teams interface, spanning approximately one hour. A literal transcript of the audio recordings made with the consent of the subjects provided the analysis base.

As I entered the research field, I found that most of the subjects were open to conversation. Individuals who had no previous experience with CARL or only tried it a few times, or who expressed a negative attitude towards the technology, felt a little uncomfortable at the beginning of the interview. In the case of these interviews, I took more time at the beginning of the conversation to create a climate of trust and to reassure the subjects that they did not have to meet any criteria, as they were not expected to be technologically optimistic, because the research aims to discover different user experiences.

7.5 Presentation of the sample

As discussed earlier *(6.6.1*), the IPA methodology suggests that the sample should not be too large. Smith-Flowers-Larkin (2009) recommends a sample of 4–10 people for doctoral research, which, according to the authors, still "allows for detailed analysis and is still suitable for describing the similarities and differences between the cases" (Rácz-Kassai-Pintér, 2016, p.322.). Following this methodological recommendation, **I formed three homogeneous study groups of 4-10 people.** The first group consists of *HR professionals involved in the development of CARL* (6 subjects), the next study group includes the general users of CARL, i.e. *employees* of the organization (10 subjects), while the third group consists of *managers involved in the implementation of CARL* (4 subjects). The number of subjects in the sample proved to be sufficient, as redundant information appeared during the conversation with the 20 interviewees, so the theoretical saturation was realized.

On the one hand, the sample was selected on the recommendation of the company contact, considering the perspective of the three different study groups in line with the practical objective of the research, and on the other hand, the members of the research groups also recommended additional interviewees. The contact person directed me to individuals who had developer or user experience with CARL, while the snowball method also allowed me to reach employees who had no information about the chatbot at all or had very little knowledge of the technology. All this allowed different perspectives to be learned within a homogeneous group. In addition, an important aspect of compiling the sample was for subjects to work in different jobs and at organizational levels. The characteristics of the sample are shown in *Table 19*. To ensure complete anonymity, I use fictitious names and I do not describe the exact job of the subjects, only which study group they belong to.

Table 19 Sample characteristics

Subject	Age	Study group	Time spent at the organization
Lilla	20-30	HR	2-5 years
Fanni	30-40	HR	2-5 years
Judit	30-40	HR	5-10 years
Petra	30-40	HR	2-5 years
Kitti	30-40	HR	15-20 years
Csilla	20-30	HR	<1 year
Krisztina	30-40	managers	5-10 years
Barbara	30-40	managers	5-10 years
Nándor	30-40	managers	5-10 years
Bálint	30-40	managers	5-10 years
Csaba	20-30	employees	5-10 years
Anna	30-40	employees	2-5 years
Tibor	40-50	employees	15-20 years
Annamária	20-30	employees	5-10 years
Zsuzsanna	30-40	employees	5-10 years
Gabriella	50-60	employees	25-30 years
Bence	30-40	employees	5-10 years
Olivér	30-40	employees	2-5 years
Martin	40-50	employees	15-20
Kristóf	40-50	employees	2-5 years

Source: own edition

7.6 DATA ANALYSIS

The analysis of the primary data was performed using interpretive phenomenological analysis. In this chapter, I present the process of analyzing interviews with the HR department to ensure the transparency of the research.

The first step in IPA is to make literal transcripts of the interview texts. I had to return to the interviews several times before starting the data analysis, and after getting to know them more deeply, I started to take the free-content notes on the right margin of the texts. In the case of interviews with HR, the following descriptive explanatory notes included, among other things, *"Experience working with CARL"*, "*Disadvantages of CARL"*, *"CARL is optional, not exclusive"*, *"CARL is neutral"*, *"CARL is positive",* "*CARL is useful"* and "*chat function is not required"*. Then I named the emerging topics based on the prominent patterns in the notes, which I placed on the left margin of the texts. In the case of conversations with HRs, the following topics emerged, among others: ***impact, creation, learning, challenge, transformation of work*** (related to different experiences of working with CARL), and ***CARL will be an HR assistant*** (*based on disadvantages of CARL, CARL is optional, not exclusive*).

The next step in the analysis process is to assign citations to emerging topics. The quotes assigned to the ***impact*** included, "*I love working on the chatbot because the results of my work are immediately visible. Feedback also comes immediately from colleagues; they love it. We look at the statistics and will be very happy if our colleagues can find the information as soon as possible."* (Fanni), *"I am proud to be involved in tasks like this. I am always waiting for the reaction of the workers. Because of CARL, there is indirect feedback on my job, they don't usually stroke my shoulder for doing tasks related to my other job, if they don't complain anymore, that's a lot of feedback."* (Judit). Exploring the connections between the emerging topics and arranging them under the main themes is the final phase of the analysis process. The topics of ***impact***, ***creation***, ***learning***, and ***challenge*** have been included in the main topic of **strengthening professional commitment**, a concept I have introduced based on my prior knowledge of the literature (at this stage it is already possible to use the researcher's constructs).

8. RESULTS

The purpose of this chapter is to present the results of the empirical analysis. Kassai-Pintér-Rácz (2017) suggest listing the main topics and emerging topics in a table for IPA research and then presenting them one by one, to which citations should be assigned and the perspective of the interviewee and the researcher should be displayed in the text. Accordingly, I will first describe the topics that emerged during the analysis, which coincide with the meanings made by the subjects to the HR chatbot, and then I present them in detail. Following the methodological recommendation of Hsiao-Wu-Hou (2008), I explore how the initial senses of the HR chatbot evolved as a result of new experiences gained during use. When I present the discovered meanings, I describe the source of the subjects' interpretations based on the classification discussed in Section *4.2.1* (Mesgari-Okoli, 2019) and the actions that followed (based on the grouping of Sandberg-Tsoukas (2015)) (*4.2.2*).

8.1 MEANINGS MADE BY THE HR PROFESSIONALS

The sensemaking process begins when individuals experience a new, surprising event that interrupts their continuity and creates uncertainty in them. To reduce this, they name and interpret unknown cues from the environment, that is, place them on their internal mental map, which also defines their actions. New experiences gained through their actions shape the initial sensemaking. The next section (8.1.1) describes how the introduction of the chatbot was perceived by HR professionals as an event, their attitude towards technology, the initial meanings (main topics) given of CARL, and how these meanings shaped their actions toward the virtual agent.

8.1.1 Initial sensemaking

Table 20 shows how HR professionals interpreted CARL's organizational implementation, what attitude they had towards the chatbot, what initial meanings they made of the technology, and how their first actions regarding the chatbot evolved. Rows marked in gray in the table (Table 20) indicate that a *sensemaking process has been induced.* In the case of two event interpretations, it can be said that they did not create ambiguity among the subjects, so they did not have to try to find plausible explanations to restore their continuity, i.e. the sensemaking process did not start in these cases.

Table 20 Initial sensemaking process induced by CARL

Event interpretation	Attitude	Initial meaning	Initial action
Novelty	positive, openness, excitement	privilege	discovery
Distrust	negative	surveillance system	resistance
Fear	negative	automatic system	resistance
Task	neutral	non-sensemaking	performing a task
A task for others	neutral	non-sensemaking	ignorance

Source: own edition

HR professionals have interpreted the organizational implementation of the CARL chatbot differently. For some subjects, it was a ***surprising event***, a ***novelty*** that filled them with excitement and interest, as the appearance of the virtual agent gave them the feeling that the organization was extremely innovative, which also meant they had the **privilege of using the technology:**

"When I first opened it, I had such a futuristic feeling that it was unbelievable that such things could already happen in Hungary." (Lilla)

The interpretation of the organizational introduction of the virtual agent as a privilege resulted in the open-mindedness of the subjects and led them to **explore the technology**, i.e. the immediate willingness to learn about the features of the chatbot and to incorporate its use into their daily routine. Their experience of using the chatbot was that the interface was simple and easy to learn, which further strengthened their positive perceptions of the technology:

"I remember, for example, when I had to deliver a tax credit statement at the beginning of the year, I went there and immediately tried to find it there, I didn't write to anyone, and it was very positive. It was the first time I really tried it and I didn't just go up to it." (Lilla)

"From the very first moment, I thought CARL would be really useful because it's very easy to use and really useful, so I use it for my own work daily anyway." (Petra)

CARL's organizational appearance aroused ***mistrust*** in some of the subjects, which came from two sources. On the one hand, there have been doubts among individuals as to whether the chatbot will be more useful than previously used technologies, which they have found to be cumbersome, slow to use, and therefore not worth using in their work. Distrust was also caused by a lack of knowledge about the use of technology, which led to the assumption that they were subject to a **surveillance system** that tracked their activities, so they needed to be careful where they clicked and what they did. Experiencing the threatening sense of control led them to take action to **resist** the technology, not to use it:

"Basically, I think, and from the beginning, I thought it was very helpful. But obviously, when a new system is introduced, it will be that no matter how digitalized we are, it is not necessarily a better solution than the previous ones. Before that, we actually had an intranet page, or we still have it, and if we had to search for any document or policy, for example, we could basically get there, which I really hated, because I could never find anything on it. Obviously a little exaggerated, but it took me hours to find what I wanted." (Petra)

"I have not used the chatbot in a very long time. I was distant from it because; I am distrustful when I am online and in digital stuff like that; it was always my first thought, what to do if I click and do something? Who sees it, then? What are you doing there in the background? What will they now use it for?" (Csilla)

The virtual agent's organizational appearance also caused ***fear among*** some HR professionals, which, like distrust, resulted from a lack of information about the operation of the chatbot. The existence of uncertainty prompted subjects to find an explanation for the technology which, as a result of this process, was interpreted as an **automatic system** that brought with it **resistance** to its use, as this interpretation was not reassuring for the HR professionals concerned:

“I remember when I heard of it, and it was a little weird that it was really a robot, so it could send something by itself; I was more scared, too, and I said, if it is really necessary, I will use it, but I rather would not.” (Csilla)

There were also two event interpretations among subjects that did not elicit a sensemaking process. Such was the interpretation of the introduction of the chatbot as a **task** that did not differ from the subjects’ previous experiences, so it did not create ambiguity, did not interrupt their continuity in their organizational existence, so they acted simply **by completing the new task**:

"I noticed that CARL was introduced, I did my job and that’s it." (Fanni)

“I liked the fact that there was a pretty solid frame for this, so we didn’t start from looking for a supplier and have a contract with him, we started from that there is a package, we have a central idea of how to do this process and that it has a target date. I think it was a very well-defined task.” (Kitti)

There was also no ambiguity about the perception of technology introduction as a **task for others**. The subjects' experience that the chatbot did not affect their work did not force them to address the fact that the chatbot appeared, so they did not notice any discrepancies from the environment. This kind of placement on the mental map did not induce action towards the virtual agent, i.e., its use **was ignored.**

“I did not particularly deal with it because I did not perform any task related to it. I did not feel the need to use it.” (Judit)

8.1.2 Current sensemaking

The experiences gained with the chatbot in the initial technology adoption phase have shaped the meanings made of the digital assistant. The data analysis revealed that some subjects for whom the technology introduction did not generate a sensemaking process made sense of the chatbot later based on their experiences gained with the chatbot which resulted in positive attitudes *(“I noted that CARL was introduced, I completed the task and that’s it. And now, I really like CARL.”* – Fanni).

