

Artificial Socialization? How Artificial Intelligence Applications Can Shape A New Era of Employee Onboarding Practices

Eva Ritz
University of St. Gallen
eva.ritz@unisg.ch

Fabio Donisi
University of St. Gallen
fabio.donisi@unisg.ch

Edona Elshan
University of St. Gallen
edona.elshan@unisg.ch

Roman Rietsche
University of St. Gallen
roman.rietsche@unisg.ch

Abstract

Onboarding has always emphasized personal contact with new employees. Excellent onboarding can extend employee retention and improve loyalty. Even in a physical setting, the onboarding process is demanding for both the newcomer and the onboarding organization. Remote work, in contrast, has made this process even more challenging by forcing a rapid shift from offline to online onboarding practices. Organizations are adopting new technologies like artificial intelligence (AI) to support work processes, such as hiring processes or innovation facilitation, which could shape a new era of work practices. However, it has not been studied how AI applications can or should support onboarding. Therefore, our research conducts a literature review on current onboarding practices and uses expert interviews to evaluate AI's potential and pitfalls for each action. We contribute to the literature by presenting a holistic picture of onboarding practices and assessing potential application areas of AI in the onboarding process.

Keywords: artificial intelligence, onboarding, employee, socialization, skill profile

1. Introduction

More than two years after the outbreak of COVID-19, the pandemic still has a firm grip on the world. Organizations were forced to quickly adapt their processes to new comply with regulatory and social-political measures and thus, remain competitive in their industry (Fitriasari, 2020). A new era of virtual working environments and business processes had to be created, including remote working, online brainstorming, or video conferencing (Kelly, 2020).

Thus, the onboarding process, which previously relied solely on personal interaction, had to be rapidly transformed online. A recent worldwide study by Talmundo & Vlerick Business School (2022) exemplified the importance of onboarding processes: 79% of respondents mentioned that onboarding can

help with a quick integration with the company, 78% stated that onboarding improves the employees' attitude towards the employer, and 73% declared that a successful onboarding leads to increased employee engagement. Moreover, Bauer (2010) states that (even before this online transformation) 50% of senior workers depart their new job within 18 months, while new hourly employees quit within the first 120 days. Thus, the onboarding process and the actions taken by organizations to welcome a newcomer into their organization are important research fields.

To provide new employees with the most efficient onboarding and lay the foundation for a sustainable working relationship, it is essential to quickly integrate them into the company and their teams (Sharma & Stol, 2020). However, since the COVID-19 pandemic, this process is even more demanding than before, as it impacts the formal (e.g., work meetings) and informal onboarding (e.g., team events, lunch break gatherings) (Klein et al., 2015). In this regard, Narayanamurthy & Tortorella (2021) found out that organizations with a greater digital maturity before COVID-19 could better cope with the transformation of processes, including new measures and the use of digital tools. Whereas some of these changes have been temporary solutions, some actions might stay permanently, as they have proven their value (Almeida et al., 2020).

While there exists already prior research on how digital structures can support the onboarding process, they mainly relate to supporting humans in solely administrative activities (Votto et al., 2021). However, AI applications have the potential not only to support administrative activities but to augment or replace specific tasks to improve the quality of the onboarding process (Makridakis, 2017). Our work examines the opportunities offered by the current situation for further optimizing the onboarding process in the future using AI applications. To the best of our knowledge, there is currently no work that captures the potential and pitfalls of AI implementation during the holistic onboarding process. To shape the era of new work and contribute to the call of Makarius et al. (2020, p.271)

to “redefine traditional work design and processes to better guide future workers’ experiences” in regard to AI implementation in organizations, we pose the following research question (RQ):

RQ: *How to design an artificial intelligence-based onboarding process for new employees in organizations?*

To answer our RQ, we conduct a systematic literature review to illustrate current onboarding practices according to the guidelines of Wolfswinkel et al. (2013) and Webster & Watson (2002). Then, we conduct six qualitative interviews to identify the potential and pitfalls of implementing AI applications for these onboarding practices. We aim to contribute to the literature by providing prescriptive knowledge, following the theoretical contributions by Gregor (2006), through identifying future potentials and best practices for the adoption of AI applications in onboarding processes.