(*"When I found out, I didn't particularly deal with it, there was an email about it, I didn't have to add anything professionally then. I did not perform any task related to this. I didn't feel the need to use it. Now I can feel it, not like in the first period, I direct the employees there, and I'm CARLing it too. I'm already using it."* - Judit). However, it has also become apparent that some HR professionals still do not interpret the chatbot as an ambiguous organizational phenomenon, so they do not make sense of it or restore their actions, as there was no rupture in their continuity (*"Well, Carl is really one project among the others."* - Petra).

Table 21 Main topics and emerging topics based on interviews with HR professionals

Main topic	Emerging topic	Source of sensemaking/ interpretation	Result of sensemaking
Strengthener of professional commitment	1. tool of influencing 2. creation 3. learning 4. challenge	*Individual- identity shaping selves* ▪ professional self ▪ psychological self	restored action
Google search engine	1. search engine 2. HR's Google 3. Siemens's Google	*Individual-cognitive resources* ▪ existing knowledge structures ▪ past experiences	restored meaning
HR digital assistant	1. future HR assistant 2. help 3. transformation of work	*Individual- identity shaping selves* ▪ professional self ▪ psychological self ▪ social psychological self	restored meaning
		Organizational resources ▪ compliance	restored action
Project	1. one project among the others 2. a clear task 3. leading project	*Individual- identity shaping selves* ▪ professional self	non-sense
		Organizational resources ▪ compliance	
Tool of digitalization	1. strategic objective 2. positive change	*Organizational resources* ▪ compliance ▪ functional integrity *Manager-specific* ▪ organizational strategies	non-sense

Source: own edition

In the current stage of technology adoption, five interpretations have emerged for the

chatbot, including the virtual agent as a **strengthener of professional commitment**, Google **search engine**, **HR digital assistant, project,** and a tool of digitalization (*Table 21*), three of which have developed as a result of a sensemaking process. During the data analysis, it was outlined from which sources the sense made of the HR chatbot and the technology interpretations came, which I classified based on Mesgari-Okoli (2019). The results of the sensemaking process also became identifiable, which I interpreted based on Sandberg-Tsoukas (2015). The following subsections present the meanings (8.1.3.1; 8.1.3.2), technology interpretations (8.1.3.3; 8.1.3.4; 8.1.3.5) made of CARL, and the actions derived from the meanings.

8.1.3.1 Strengthener of professional commitment

During the analysis of the interviewees, it became clear that a deeper understanding of CARL's operating principle in the later stages of technology adoption and new experiences gained during the chatbot-related tasks resulted in positive feelings and openness among HR professionals:

"My attitude towards CARL has changed because I have talked to the founding father or such a great caregiver, and I liked it even more. I was even more amazed at how many things the system is capable of. You know, you could learn things from him, what do employees often look for." (Lilla)

The development of the virtual agent **strengthens the professional commitment** of HR professionals through the experience of several factors. This impact of the chatbot is significant for both individuals and the organization because professional commitment refers to an individual's attitudes toward their profession that affect their behavior (Blau, 1985), namely their identification with professional goals, which contributes to being committed to the workplace in the long run (Koltói-Kiss, 2020) and thus be part of the organization. Experiencing the ***impact on others*** *through* the performance of CARL-related tasks, including immediate feedback, played a significant role in strengthening the professional commitment of HR professionals, which induced positive feelings:

I love working on the chatbot because the results of my work are immediately visible. Feedback also comes immediately from colleagues; they love it. We look at the statistics and will be very happy if our colleagues can find the information as soon as possible." (Fanni)

"I think I like CARL, my relationship with it is pretty positive, it feels good that it belongs to me too, and I can tell my close colleagues to feel free to direct their development suggestions for the chatbot to me. I am proud to be involved in such tasks. I am always waiting for the reaction of the employees. Because of CARL, there is indirect feedback on my job, they don't usually stroke my shoulder for doing tasks related to my other job, if they don't complain anymore, that's a lot of feedback." (Judit)

In addition to the impact on the members of the organization (the experience of the meaning of their work), CARL's care also means the experience of ***creation*** for certain subjects, which at the same time provides them with an experience of relaxation and creativity compared to their other work:

"Working on the chatbot is a good experience because we are shaping it, and it is creative compared to my other monotonous tasks. I never got bored of it. I really like doing it." (Fanni)

In addition to the above-mentioned aspects, identification with professional goals is enhanced by the acquisition of new skills required for the chatbot-related tasks, i.e. ***learning***, which is also a ***challenge*** for the subjects. However, all this keeps them moving and they can experience little success as they progress through the stages of development, which is essential for their long-term organizational well-being:

"It's good to work with CARL, it just requires a different kind of thinking. The hard part is that you have to think with the brains of others, there are a lot of possible questions, so it's better for more people to do it. It is not so easy to give input to the robot without knowing what questions might come to it. It's a good learning task for us too." (Fanni)

"It all encouraged people to learn new skills. CARL is definitely a new area for me where I could try myself and never know or use anything like it before. A new challenge, a new approach." (Judit)

Experiencing the chatbot-related tasks as an impact, a creation, learning, a challenge resulted in the **enjoying the development (care) of the chatbot** among HR professionals, which is not only positive for the subjects but also for the organization, because in this case, the employee behavior is congruent to the company objectives. The meanings given by this group of HR professionals come from the identity shaping selves, including the professional and psychological selves (Mesgari-Okoli, 2019).

8.1.3.2 Google search engine

All subjects in the study group said during the interviews that CARL was *"a Google search engine"*. The chat feature of the virtual agent became available in Hungary only in September 2021, according to which the members of the organization could only use its search function for two years, which explains how individuals placed the chatbot on their mental map. The comparison of CARL to a **Google search engine** came from the cognitive sources of individuals, more precisely from their existing knowledge structures and previous experiences (Mesgari-Okoli, 2019). Within the Google search meaning, various sub-meanings have been outlined. Some subjects have interpreted CARL as a ***search engine*** and have tried to define the meaning of the chatbot based on their prior knowledge of the technology:

"*The structure itself, I think, absolutely follows today's trends that you get push notifications on what might be important to you. This is followed by a search engine where you can put what you are looking for, and you get as a results document, policies, emails, and anything else, and below it, the most important links that an employee can use, be it our job advertisement, a time and attendance systems, so our structure is simple yet good*." (Kitti)

"I basically still compare it to Google because it's obviously the same logic behind it. Its main function is the search function, it looks practically the same or it doesn't look the same, but obviously, it has the same function as a Google search engine, so you type in a search term and then it finds the documents, forms, and regulations relating to it." (Petra)

Another group of subjects interpreted CARL as ***HR's Google***. It can be seen from the responses of these subjects that it is important for them to highlight that this technology belongs to the HR department and not to the company-wide search function:

"CARL could be an HR Google. It can work on absolutely similar principles. At the given time answers the given question." (Judit)

"You can share information with colleagues, so the search engine is just one thing, and it's actually starting to be the collection page for HR topics right now, so now it's the main channel." (Csilla)

However, comparing it to the Google search engine reveals that for individuals, based on their existing knowledge of technologies, this is the most obvious, closest wording to CARL, however, individuals point out that the virtual agent does not yet work like Google search as it cannot answer all questions so these subjects named it as ***Siemens' Google:*** *"So it's like Google, but it's not as smart, because it requires a lot more human resources than one would expect from an artificial intelligence. So that was more of what shocked me so much that you still have a lot to add to make this machine work. Google is like typing a word out there, and you're right there. Here, if there is nothing, you can't suggest anything else. CARL is the Google of Siemens."* (Lilla)

8.1.3.3 HR Digital Assistant

When asked *"What is CARL?"*, HR professionals all replied that *"a digital assistant"* suggesting that they have taken over the name of the technology conveyed by the organization. *(So basically, it's called here this way, we communicate towards employees that CARL is a digital HR assistant, so this is the wording we communicate."* - Petra), which does not mean, however, that they give the virtual agent the same meaning as the actors responsible for implementing the chatbot. The analysis of the subjects' detailed answers to the above-mentioned question revealed differences in the meaning of **HR digital assistant**. Some individuals, despite using the organizational name, see the chatbot as a ***future HR assistant****:*

“Maybe one day it will become an HR assistant. For now, it is a Google search engine. I would not say HR assistant yet because the chat is still a very fresh function” (Fanni). This meaning stems from the perception that the subjects concerned do not yet consider the technology to be sufficiently advanced.

CARL’s interpretations as an HR assistant also include looking at the virtual agent as ***help***, which brings with it the action to get the technology into the post-adaptation phase, that is, to integrate into the daily routine of employees, thus becoming meaningless (Hiso-Wu- Hou, 2008):

"It depends, on what we mean by a digital assistant, but I basically think CARL is someone, obviously in quotation marks, someone who can be seen as a colleague who is really available at any time, compared to a human colleague." (Petra)

“The chatbot is a help to us, I would rather say that. Someone who supports us in the background. But I would not personalize it.” (Csilla)

“It would be nice if you could take over more and more things and let everyone know you have and can use it. A call or an email will come in and I’m not going to gather the info for my colleague, I’ll direct it to CARL to type in and they’ll find everything there. The first is to link it. If there are other questions for which you do not get an answer, search. It’s still not as widespread in the life of the organization as it should be. It takes a lot of time to write an email, especially if your colleague has a hard time understanding it. It’s around 20% of what the chatbot takes over, 80% still turn to me directly. I also put CARL in my signature; we try to find channels where you can promote. Employees are used to looking for whom the subject belongs to.” (Judit)

However, not all HR professionals are so consistent when it comes to promoting technology, even though they see the chatbot as help: *“If I’m near a deadline and I’m overwhelmed, that’s a good help for me. If I have time, I will be happy to respond to the workers.”* (Fanni). Thus, it can be seen that the subject does not interpret CARL as an unavoidable, exclusive organizational technology, as they are inconsistent with using it, which can also be explained by the fact that most HR professionals like to interact with their colleagues, during which they can support them in both professionally and personally:

"Right now, I feel like it's a very important part of the organization. I can see in myself too, what I think a lot of my colleagues are going through, at the beginning it was a bit distant, and now, in the perspective of two years, it has become much closer to me, so it could be just a smooth change. We went through it emotionally and accepted it. We've seen what its advantage is now, and we're glad we have it. I think it's modern and can really help colleagues. If we can keep communication and social interaction on other topics, I think I will continue to be happy." (Csilla)

Accordingly, some subjects interpret CARL as an entity that ***transforms their work***, which induces ambivalent feelings, because despite the advantages of the technology - which allows them to perform more meaningful tasks by which it reduces redundancy - they also experience disadvantages, namely, reduced interactions, that suggest to them that employees will not need them anymore. In addition, they perceive it as a threat of a transformation of their current job, which will force them to rethink their careers:

"On the one hand, I'm very happy with CARL because I'm much more strategic, I can deal with other things than sending a form or answering an extremely basic question. On the human side, I cry because I really like it. For me, one of my basic elements is that I discuss with colleagues, I talk, in addition to giving professional advice, I also deal with the human side a bit, and then I listen to them, I used to ask how they are." (Csilla)

"I think it's very good because I don't have to send that statement to the fifteenth person anymore, or I won't always have to look up the rules. But my second thought, of course, is that it's good, and then how long will it they need me? My third thought, but it may be just my individual, so to speak, I have an attitude that okay, what can I learn that will make me smarter than CARL, which will allow me to move out of this position because I realize that the development of this tool is still giving work, it needs to be taught, but after that, it will do it alone. Where can I go then?" (Csilla)

Interpreting CARL as a digital assistant has led to different actions: some subjects **consistently directed employees to it** in line with the organizational goal of completely replacing e-mailing with chatbots, while others are characterized by **inconsistency** and

only send employees to the virtual agent when they were busy - restoring their interrupted continuity as a result of their action (Sandberg-Tsoukas, 2015) - which can be explained by their needs for social relationships and their desire to preserve an important component of their professional identity, which is the experience that workers can count on them.

Regarding the sources of sensemaking, on the one hand, the identity-shaping selves, including the professional, psychological, and social psychological selves (Mesgari-Okoli, 2019), play a significant role in shaping the interpretation of the chatbot as a work-work-transforming entity considering their ambivalence from experiencing less and less social interactions and thus satisfaction. The interpretation of the chatbot as help comes from the professional self, while the communication about the virtual agent as an HR digital assistant comes from an organizational source (Mesgari-Okoli, 2019), namely the compliance with the organizational rules, hierarchy, and job descriptions.

8.1.3.4 Project

The experience gained during the subsequent use of the technology did not induce a sensemaking process among HR professionals who interpreted the chatbot as a **project**. Among the research subjects were those who saw the CARL-related tasks as one project among their other projects:

"It didn't really affect me that I got CARL as a new project, it wasn't like oh my God, extra work and I'll get overloaded, it was perfectly fine so. I've had such a mix for a while now that I have multiple tasks, so I thought of it as the next project I got, so CARL is actually one of my projects among the others." (Petra)

"My colleague is mainly doing this project and I support them to the extent that CARL is a constant part of my email signature, and we always write what colleagues find where. We are absolutely involved in the promotion. That didn't change my specific task, but it got added as an extra topic." (Csilla)

It can be seen, therefore, that the new tasks arising from the organizational application of the virtual agent do not constitute ambiguity for the subjects, but are even interpreted as a ***clear***, well-defined ***task***:

"I liked the fact that there was a pretty solid frame for this, so we didn't start from looking for a supplier and then having a contract with him, we started from that there is a package, we have a central idea of how to do this process and that it has a target date. I think it was a very well-defined task." (Kitti)

The associations related to the project are positive, not only because consolidating and taking care of the organizational application of the chatbot is a clear and manageable task for individuals, but also because of the subjects' narrative that the organization is at the ***forefront with this project***, it is better than other organizations:

"I really see more and more companies trying to go in something like this, but not everyone succeeds. Rather, there are only big words and initiative, but concrete implementation is very rare. And here is this project that has actually been implemented, and they have been trying to develop and improve it ever since. Not only do we leave it rusting there, but they also deal with it." (Lilla)

The previous interpretations imply that the actions are not called into question, thereby **operating following the organizational objectives,** namely **the performance of tasks** related to CARL. Among the sources of interpretations related to chatbots are the professional self (coming from the identity shaping selves), as well as compliance with the organizational rules, hierarchy, and job descriptions regarding the organizational sources (Mesgari-Okoli, 2019).

8.1.3.5 Tool of digitalization

CARL chatbot also did not generate a sensemaking process among HR professionals who interpreted the virtual agent as **a tool of** organizational **digitalization** that fitted into their previous image of the organization without causing the discrepancy. These subjects did not question CARL's raison d'être, as they agree with the company's ***strategic goals*** and see changes in the external environment that require this ***positive change***. Accordingly, the continuity of these individuals in their organizational existence was not interrupted, so they did not have to find plausible explanations to restore it. In terms of their actions toward the virtual agent, **they act following organizational expectations**.

"Basically, I'm also committed to CARL at the company level, because digitalization is a pretty significant goal for Siemens." (Petra)

"I think that's what we see in today's world, and then what was a very important driver of this change is that we're digitalizing the core functions we find in a classic organization, including, communication, HR, procurement, so we are using more and more digital platforms, and our employees need to use them as well, which makes collaboration easier. And I think CARL came to us under the auspices of that. It is definitely a positive change for the organization if we move towards digitalization and move forward." (Kitti)

"As far as CARL is concerned, I think we have to catch up with time, so we can't get stuck because the competitors are rushing past us in the meantime." (Csilla)

Their interpretation of technology stems on the one hand from organizational sources, including the conforming behavior defined by Mesgari-Okoli (2019), i.e., agreeing with organizational rules, hierarchy, and job descriptions, and striving to maintain functional integrity, that is, to ensure organizational survival. their consistency. Following the interpretation of organizational strategy, which Mesgari-Okoli (2019) names as one of the resources specific to managers, can also be identified as a source of their interpretation.

8.2 MEANINGS MADE BY THE EMPLOYEES (GENERAL USERS)

In the next subsection (8.2.1), I present how the introduction of CARL was interpreted as an event by the employees (general users), what characterized their attitude towards the technology, what initial meanings they made of the virtual agent, and what actions these meanings generated.

8.2.1 Initial sensemaking

As a result of the analysis of the interviews with the employees, four event interpretations were outlined, two of which did not lead to a sensemaking process, as in these cases the subjects' expectations coincided with experiences when using CARL. It has also become

apparent that the lack of a sensemaking process has brought employee behavior congruent with organizational objectives, i.e., they used the chatbot. However, the event interpretations that induced the sensemaking process (the rows marked in gray in *Table 22) generated the avoidance or rejection of the use of the virtual agent.*

Table 22 Sensemaking of CARL in the early stages of technology adaptation

Event interpretation	Attitude	Initial meanings	Initial action
joy	positive, openness	facilitating operation	trying its functions
necessity	neutral	digitalization tool	use
non-recognition	negative	another useless tool	avoidance of use
distrust	negative	becoming a test subject	rejection of use

Source: own edition

The group of research subjects who interpreted the introduction of CARL as a ***joyful event*** had a positive attitude and were open to the chatbot, which resulted from finding the chatbot useful, and interpreting **it as a tool to facilitate their daily operations**. The capabilities provided by the chatbot matched their expectations, i.e., the appearance of the virtual agent for these subjects did not generate a sensemaking process. All this meant that even during the initial phase of technology adaptation, they regularly visited the CARL platform and **tried** out its functions.

"Basically, I support any initiative that can make any process more efficient. When we got the email about CARL's introduction, it was still my first thought that it would probably not be introduced overnight in a way that everyone would really use and be happy with, but it was definitely worth a try, so I supported it." (Csaba)

"I remember when I found out they're introducing it. And I love things like that. When they launch an app - let's stay with CARL now - it always brings me the message that something will work in a structured way. This is important to me because, on the one hand, my work is like that, and I am like that in my own head. So, I have to see how are things built." (Anna)

Interpreting the chatbot as a ***necessary organizational event*** also did not induce a sensemaking process: "*These innovations are part of our lives, so the introduction of this interface also served this purpose"* - Martin. This group of subjects experienced the appearance of CARL as neutral, and the lack of expectations about the chatbot resulted in no discrepancy, so they didn't have to make meaning of the virtual agent to reduce cognitive dissonance: "*It didn't affect me too much, so I had no expectations until I started using it. Well, you don't look for such things every day"* - Bence. These organizational users have placed CARL as a **tool for digitization** on their mental map and are beginning to incorporate its **use** into their daily lives as they perceive the benefits of using the chatbot:

"Now, as life changes, just as we look at an international organization, we don't necessarily look for things on the computer from the administrator, but on the intranet, but there are also below-surface places of where, under which organization, under whose name we find a document, a valid document, so this must be added. It helped us a lot when we typed something in the field for CARL to fill in." (Martin)

"Mostly, if I want to look it up, e.g. I got something in the email, oh, what exactly was that? then it's easy to find it on CARL, and you can get such a more global picture, if I want to update my knowledge a little from time to time, it's easier to do it in such a central place than to read the news back." (Csaba)

There was also an interpretation among employees that led to a negative attitude towards the virtual agent as employees did not understand the chatbots' benefits and the chatbot was not taken seriously *("I know this could be taken more seriously, but somehow the focus is not here."* - Tibor), which stemmed from the bad experiences with the digitization tools introduced in the organization earlier. As a result, the chatbot was interpreted as **another useless tool** out of many: *"Well, the introduction of the chatbot did not affect me well because when a new tool or any new thing gets into our lives, it usually means technical problems arise, and it causes stress about the device. When I found out they were introducing it, I thought it was something stupid again."*- Gabriella. This interpretation resulted in the employees trying to **avoid using** the virtual agent and obtaining the information they needed in the usual way: *"Options are good, I asked it*

some questions, and checked and learned it was fun, this is where you click. Obviously not bad anyway. I just don't know; you still have to get used to it. The toolbar is very new, and I don't think I'm that old yet, but I'm used to being able to visit HR professionals at any time." (Olivér)

The introduction of the chatbot has created ***distrust*** among subjects who have had negative beliefs about artificial intelligence and robots, which has led to interpreting CARL as a **test system** through which the chatbot can learn: *"I don't like chatbots. I have a very strong, let's say, antipathy about chatbots. The basis of chatbots is that it should be a self-learning system, and a lot of companies have introduced it. Let's call chatbots in the beginning like a toddler with a sponge in his brain and then try to fill it with information and get as much information as possible or get feedback on whether it's good or not, from then on you can learn as a self-learning system. I don't really like the fact that I'm the subject on which these things are tested and this system learns through me, and unfortunately, I think it's introduced in places where there are critical issues because somebody wants to manage something, and then a chatbot with the intelligence of an 18-months-old child saying something to me there, and once I want to manage something, I get crazy."* (Tibor)

Employees who don't trust CARL are afraid of it, **refuse to use** it, and have strong negative feelings about the technology: *"When I first got the info that there was this CARL-thing, I checked it out, and then I haven't chatted with it since then"* - Tibor. *"People have such a fear in their lives about new things. I don't think it helps these things; it hinders them"* - Gabriella. "*Anyway, I don't think we'll get to finding information faster if we start typing into the chatbot. We start asking around."* (Annamária)

8.2.2 Current sensemaking

The experiences gained using the chatbot did not always lead to employees making sense of the virtual agent. The attitudes of some subjects have not changed at this stage of technology adaptation, and as a result, these individuals have made little effort to incorporate the application of CARL into their organizational lives. *Table 23* illustrates what meanings the employees attributed to the chatbot, what sources these meanings

came from (based on Mesgari-Okoli (2019)), and what results it led to (based on Sandberg-Tsoukas (2015)).

Table 23 Main topics and emerging topics based on interviews with employees

Main topic	Emerging topic	Source of sensemaking /interpretation	Result of sensemaking
self-service system	1. self-service support tool 2. self-service rejection toll	*Organizational resources* ▪ compliance	restored action
		Individual- identity shaping selves ▪ social psychological self *Individual-cognitive resources* ▪ attitude	
operation facilitating tool	1. time-saving tool 2. a tool to help you become more competent	*Individual-cognitive resources* ▪ attitude, goals	restored sense
		Individual- identity shaping selves ▪ professional self	
search page	1. collection page 2. search engine 3. intelligent website	*Individual-cognitive resources* ▪ existing knowledge structures ▪ past experiences	non-sense
			no restored action
HR assistant	1. rudimentary tool 2. a tool to assist in private matters 3. a tool to help with HR topics	*Individual-cognitive resources* ▪ existing knowledge structures	restored sense
		Individual- identity shaping selves ▪ psychological self	
		Organizational resources ▪ compliance	non-sense

Source: own edition

8.2.2.1 Self-service system

Interpreting CARL as a self-service system carries opposed sub-meanings among the subjects. Some employees saw CARL as a ***self-service support tool***. They took the time and energy to learn about and use the technology, freeing the HR department from redundant questions. These subjects felt empathy with HR professionals, wanting to take responsibility for their own organizational existence, the source of which is agreement with organizational rules, hierarchy, and job descriptions (Mesgari-Okoli, 2019):

"I think this is for or will be for you only have to deal with things that have real added value, and not such a small day-to-day administrative task.

So, I am happy to struggle with that, because conversely, that's what I expect from our customers when they call about a technical question to open the user guide because it's on the first page what they are asking." (Csaba)

The behavior of this group of employees is characterized by the fact that they regularly **try** out the functions of CARL, **make efforts to learn the technology**, and **teach the chatbot.** They therefore believe that the existence of a virtual agent gives perspective to the organization:

"Yes, I use it. I've tried the chatbot once before but with more or less success, rather less. But to put it this way, I am an experienced Google user, so I approached it this way. I didn't formulate complete sentences, but I reworded the keywords that seemed relatively simple, if there were no results, I typed in a different word, so that's how I approached it. It virtually gave me the feedback to every question that "I'm sorry, I couldn't answer", and offered the two things most people were looking for. And then out of eight attempts or ten, I don't know, it happened six or eight times when I had already written specifically those four letters or the name of that tool, then I had really managed to find it already." (Kristóf)

"I experienced in a previous job when a colleague resigned, they dealt with something that you would never know because only they knew. And I like it so much here, for example, that CARL is smarter and much more structured. And I think in this he is a partner, it's all in one. Just look for it!" (Anna)

The chatbot appears on the mental map of some individuals as a **self-service rejection tool**, as the presence of CARL has made their social needs even more perceptible in their interactions with HR professionals, which they insist on with the advent of the chatbot:

"When I found out they were introducing CARL, I watched it like, okay, but I'll call HR if I have a problem. I like to talk. The chatbot does not necessarily meet my needs." (Olivér)

“But somewhere it would be good if you didn’t impersonate what we used to call human resources, and what we now call people and organizations. I think it would be detrimental to completely rule out the human factor in this genre, the genre of HR. So, we will need HR professionals, that's for sure.” (Martin)

This sub-meaning also stems from the impatience of the workers concerned, who do not want to put extra effort into learning the technology. So, employees **avoided** the change caused by the technology and the **use of CARL.** The sources of this meaning are the social psychological self (identity shaping selves), and the schema (cognitive resources) (Mesgari-Okoli, 2019).

“At the moment, I’m like I don’t have such big requests, and I can usually handle them in person, so I’m not CARLing. So, I don’t have the patience for that, and I don’t have the time, I think. If we are all not sure, we’ll call Csilla, or Nándor, or anyone we can reach super quickly, and then CARL somehow doesn’t come into the picture.” (Tibor)

"I think we're still thinking it's easier to ask someone than to search for something in CARL for hours." (Annamária)

8.2.2.2 Operation facilitating tool

CARL was perceived as an operation facilitating tool by employees who felt that the chatbot ***saves*** them ***time*** (“*Well, CARL is a helper who can save me time in my work”* - Gabriella) and provides them with information that makes them ***more competent*** in the eyes of their colleagues. These positive meanings shape the actions taken towards the chatbot so that the subjects **turn to CARL** when they **need information quickly** or incorporate the **use of a virtual agent into their daily work** to keep them up to date, making their work more professional:

“It’s absolutely good that as soon as you click on it, the answer comes right away, you don’t have to wait if it had typed anything there. It was absolutely good, and the answers made sense and were helpful.” (Olivér)

"I used to read the information in CARL, and mostly because my colleagues don't only turn to me regarding some course they need, but all other HR and management-related questions, like how things work at the company. I don't like it when things are not done, so I open CARL and search. I'm not saying that I know by heart what all the shifts look like or what's the exact cafeteria policy, but you read something, and you get a vague image, and then you look more competent in the eyes of your colleagues, with them saying like "wow, she could help with this one." (Anna)

Thus, it can be seen that these employees experienced CARL's help not only as users but also in their professional roles, as the information obtained through the chatbot helped them perform their tasks to a higher standard. Interpretation of technology as a **time-saving tool** comes from individual cognitive sources (attitude and goals), while the experience of becoming more competent through the regular use of the chatbot is influenced by the professional self among the identity-forming selves (Mesgari-Okoli, 2019).

8.2.2.3 Search page

The organizational appearance of the chatbot did not generate a sensemaking process among employees who did not notice the signs of the introduction of CARL (*"As I said, As I said, I think I'm a year or two behind in the functions."* - Kristóf) or have strong resentment against the virtual agent. While it is clear from the former that an individual does not have to make sense of the technology because they do not experience a break in their continuity, negative feelings may induce efforts to reduce uncertainty. However, the results of the data analysis showed that by rejecting the chatbot in this way, the respective subjects would also refrain from making sense of the virtual agent:

"I probably don't know what CARL is. I say this because I haven't used it, I don't use it, for never had to use it, so honestly, I don't know what CARL is. And it could be my fault or because there was this fuss about having CARL, and nothing since then. I'm not looking at these things, I don't click there because I never was in a situation where I'd need to use it. The time may come that I'll be forced to use CARL and I may figure out that it's amazing, but at the moment, I don't know what CARL is, I don't even have any words. Honestly, I have no idea." (Tibor)

In the absence of a sensemaking process, the subjects recollected their cognitive resources, including their existing knowledge structures and past experiences (Mesgari-Okoli, 2019), to interpret technology as a **collection page**, a **search engine,** or an **intelligent website**:

"I basically see it as such a place, such a portal, where information is gathered." (Christopher)

"Search engine, more like a search website. A bit like Google. That sounds a little silly, but it's like that." (Bence)

"I would compare CARL to a slightly smarter website. So, I don't see anything special in it, I have to say. This is like our own child, but I'm not impressed like I never missed it in my life before we had it." (Tibor)

The individuals who did not make sense of the chatbot **did not incorporate the use of the technology** into their daily routines:

"So, I have to say that it's a web interface for me where I can find the right information if I really want to. It is certain that I will not chat with him, we can rule that one out." (Tibor)

"If possible, I will avoid using the chatbot. But there will definitely be a situation where this is inevitable." (Olivér)

8.2.2.4 HR assistant

The interpretation of CARL as an HR assistant was the result of a sensemaking process for two interpretations. A group of subjects reduced their uncertainty caused by the chatbot by recognizing the role of the virtual agent in the organization by defining it as a ***"rudimentary tool"*** but supplemented this definition by saying that it could only *"provide limited assistance"*, thus retaining the option to turn to the HR department.

According to the other sub-meaning the chatbot is ***a tool to assist in private matters.*** This interpretation stemmed from comparing the virtual agent to HR professionals and finding the advantage that in some sensitive matters, such as termination, employee loans, and cafeteria, it is more comfortable for organizational users to turn to an artificial entity. Interpreting CARL as a rudimentary tool has resulted in its **occasional use,** while its interpretation as a tool to assist in private matters has resulted in the **special, ad hoc use of technology:**

"Basically, my opinion hasn't changed. What I want to use is easy for me. I've needed it for one or two things from the beginning, but those work perfectly. But I wouldn't call this click-through thing a chatbot yet." (Bence)

"If someone is interested in the terms of termination, they had to speak about this with the supervisor, a friend at the company, or even with HR. Now there are such opportunities for you to check it out there." (Olivér)

"And maybe you really only have time for things like that at home at eight or nine in the evening. It is everyone's private choice what you choose with the cafeteria or how you modify your statement." (Martin)

Subjects who see CARL as a ***tool to help with HR topics*** did not make meaning of the chatbot and use the wording of management, i.e., their interpretation comes from an organizational source, more precisely, from compliance (Mesgari-Okoli, 2019). The behavior of these subjects towards the virtual agent is characterized by the fact that it was initially tested but **not used later**:

"CARL is an assistant who basically gathers information on HR topics, and provides them to users, in a user-specific way. I can say that I'm getting used to it, the website-level service, or the aggregate part of the chatbot but I don't use the chat function so much, but I may start using it in a year or two." (Zsuzsanna)

8.2.2.5 Employee expectations regarding the development of CARL

The sensemaking process begins when individuals' expectations do not coincide with their experiences. In such cases, they experience uncertainty, for the reduction of which they seek a plausible explanation, that is, they make meaning of the phenomenon that causes ambiguity. *Table 24* shows the experiences of the employees with CARL and the expectations they have towards it, which are their suggestions for the development of the chatbot, therefore their knowledge supports the realization of the practical goal of the thesis, as it contributes to exploring what all hinder the congruence between a company's HR digitalization strategy and employee actions toward CARL. Meanings and actions related to experiences and expectations are also shown in *Table 24*, which has already been presented in Section 8.2.2.5.

Table 24 Employee expectations regarding CARL's development

Experience	Expectation	Meaning	Action
▪ It knows a few topics ▪ You have to scroll down a lot	(1) It should know about more topics (2) Interface for registering development suggestions	**rudimentary tool**	**occasional use**
▪ You have to search for a long time ▪ Stalling	(1) Inclusion of a FAQ section (2) Possibility to save favorites (3) Make the structure clearer (4) Have a simpler search interface (5) Offer contact	**HR assistant**	**occasional use**
▪ Little information about CARL	(1) Education on CARL	**non-sense**	**avoidance of use**
▪ The interaction is task-oriented ▪ It's not like it's really talking	(1) Improving its communication style (2) Suggestion of specific examples to choose	**search page**	**occasional use**

Source: own edition

Employees experienced while using CARL, that it is familiar with only a few topics, so they cannot answer many user questions. Compared to this, employees expect the virtual agent **to be competent in several areas** and to have an **interface** where **development suggestions** on topics **can be entered**:

“Well, in terms of developing CARL, I think it would be worthwhile to expand the functionality. Currently, it can be used related to cafeteria and employee loans, but this does not fully cover the real needs. I hope that by the beginning of the year, you will be able to ask about tax benefits or benefits for those who have children that would help a lot.” (Martin)

“Well, I think it could be smarter. As I saw, it can really help on two or three topics.” (Bence)

“I think things that aren’t in it at the moment or tools not available at the moment should be included, especially those for which people have already searched for. It should be possible to give development ideas on what could be better or what could be different.” (Csaba)

Subjects also expressed a need for a **cleaner user interface**, as well as for **saving favorites** and **creating a frequently asked questions section**, as they perceived that it takes a longer time to search for information they are interested in, which often resulted in asking HR more.

“For me, this amount of information is a lot, I’d rather say. So, everything is nicely put together, but I think you should decide in which direction this website is going. This website is either going in the direction that it’s helping the co-worker, or it’s going in the direction like the internet, and then I’m communicating news because now, as I look at it that way, it’s actually both. In addition to this, I would say so much about the structure that it’s not so good because I have to scroll a lot if I don’t care about the top one. This could be a little better structured.” (Bence)

“Somehow the search parts in it and everything should be made simpler. It's obviously simple, but only for the one who knows it well.” (Gabriella)

“I want to be able to save favorites for myself. But maybe it’s just me that I cannot.” (Balázs)

"There could be a section for FAQ." (Olivér)

Related to their previous experiences, the users expected that the chatbot would offer the **contact details** of the **human employee** who can be contacted if the employee does not find the information they need:

"It wouldn't be bad to have a question option about a particular topic so that if everything fails, you can still call someone. I don't think it's bad, although I understand it is to avoid calling someone right away without looking for anything. The direction is really good. I think there is still a bit to polish." (Olivér)

Some subjects felt that the information obtained when the technology was introduced was not sufficient to familiarize themselves with the virtual agent, which contributed to avoiding the use of the chatbot. They expressed their expectations **for personal education** and **training** in connection with CARL:

"We don't use it because we don't like it, but because we're not so familiar with it yet, it's often easier to ask colleagues. Somehow, I don't even know, maybe if these tools were a bit more stupid-proof or clearer? I rather believe in personal education, that we're there and then we ask there, it's not that we upload a tool and just add instructions for use." (Gabriella)

"Somehow, training or individual tutoring may be necessary. Really, some people like new things and start using them right away, but I don't think it's everyone. And really, the introduction to the culture can only happen if there is an individual introduction." (Kristóf)

Relatively few research subjects have set expectations regarding CARL's chat function. However, organizational users who chat with the virtual agent get the impression that the interaction could be more humanlike if the chatbot not only offered answers but also wrote sentences, and if its **communication style were** i**mproved**:

"I could compare it to Facebook Messenger where you don't really chat, you just choose specific things. If we really want this to be a chatbot, I think it would be better if it wasn't the only one to suggest specific examples of what I should choose. Obviously, he suggests this because that's all it knows, but I think it would be a good idea to keep this chatbot a

little like that, so that if I write something like I talk, he'd really respond. I think that could be improved." (Bence)

"Could CARL be less rigid? Of course, we can't expect such a corporate function to tell us a joke or sing to us, but I think that if they have the time for it and want to improve on it, it would be nice to make it less formal, for example." (Martin)

"It's definitely positive to find what I'm looking for, but at least it's not such a big plus for me to be able to answer in a meaningful sentence or say kindly that there are no findings, but maybe for someone else, it's a great thing that it can provide an interaction you would have with a lovely HR colleague, over the phone or in person. " (Christopher)

8.3 MEANINGS MADE BY THE MANAGERS

The third group of interviewees consisted of the managers involved in the chatbots' introduction. Understanding their perspective is important because they play a central role in identifying directions for the organizational adaptation of a chatbot that can be perceived among employees through the transmission of their understanding of the technology and the resulting expected actions (behaviors). In addition to the previous research groups, it is also necessary to explore the perspective of the actors responsible for digitalization to achieve the practical goal of the thesis, i.e. to identify the reasons for the differences between corporate goals and employees' actions. This subsection shows how the managers involved in the organizational implementation of CARL think about the organizational presence of the chatbot, what meanings they attribute to the virtual agent, and what actions they expect employees. The meanings made of the technology and the expected employee actions are shown in *Table 25*.

Table 25 Meanings made by the managers of the chatbot, and actions expected from employees

Meaning	Expected action	Expectation target group
a tool for transformation	▪ Make it the primary channel for users	employees
	▪ Explaining the benefits ▪ Introduction ▪ Development of technology ▪ Rethinking operational processes ▪ Organizing resource needs	HR
	▪ Change management	HR executives
a tool for keeping up	▪ Persuasion to use ▪ Continuous updating of background information ▪ Strengthening promotion	HR
	▪ Reach the entire organizational staff	decision-makers
infotainment	▪ Users use it without a specific purpose	employees
	▪ CARL's daily education	HR

Source: own edition

Some experts saw CARL as a **tool for transformation**. The analysis of the interviews outlined that these subjects thought that the chatbot truly enables transformation because, compared to previously introduced technologies, the chatbot is interpreted as a well-designed innovation that offers a real solution: *"What was obvious to us HR professionals is that we have often found that we are introducing all sorts of global tools or software that we did not immediately see to have tangible benefits. It was like we already had a local solution that was pretty much the same as the global one, or that we really didn't solve a problem with it that would have been a real problem or that would have been a real challenge locally. But CARL solves a problem that it shares and searches for information in the most user-friendly way, which was really a shortcoming at the local level in the organization."* - Nándor.

Interpreting the chatbot as a tool of transformation implies an expectation for employee action that CARL should be the **primary channel** they **use**: *"Obviously, this is also the only way for us to receive inquiries and start processes. Through this, we handle the incoming needs, really at a level close to almost 100%"* - Nándor. Linked to this goal are the actions expected of HR professionals, including raising **awareness of CARL** and its **benefits** and also, the **improvement of the technology**:

“The goal is to make it as widespread as possible and used by colleagues, because as I mentioned, we’re putting a tool in their hands that they can really easily use for looking up things, so we really have to break the ice to make them get there to open it and look at it at least once, because if you have done that, then they will obviously see how easy it is to find and how easy it is to use.” (Nándor)

The transformation brought about by the organizational implementation of the chatbot induces **change management challenges** for HR managers, as in addition to **rethinking their operational processes** and **planning their resource requirements** to operate the technology, HR employees need to be convinced of the benefits of using CARL:

“I always hear from HR that ‘I don’t have time to teach CARL because I have to pick up the phones’. I tell them to only try for an hour not to pick up the phones and deal with CARL until then.” (Bálint)

"It's also important for HR management to understand that despite the initial difficulties, this direction can be maintained and it needs to be explained, which is a challenge for the organization, that this is obviously an extra task for them, but this direction needs to be maintained." (Nándor)

The interpretation of CARL as a **tool for keeping up** has also emerged among managers**.** This technology interpretation stems, on the one hand, from the fact that subjects see the competitive environment as requiring increased digitalization, and on the other hand, due to the company's internal capabilities, including high headcount, and employee needs, it is necessary to increase efficiency through fast service self-service systems:

“The business, the world, and our colleagues are getting faster and faster, we can’t get stuck on a paper basis, we can’t get stuck in personal relationships, even if it hurts my heart that these are shattered together, but nonetheless, colleagues need the information right away, they need to move fast. Simply because of the quality of our services, we can't afford to lag behind, and this is sure to be the next step in introducing this and that's the way we go.” (Krisztina)

“We are following current market trends; we are becoming more and more mobile. This, I think, is one of the big motivators for CARL, and the other is perhaps how we keep in touch with colleagues, not necessarily in person, but in many cases even here, due to staff pressure on the organization, this is no longer the classic customer-focused HR but an online, more self-service way of working.” (Barbara)

“There are often criticisms of our organization that they don’t know who is dealing with what when they are replacing whom, and who they can turn to. They don't have to deal with this here, but there is an interface through which they can file a case, and then we'll work it out in the back office. So I think that means a much more stable and predictable operation from the service provider's side as well.” (Nándor)

Linked to this interpretation of CARL is that experts see the benefits of a virtual agent and bring with it the expectation that HR employees **should convince** employees to use the technology regularly:

“CARL’s advantage is that it can react really quickly, so it can answer right away. It’s also very important that he’s available at all times, so he’s there 24/7, he doesn’t get tired, he doesn’t have to sleep, he’s not hungry and he doesn’t ask for salary. Even if there were temporary errors, we need to convince our colleagues that it was just a temporary error. Especially that the 100% confidence that has not been there so far may be diminished even more. (Krisztina)

“Obviously, there are features that are a step backward from the point of view of a given colleague, as so far they have been able to start a process by sending an email or in any other form, or asking something for which he has received some quick response. In comparison, you really have to enter the data into a tool now, and it's a challenge to explain the benefits that the user may feel.” (Nándor)

Experts highlighted the dangers of CARL that without constant updating, users may be disappointed, so the HR department should pay close attention to **constantly improving the digital assistant's background information** and uploading the latest documents: *"It would make sense to review the documents again to what is being uploaded, what may have changed in the meantime, which link is working at the moment.”* - Barbara.

"The goal is to keep it up-to-date so that the latest regulations and the latest information are always available through it." - Nándor. In addition, expectations have been set for HR to strengthen the branding of CARL: *"Now, by the way, I would promote reinforcing communication to update people that this should be used."* - Barbara

Some subjects in the study group mentioned a problem that more than half of the company staff, physical workers, cannot use CARL because they do not have access to the company system. Accordingly, the subjects expressed to the decision-makers the need to make the use of the chatbot **available to everyone:** "*It's a manufacturing site, right? So at the moment, a big limitation of this system is that our blue-collar colleagues, who are 60% of the headcount do not have access to this data and information available on CARL."* – Barbara.

According to the fourth interpretation of the technology, the interface is an **infotainment tool,** in connection with which experts expected employees to visit CARL **without a specific purpose** to **spend time on the site**, and **review current news**. In this context, guidelines for the HR department have also been defined, namely, **regular efforts to teach CARL** were expected rather than respond to telephone inquiries from employees:

"One of the challenges right now is that employees use CARL only if they have a specific goal, a problem to solve. Why don't they come to the interface just for fun? Why should CARL not be Siemens' Netflix? Because you go to Netflix to have fun or relax, but because of a problem, you would never go there." (Bálint)

8.4 COMPANY OBJECTIVES CONCERNING CARL CHATBOT

In addition to the analysis of interviews with experts, the results of the document analysis and web content analysis presented in this chapter also contribute to the understanding of the organizational objectives related to CARL. The process of content analysis begins with the preparation of the data, during which the researcher designates the unit of analysis, justifies the relevance of the analysis base, and then presents the characteristics of the sample. *Table 26* shows the preparation of the secondary data.

Two data sources were selected for the secondary research, including an online available German-language document published by Siemens and a relevant section of IBM's website (Siemens has developed the chatbot with IBM). The analysis will help to ***understand the management's perspectives on CARL's organizational role and, consequently, the expectations of actors responsible for development.***

Table 26 Preparation of secondary data

Elements of preparation	Document analysis	Web content analysis
Availability	https://www.bayern-innovativ.de/services/asset/veranstaltungen-2021/2021-03-11-digitale-arbeitswelt-ki-teil-1/Digitale-Arbeitswelt-mit-ohne-KI-ChatbotCarl-Teil1. pdf	https://www.ibm.com/case-studies/siemens-ag-watson-ai
Date of download	March 25, 2022 06:45	March 25, 2022 06:45
The title of the document/web page	CARL, Der digitale HR Assistent der Siemens AG	A one-of-a-kind AI-based virtual agent innovates in employee support
The type of document	pdf file in German	-
Physical characteristics of the document	digital format, 8 pages, available online	-
Appearance of the document/web page	March 2021	2019
Author/responsible person for the document/website	Sabine Rinser-Willuhn	IBM
The audience for which the document was written	Siemens AG members	-
Characteristics of the content of the document/web page	I. Der digitale HR Assistent der Siemens AG II. Die Story III. Zahlen, Daten, Fakten IV. Einblicke, Erfahrungen	I. Business Challenge Story II. Transformation Story III. Results Story
Units of analysis	The entire document.	The whole page.

Source: own edition

As a result of the inductive content analysis, four codes were outlined, including *the driver of change*, *CARL's meaning*, *the challenges*, and *the expectations*. The following subsections present these codes.

8.4.1 The driver of change

The Siemens Group employs 379,000 people worldwide. In addition to providing AI-based services to consumers and partners in the digital transformation, corporate management aims to support the global workforce with the introduction of modern

technologies, including an interactive HR virtual agent that is accessible to all, regardless of device, location, or time. In 2016, the company decided to implement the AI-based chatbot, which it developed with IBM. This decision was prompted by the experience that previously used intranet sites did not provide employees with fast and accurate access to information, therefore the management wanted to implement digital HR assistant: *"We had a solution in Germany which provided links to several HR IT applications, but we needed to replace it. We realized that we had a golden opportunity to explore new ways of working to achieve our goals, and that's when we contacted IBM."* (Sabine Rinser-Willuhn, Manager, HR Systems, Siemens AG).

8.4.2 The meaning of CARL

Siemens management sees an up-to-date helper for employees in the chatbot, looking at both the search and chat functions: *"CARL responds to approximately one million standard employee queries a month. It spends its days helping Siemens employees access relevant, accurate content, both through interactive chats and by highlighting trending topics on its landing page."* (IBM website, 2022).

Management not only believes in the benefits of CARL for organizational users but also emphasizes its role in supporting the HR department. In addition, they interpret the chatbot as a tool that contributes to employee satisfaction: *"CARL helps make life easier for the company's employees as well as its HR departments. Employees have a faster and more straightforward way to find relevant HR-related information- increasing employee satisfaction and reducing the time that HR staff spend answering employee support requests."* (IBM Website, 2022). *„In keeping with design thinking practices, the development team prioritized the user experience in creating CARL."* (IBM website, 2022).

8.4.3 Challenges

Regarding the challenges related to CARL, the management points out that keeping it up to date and constantly expanding its knowledge requires a lot of resources: *" The IBM and Siemens teams were both aware of what an enormous challenge it would be to fit so*

many topics into one chatbot." (Sabine Rinser-Willuhn, Manager, HR Systems, Siemens AG)

In addition, local CARL development teams need to pay attention to how to make chatbot interactions more humanlike: *"How people actually talk to each other - how to 'simulate' this with a machine"* (Sabine Rinser-Willuhn, Manager, HR Systems, Siemens AG)?

Siemens is aware that the introduction of new technology raises several issues that need to be addressed on an ongoing basis and should not lose faith: *"Yes, new technologies offer new solutions, but the technology remains technology and it should be (simply) introduced "* 😉 (Sabine Rinser-Willuhn, Manager, HR Systems, Siemens AG).

8.4.4 Expectations

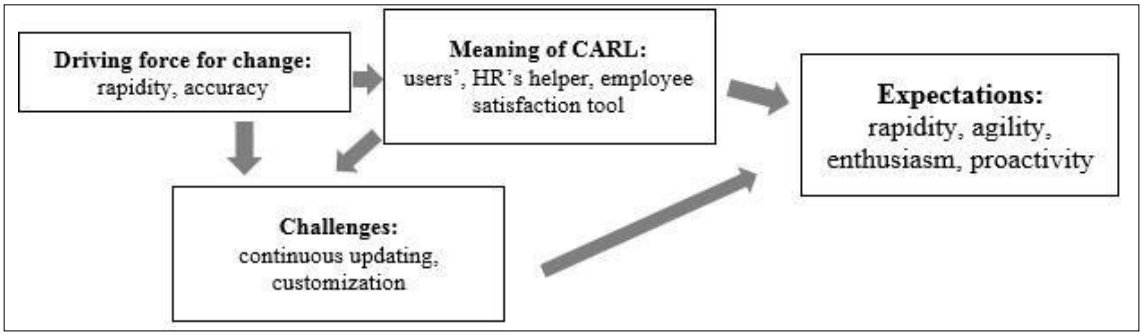
Siemens has set different expectations for the continuous development of CARL, including agile thinking, curiosity, courage, and patience on the part of the teams responsible for CARL: *"New technologies require long-term patience. Shared vision! Agile in thinking, in implementation. Be curious and brave"*. 😉 (Sabine Rinser-Willuhn, Manager, HR Systems, Siemens AG), which guideline derived from the experience gained during the initial development of the chatbot with IBM: *"I don't think there's ever been an HR chatbot like CARL, and it wouldn't exist without the agile, design thinking approach that IBM provided."* (Sabine Rinser-Willuhn, Manager, HR Systems, Siemens AG).

In connection with the development of the chatbot, the HR department is also expected to update CARL quickly and adapt it to the needs of the organizational users, as they can do so on their own, they do not depend on other units regarding this: *"The platform allows the Siemens HR staff to implement different topics quickly, without the need for IT support. This feature enables every Siemens location to quickly configure and customize its version of CARL based on employees' unique needs."* (IBM website, 2022).

8.4.5 Relationship between content codes

The final step in the content analysis process is to explore the relationship between the codes. During the analysis of the secondary data, four content codes emerged from the texts. Aspects mapped in connection with the driver of change have shaped the meaning that management made of CARL, and these meanings, as well as the motivation to introduce technology, have outlined the challenges of the chatbot. Along these challenges, and based on meanings made by managers of the chatbot, management expectations for the development of the virtual agent were formulated, namely the presence of rapidity, agility, enthusiasm, and proactivity in the care of the chatbot (Figure *10*).

Figure 10 Relationship between content codes



Source: own edition

8.5 SUMMARY OF RESULTS

My thesis aimed to answer the question of ***what sensemaking processes the implementation of the HR chatbot generates in the organization***, i.e. what meanings HR professionals, employees, and managers make of *the virtual agent* and *how this meaning shapes their actions towards the chatbot.* As a result of the data analysis, it became apparent that for some subjects, the organizational introduction of the HR chatbot did not mean an ambiguous event that would have interrupted their continuity. Consequently, in their case, CARL did not induce a sensemaking process, so for these subjects, I only had the opportunity to explore how they interpret the virtual agent.

The first study group was represented by HR professionals whose responsibilities included developing CARL. In the current phase of technology introduction, I have

uncovered **three meanings** that HR professionals made of the chatbot, as follows: **(1) strengthener of professional commitment**, **(2) Google search engine,** (**3) HR digital assistant**. Within these meanings, I discovered more sub-meanings. In terms of actions, it became apparent that experiencing the chatbot's organizational presence as a professional commitment strengthener resulted in the **joyful care of the virtual agent,** but framing it as a Google search engine resulted in a restored meaning (Sandberg-Tsoukas, 2015), so there was no identifiable action in this case. Finally, the HR digital assistant meaning resulted in two types of actions: some subjects **consistently directed organizational users to CARL,** but other HR professionals were **inconsistent** and **offered employees this option only when they were busy**.

In the current phase of the technology adoption, **three meanings could be identified**, including the **(1) self-service system**, the **(2) operation facilitating tool,** and **(3) the HR assistant**. Within these meanings, further sub-meanings have emerged. The chatbot as a self-service system led to the **regular use of the technology, trying it out, learning its functions, and teaching it,** and the **rejection of use**. Interpreting it as an operation facilitating tool resulted in the **regular use of the chatbot.** Two meanings of the interpretation of CARL as an HR assistant have shaped the actions of individuals towards the virtual agent, using the technology **occasionally** and in **special cases.**

In the case of the managers involved in the implementation of CARL, I aimed to find out how the meanings they make of the chatbot shape their expectations regarding the actions of the employees towards the virtual agent. In the case of this study group, **three meanings** have emerged as a result of the data analysis: **(1) a tool for transformation, (2) a tool for keeping up**, and **(3) an infotainment**. There was an expectation for employees to **use CARL as a primary communication channel**, and for the HR professionals to **explain its benefits,** to **continually improve**, to **rethink business processes**, and **to organize the resource requirements required for this rethinking**. In terms of the actions of HR managers, **change management has been** formulated as an expectation. From the interpretation of the chatbot as a tool for keeping up, the HR department has been expected to **convince employees to use the technology, constantly update** its **background information**, and **strengthen its promotion**. The decision-makers were expected to make CARL **available to the entire organizational staff.**

Finally, interpreting the chatbot as infotainment has created the expectation that **employees should use the site even if they do not have a specific goal,** using CARL for **entertainment**. In connection with this, the HR department is responsible for the **daily education and development of CARL following user needs**.

It is also interesting to compare the similarities and differences between the meanings made by the three study groups. The professional commitment of a group of HR professionals is enhanced by the chatbot, and some organizational users have framed CARL as a self-service system. Both meanings bring with them learning and everyday actions toward the chatbot. These meanings coincide with the manager's interpretation and associated expectations that chatbot is a tool for transformation and requires continuous improvement from HR professionals and regular use from employees. HR professionals' interpretation of CARL that the chatbot is an element of digitalization is also congruent with managers' interpretation according to which the chatbot is a tool for keeping up. A group of HR professionals have placed CARL on their mental map as an HR assistant, and the same meaning was made by general users (a rudimentary tool). HR professionals' interpretation that CARL is a Google search engine is also similar to the interpretation of general users (search page). The chatbot has been also interpreted as an operation facilitating tool for employees, which also coincides with the experience of HR professionals, namely that CARL helps them. However, none of the meanings provided by the other two study groups coincided with the managers' objective of using CARL as an infotainment tool.

The analysis of the data also showed that the research subjects experiencing the equivocality of the technology did not necessarily associate negative emotions with the HR chatbot, as meanings with explicitly positive content (a tool for strengthening professional commitment and self-service support tool) were identified, which resulted in active use of technology. It has also been outlined that the obviousness experienced about the implementation of technology can lead to two types of action, similar to the behavior of individuals experiencing equivocality, i.e., a neutral attitude towards the chatbot can also result in usage. In summary, perceiving the equivocality of technology is not necessarily inconsistent in terms of achieving an organization's objectives related to CARL, and a neutral attitude to obviousness does not necessarily result in employee behavior that supports goal-matching (*Table 27*).

Table 27 Interpretation of technology introduction and correlation of actions

Interpretation of the event	Attitude	Action	Example
Experiencing equivocality	positive	regular use	tool for self-service
	negative	rejection of use	tool for rejecting self-service
Experiencing obviousness	neutral	use	project
	neutral	avoidance of use	a tool to help with HR topics

Source: own edition

In addition to exploring the meanings, an important aspect of the data analysis was how meanings were changed during the use of the technology. The results showed that the initial neutral attitude towards the chatbot may have turned positive with the experience gained with the artificial entity, which may have led to positive meanings, which led to the joyful use and development of the chatbot. The initial openness and positive reception regarding CARL remained in the case of the affected subjects, i.e. it seems that the subsequent use of the technology did not result in any negative meanings among those who had positive interpretations in the initial technology adoption phase.

A group of subjects was characterized by a lack of change in their neutral attitude to the technology as a result of their subsequent experience, no sensemaking process was induced. This is because they had little interest in CARL and did not feel they should pay attention to the technology. A further explanation among HR professionals is that they also saw CARL as one of their other tasks, not framing it as a special thing. Finally, the attitudes of some subjects did not change during the later stage of technology use, due to their lack of knowledge about the chatbot, fear of the virtual agent, or previous negative beliefs about it.

The personal objective of the research, in line with Dautenhahn's (2012) definition of human-chatbot interaction, was to find out what characterizes human-chatbot interactions that, while ensuring efficiency, are acceptable to people, take their needs into account, and respect their values. Based on the results of the study, it became apparent that the organizational appearance of a chatbot reinforced the need for social interaction between HR professionals and general users (employees) because of the fear of losing it. Based on the research, it has been outlined that task-oriented

human-chatbot interaction is acceptable for employees, as long as the possibility of communication with each other is provided. This is because employees need to be able to share their difficulties with HR professionals, and HR professionals would like to provide help that is more about human connectivity than operational support, so creating it is not inconsistent with organizational goals.

9. SCIENTIFIC EVALUATION OF THE RESEARCH RESULTS

The aim of this chapter is to compare the results of my empirical research with the findings presented in the literature review. In the following, it is discuss which empirical results coincide with those revealed as a result of the literature search (*Table 28*), and then I list the new findings that contribute to the research area.

Rapp-Boldi-Curti (2021) found that if users do not have specific expectations for chatbots, they compare them to alternative technologies, which is in line with the interpretation revealed in the case of two study groups, as certain HR professionals and several general users defined the virtual agent as a search page. Chaves-Gerosa (2020) identified three groups of characteristics that represent user expectations for the chatbot. Proactivity and awareness within conversational intelligence, as a characteristic of the chatbot, have also been expressed by some of the suvóbjectes as an expectation for the virtual agent. The results of Li et al. (2020) also outlined that interactivity plays an important role in the development of satisfaction with the chatbot.

Zarouali et al. (2018) investigated which factors play a role in attitudes towards chatbots. They found that perceived utility - which is consistent with the reliability identified by Li et al. (2020) which means the perception of whether the chatbot can perform its task - and the results of Rese-Ganster-Baier (2020) and Behera-Bala-Ray (2021) – based on their studies of technology acceptance – plays a role in users' attitude with which my empirical results also coincide as I found that the perception of usefulness had a positive effect on the HR professionals and general interpretation of HR chatbot. Zaroauli et al. (2018) also found that the acceptance of the chatbot is influenced by the emotions appearing in connection with it, which is well exemplified by my result that certain subjects reported negative feelings towards the technology, which conveys negative meanings and avoidance or rejection of use.

Perceived ease of use - which influences attitudes and technology acceptance, and thereby the intention of use- identified by Kasinlingam (2020), Nordheim-Følstad-Bjørkli (2019), Richad et al. (2019), Behera-Bala-Ray (2021), the emerging trust towards technology and the personal innovativeness identified by Li et al. (2020) and Nordheim-Følstad-Bjørkli (2019) influencing the intention of use were also identified in my empirical research. Some subjects found that the use of the HR chatbot interface was not clear, which led

them to avoid the use of the virtual agent. The behavior of those experiencing distrust was characterized by avoidance or rejection of use. Subjects who liked to try out new technologies also attached positive meanings to CARL's organizational appearance and regularly used the chatbot.

Skjuve et al (2019) examined the factors under which individuals experience the uncanny valley phenomenon. The authors found that the long waiting time experienced during the conversation was identified as a factor that caused discomfort. Similar to this result, my research subjects have articulated, as one of the qualities of CARL that they do not have to wait for it to *"type in the answer"*. Hill-Ford-Farreras (2015) found that individuals send messages to the chatbot on average with fewer words than their human interaction partners, which is consistent with my results that subjects identifying themselves as *"experienced Google users"* sent questions simplified to the chatbot as many times as it was needed.

Eren (2021) found that the context of the interaction also influences the development of chatbot-related satisfaction. In my empirical research, it became possible to identify subjects' previous experiences of how successfully their organization had introduced new technologies that also shaped their presuppositions about CARL and thus their intentions to use it.

Two of the factors influencing satisfaction examined by Cheng-Jiang (2020) appeared in my research, including the utilitarian (accuracy and reliability of the information provided by the chatbot) and the speed of access to technology as aspects of shaping the meanings and usage. Among the chatbot personalities examined by Mehra (2021), the transactional type (task-oriented, few interactions) has emerged as the dominant expectation in my empirical research, i.e., the majority of subjects did not articulate social needs for CARL.

Among the managerial representations explored by Jang-Jung-Kim (2021) in connection with the chatbot's organizational introduction, the following appeared in the present research: increasing user satisfaction, organizational resistance, supporting role, and increasing operational efficiency. These factors have been articulated by the managers involved in the implementation, and have also emerged as challenges and actions to be taken as a result of the content analysis of the secondary data.

The advantage mentioned by Claus (2019) and Majumder-Mondal (2021) for HR chatbots used to automate organizational internal communication, according to which they can relieve HR professionals of a significant burden, has been articulated by my research subjects, but it has become clear that this action of theirs is not consistent, depending on their workload. They have defined their need for human interactions, which they experience by helping employees, which is an important element of their professional identity. Therefore they consider CARL to be non-exclusive and optional, and they only encourage organizational users to use it if they are currently overloaded.

Table 28 Literature related to the meanings discovered during the empirical research

The result of empirical research	Author
▪ Search page	Rapp-Boldi-Curti (2021)
▪ Communication development	Chaves-Gerosa (2020) Li et al. (2020)
▪ Operation facilitating tool ▪ HR digital assistant	Zarouali et al. (2018) Ashfaq et al. (2020) Li et al. (2020) Nordheim-Følstad-Bjørkli (2019) Richad et al. (2019) Rese-Ganster-Bavaria (2020) Behera-Bala-Ray (2021)
▪ Becoming a test subject ▪ Surveillance system ▪ Self-service system	Zarouali et al. (2018) Li et al. (2020) Nordheim-Følstad-Bjørkli (2019) Behera-Bala-Ray (2021)
▪ Becoming a test subject ▪ Surveillance system ▪ Self-service system ▪ Self-service support tool	Casino (2020) Ashfaq et al. (2020) Richad et al. (2019)
▪ HR assistant	Skjuve et al. (2019)
▪ Self-service support tool	Hill-Ford-Farreras (2015)
▪ Lack of understanding in the initial technology adoption phase	Eren (2021)
▪ Operation facilitating tool	Cheng Jiang (2020)
▪ HR assistant - rudimentary tool	Mehra (2021)
▪ Challenges and expectations related to CARL	Jang-Jung-Kim (2021)
▪ HR digital assistant	Claus (2019) Majumder-Mondal (2021)
▪ Searched topics in CARL	Raj (2019) Hristova (2019) Jitgosol-Casemville-Boonchai (2019)

Source: own edition

Some of the topics named by Raj (2019), Hristova (2019), and Jitgosol-Kasemvilas-Boonchai (2019), in which the HR chatbot can help organizational users, in this research benefits, organizational procedures and regulations, payroll, and leave were also mentioned.

Skjuve et al. (2021) examined the relationship between humans and chatbots using the Social Penetration Theory. The second phase of this is the affective one, in which the virtual agent's accepting, supportive, understanding, non-judgemental behavior and transparency on its identity contribute to the evolution of trust. Based on my empirical results, all this can be supplemented with the aspect that if the chatbot appears in an organizational context and the purpose of the interaction is professional, the development of positive feelings about the chatbot in individuals may be due to the fact that developing the chatbot becomes a creative activity.

Nordheim-Følstad-Bjørkli (2019) examined the development of trust in chatbots and the role of three groups of factors in this, including factors related to chatbots, environment-related, and user-related factors. Based on my research, the user-related factors (for which the authors cited a tendency to trust technology) have been supplemented by subjects' willingness to learn technology, which may result from a tendency to trust, including individuals' beliefs. This was characteristic of the behavior of the subjects in my sample who placed the chatbot as a self-service system on their mental map.

Brachten-Kissmer-Stieglitz (2021) found that the influence of peers on the intention to use a chatbot was more significant than the influence of leaders. However, in the present research, neither the role of peers nor managers in the formation of the subjects' intentions to use was prominent.

The sensemaking processes generated by HR chatbots have not been previously explored by any of the publications in the databases I used. As a result of my empirical research, I have enriched the **literature on making sense of technology with the following:**

3) I revealed nine meanings made of chatbots,
4) I identified the actions related to these meanings.

So far, no studies have been conducted on HR professionals' perspectives on HR chatbots used to automate internal communication in an organization. My research findings contribute to the **research area of human-chatbot interaction with the following:**

3) I examined HR professionals' perspectives on the HR chatbot,
4) I discovered employees' (organizational users) perspectives on the HR chatbot.

10. PRACTICAL IMPLICATIONS

The practical objective of the thesis is to discover whether **a gap can be identified between the actions of the organization members towards the HR chatbot, and the strategic goals of the managers related to the digital assistant. I also aim to present how this gap can be narrowed or eliminated.** The analysis revealed that subjects who associated positive meanings with the HR chatbot typically engaged in actions that matched organizational expectations, i.e., made the use of the virtual agent their routine. An interesting result is that the closer an HR employee is to the technology as they work, the more positively they perceive it. The HR professionals responsible for developing CARL experienced their personal impact, the creation, and the learning that led them to the joyful care of a chatbot. Experiencing technology ambivalence, - the negative parts of which typically stemmed from their experience with prior organizational technologies and the lack of knowledge related to CARL - may have resulted in occasional use or avoidance, but experiencing negative feelings clearly led to rejection of use. The sources of resentment about the chatbot stemmed from the subjects' beliefs, their fear of threatening their professional role, their distrust, and their unwillingness to make an extra effort to master the use of CARL. Among the expectations expressed by the managers involved in the introduction was that the chatbot should be the primary channel for users, present in the organization as a tool to make life easier for employees. It is also part of the objectives to eliminate the exchange of e-mails with HR staff using CARL. My empirical research has shown that HR professionals and employee actions do not fully coincide with these goals, which are due to

1) HR professionals' priority is to interact with employees because this way they feel they can count on them, which is an important pillar of their professional identity,
2) organizational users prefer to contact HR because of their social needs,
3) organizational users find it easier to call HR professionals.

It is clear that according to employees' consideration, HR is available and helps fast. Compared with that, trying out the chatbot is not attractive to them. Also, it is clear that the needs of HR professionals need to experience their professional identities and

employees' social needs are met by interacting with each other, with the result that the actors concerned do not entirely give up their previous actions. Although HR professionals recommend CARL and employees try to ask for help from them, none of the subjects saw the HR chatbot as being exclusive to the organization.

If the company continues to make the elimination of email changes one of its goals, **clearer communication and provision is needed to make it clear to both employees and HR professionals that the use of the chatbot is not optional, but exclusive.** This measure will affect the judgment of the chatbot, as in this case, the members of the organization are not free to use the technology (Brachten-Kissmer-Stieglitz, 2021).

In addition to the reasons previously discussed, the avoidance or possibility of using a chatbot is also explained by the fact that communication about the technology did not provide enough information for some organizational users. Accordingly, the need was formulated for the organization to provide them with **group or individual training** in which they could learn how CARL works. This is also in line with the managers' call for action to **strengthen the promotion of the chatbot**. Some research subjects said during the interview that they know almost nothing about the functions of CARL, *"I'm about two years behind."* It follows that, for technology to become part of the organizational culture, **further action is needed to promote and disseminate it, which may require additional managers responsible** for constantly updating CARL.

Managers have also set a goal to make CARL an interface for entertainment. However, employees did not appear to require the chatbot to entertain them, in contrast to the results presented in the literature that users increasingly expect the chatbot to entertain them during the interaction (Cheng-Jiang, 2020). An analysis of the corpus articles revealed that the anthropomorphic nature of the chatbot may promote the experience of entertainment (Han, 2021), however, my research results show that the employees do not expect human likeness from their artificial interaction partners. If management expects CARL to **become an interface for entertainment, it is worth strengthening the antorpomorphic nature of the virtual agent**.

11. LIMITATIONS AND FUTURE RESEARCH

One of the limitations of the research was that I did not conduct a longitudinal study, as a result of which the turning points leading to the post-adoption phase of the technology (Hiso-Wu-Hou, 2008) could not be identified, i.e. the phase when the technology becomes meaningless, and become part of organizational routines.

Also, a longer-term study would have allowed me to observe, whether with the development of the chatbot, the demand from organizational users to satisfy their social needs (Cheng-Jiang, 2020; Tsai-Liu-Chuan, 2021) or the need for anthropomorphic characteristics (Han, 2021) does appear.

Further research directions include conducting a longer-term study to learn about the evolution of the human-chatbot relationship and the changing needs of organizational users regarding chatbots.

Further research may also reveal sensemaking processes generated by chatbots in organizations where users cannot decide on the use of the chatbot, which may change their attitudes toward the technology (Brachten-Kissmer-Stieglitz, 2021).

It may also be interesting to research what sensemaking processes more humanly chatbots induce and whether they can really become an interface for entertainment in the organization.

APPENDIX

I. Appendix 1: Details of corpus articles

Author	Year	Title	Journal	Number of citations	Application area of chatbot	Methodology
Beattie, A., Edwards, AP, Edwards, C.	2020	A Bot and a Smile: Interpersonal Impressions of Chatbots and Humans Using Emoji in Computer-mediated Communication	Communication Studies	36	experiment (simulation)	quantitative
Behera, RK, Bala, PK, Ray, A.	2021	Cognitive Chatbot for Personalized Contextual Customer Service: Behind the Scene and beyond the Hype	Information Systems Frontiers	6	B2B communication	quantitative
Cheng, X., Bao, Y., Zarifis, A., Gong, W., Mou, J.	2021	Exploring consumers' response to text-based chatbots in e-commerce: the moderating role of task complexity and chatbot disclosure	Internet Research	5	e-commerce	quantitative
Cheng, Y., Jiang, H.	2020	How Do AI-Driven Chatbots Impact User Experience? Examining Gratifications, Perceived Privacy Risk, Satisfaction, Loyalty, and Continued Use	Journal of Broadcasting and Electronic Media	21	e-commerce	quantitative
Chung, M., Ko, E., Joung, H., Kim, SJ	2020	Chatbot e-service and customer satisfaction regarding luxury brands	Journal of Business Research	260	e-commerce	quantitative
Croes, EAJ, Antheunis, ML	2021	Can we be friends with Mitsuku? A longitudinal	Journal of Social and	21	social chatbot	quantitative

		study on the process of relationship formation between humans and a social chatbot	Personal Relationships			
De Cicco, R., Silva, SC, Alparone, FR	2020	Millennials' attitude toward chatbots: an experimental study in a social relationship perspective	International Journal of Retail and Distribution Management	35	experiment (simulation)	quantitative
Eren, BA	2021	Determinants of customer satisfaction in chatbot use: evidence from a banking application in Turkey	International Journal of Bank Marketing	29	banking services	quantitative
Han, MC	2021	The Impact of Anthropomorph i sm on Consumers' Purchase Decision in Chatbot Commerce	Journal of Internet Commerce	14	e-commerce	quantitative
Lee, S., Lee, N., Sah, YJ	2019	Perceiving a Mind in a Chatbot: Effect of Mind Perception and Social Cues on Co-presence, Closeness, and Intention to Use	International Journal of Human-Computer Interaction	28	experiment (simulation)	quantitative
Li, L., Lee, KY, Emokpae, E., Yang, S.-B.	2021	What makes you continuously use chatbot services? Evidence from chinese online travel agencies	Electronic Markets	16	tourism	quantitative
Nordheim, CB, Følstad, A., Bjørkli, CA.	2019	An Initial Model of Trust in Chatbots for Customer Service - Findings from a Questionnaire Study	Interacting with Computers	63	customer service	quantitative
Rese, A., Ganster, L., Baier, D.	2020	Chatbots in retailers' customer communication: How to measure their acceptance?	Journal of Retailing and Consumer Services	62	e-commerce	quantitative

Richad, R., Vivensius, V., aSfenrianto, S., Kaburuan, ER	2019	Analysis of factors influencing millennial's technology acceptance of chatbot in the banking industry in Indonesia	International Journal of Management	21	banking services	quantitative
Schuetzler, RM, Grimes, GM, Scott Giboney, J.	2020	The impact of chatbot conversational skill is engagement and perceived humanness	Journal of Managemen t Information Systems	25	experiment (simulation)	quantitative
Shumanov, M., Johnson, L.	2021	Making conversations with chatbots more personalized	Computers in Human Behavior	33	tele-communications	quantitative
Toader, D.-C., Boca, G., Toader, R., (...), Ighian, D., Rădulescu, AT	2020	The effect of social presence and chatbot errors on trust	Sustainability (Switzerland)	36	e-commerce	quantitative
Tsai, W.-HS, Liu, Y., Chuan, C.-H.	2021	How chatbots' social presence communication enhances consumer engagement: the mediating role of parasocial interaction and dialogue	Journal of Research in Interactive Marketing	8	experiment (simulation)	quantitative
Zarouali, B., Van Den Broeck, E., Walrave, M., Poels, K.	2018	Predicting Consumer Responses to a Chatbot on Facebook	Cyberpsychology, Behavior, and Social Networking	118	experiment (simulation)	quantitative
Chaves, AP, Gerosa, MA	2020	How Should My Chatbot Interact? A Survey on Social Characteristics in Human–Chatbot Interaction Design	International Journal of Human-Computer Interaction	124	-	literature review
Ciechanowski , L., Przegalinska, A., Magnuski, M., Gloor, P.	2019	In the shades of the uncanny valley: An experimental study of human – chatbot interaction	Future Generation Computer Systems	289	experiment (simulation)	quantitative

Skjuve, M., Haugstveit, IM, Følstad, A., Brandtzaeg, PB	2019	Help! Is my chatbot falling into the uncanny valley? An empirical study of user experience in human-chatbot interaction	Human Technology	57	experiment (simulation)	mixed
Go ES, Sundar, S.	2019	Humanizing chatbots: The effects of visual, identity and conversational cues on humanness perceptions	Computers in Human Behavior	244	experiment (simulation)	quantitative
Park, N., Jang, K., Cho, S. and Choi, J.	2021	Use of offensive language in human-artificial intelligence chatbot interaction: The effects of ethical ideology, social competence, and perceived humanlikeness	Computers in Human Behavior	6	experiment (simulation)	quantitative
Jang, M., Jung, Y. and Kim, S.	2021	Investigating managers' understanding of chatbots in the Korean financial industry	Computers in Human Behavior	18	banking services	qualitative
Mehra, B.	2021	Chatbot personality preferences in Global South urban English speakers	Social Sciences & Humanities Open	2	experiment (simulation)	mixed
Hill, J., Ford, WR and Farreras, IG	2015	Real conversations with artificial intelligence: A comparison between human – human online conversations and human – chatbot conversations	Computers in Human Behavior	590	experiment (simulation)	quantitative
Kasilingam, DL	2020	Understanding the attitude and intention to use smartphone chatbots for shopping	Technology in Society	84	e-commerce	quantitative

Brachten, F., Kissmer, T., Stieglitz S.	2021	The acceptance of chatbots in an enterprise context - A survey study	International Journal of Information Management	10	corporate internal use	quantitative
Ashfaq, M., Yun, J., Yu, S. and Loureiro, SMC	2020	I, Chatbot: Modeling the determinants of users' satisfaction and continuance intention of AI-powered service agents	Telematics and Informatics	96	customer service	quantitative
Skjuve, M., Følstad, A., Fostervold, KI and Brandtzaeg, PB,	2021	My Chatbot Companion - a Study of Human-Chatbot Relationships	International Journal of Human-Computer Studies	27	social chatbot	qualitative

Source: own edition

II. Appendix: Interview outlines

HR PROFESSIONALS

1. Please tell me about the tasks you perform in your organization.
2. What does it mean to you to be a member of this organization?
3. Could you grasp a characteristic story that shows the significance and meaning of your work for you?
4. How did you feel when you found out that CARL would be introduced into your organization?
5. How did you initially approach CARL?
6. How does the fact that CARL has been introduced into your organization affect your work?
7. What are your responsibilities related to CARL? What new skills do you need to perform these tasks?
8. What of your responsibilities did CARL take over? How does it affect you that some of your responsibilities have been taken over by CARL / it assists you in these?
9. How do you currently relate to CARL?
10. What is CARL?
11. How would you describe your collaboration with CARL?
12. What could you compare CAR to?
13. What does CARL mean to you?

EMPLOYEES (GENERAL USERS)

1. Please tell me about the tasks you perform in your organization.
2. What does it mean to you to be a member of this organization?
3. How does the fact that CARL has been introduced into your organization affect your organizational existence?
4. What do you use CARL for? What did you experience while using it?
5. What could you compare CARL to?
6. Have you used a chatbot before? If so, what was your experience?
7. What did CARL mean to you when it was introduced?
8. What does CARL mean to you now?
9. What is CARL?
10. What suggestions for improvement could you make concerning CARL?
11. What do you expect from CARL?

MANAGERS

1. When and why did the organization decide to introduce CARL?
2. Which departments are affected by the introduction of CARL?
3. Which department is responsible for the operation of CARL?
4. How did the workers initially react to the introduction of CARL?
5. How does the application of CARL (HR department and general users) affect human resources?
6. What are the challenges of applying CARL?
7. What are the main benefits of using CARL?
8. How do employees currently relate to CARL?

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