2. Theoretical Background

2.1. Onboarding and Socialization Process

Most of the extant literature agrees that onboarding is about bringing an employee up to speed as quickly as possible, maximizing their output and commitment while optimizing the length of their stay with the company for as long as possible (Dai & de Meuse, 2007). However, when it comes to precise definitions of the onboarding process, opinions and terms differ (Klein et al., 2015). While many authors speak of onboarding in the terms mentioned above, others speak of (organizational) socialization. Some embrace both concepts but regard them as separate, complementary constructs. According to Klein et al. (2015), onboarding consists of a set of actions taken by an organization to attain specified goals. Bauer & Erdogan (2011) refers to both the actions and the goals in her definition of onboarding below. Their definition is in line with many prior definitions, thereby, we will follow it for our own research: “*Organizational socialization, or onboarding, is a process through which new employees move from being organizational outsiders to becoming organizational insiders. Onboarding refers to the process that helps new employees learn the knowledge, skills, and behaviors they need to succeed in their new organizations. This [is a] process of learning to become an effective organizational member*” (Bauer & Erdogan, 2011, p. 51). Dismantling the term reveals more specific statements regarding the process and the goals that can be made. The onboarding process should include building blocks that provide the new employee with the information, skills, and behaviors required to

succeed in the organization. The goal is to quickly integrate new employees so they can become effective team members and socialize well. The appearance of the term ‘socialization’ within the definition demonstrates that these two concepts are inextricably intertwined, and their separation is frequently at the author’s choice, even in current research. One possible explanation for this is that onboarding is considered part of the broader context of socialization (Dai & DeMeuse, 2007). Hence, ‘socialization’ is a process that begins long before onboarding.

2.2. Relevance of Onboarding Practices

New employees are nervous and apprehensive at the start of their employment, which is why managers need to help them understand the basic company processes and culture (Sharma & Stol, 2020). Current literature requires that onboarding practices need to be tailored to the new employees for a unique experience (Scott et al., 2022). Hence, managers need to understand the unique employee’s personality and adapt their introduction accordingly. The onboarding includes agreeing on a common definition of processes, interactions, and communication modes between superior, team, and newcomer (Bauer, 2016). Not surprisingly, onboarding influences retention in organizations. Numerous publications advocate for the establishment of a comprehensive onboarding process, with some emphasizing the length of time new employees stay with a company (e.g., Carucci, 2018). Bauer (2010) provides figures that support the importance of the onboarding process in Fortune 500 companies, stating that 50% of senior workers fail in their new job within 18 months, while new hourly employees depart within the first 120 days. Thus, onboarding influences the engagement of employees. Heimburger et al. (2020) conducted an analysis of employee commitment and engagement. The authors discovered that engaged employees with a robust onboarding process perform much better than disengaged employees. To summarize, the quality of onboarding determines the employees’ retention and commitment.

2.3. AI Applications in Onboarding

AI is the most transformative and disruptive technology in our era. Since the 1950s, AI applications have been steadily rising attention (Brynjolfsson & McAfee, 2017). Due to frequent improvements in hardware and software performance along with complementary trends like big data, the implementation and adoption of AI applications augments rapidly (Zeadally et al., 2020). A very broad and comprehensive definition was provided by Russell

& Norvig (2021), who describe AI as “intelligent agents” (p. viii). Berente et al. (2021, p. 1435) conceive AI rather as a process, defined as “the frontier of computational advancements that references human intelligence in addressing ever more complex decision-making problems”. The authors additionally define three facets of AI applications, including autonomy to act without human intervention, learning through data, and inscrutability (Berente et al., 2021). Today, machine learning is one of the most dominant approaches to AI applications (Berente et al., 2021). AI applications can overtake certain functions inspired by humans’ cognitive abilities, including perceiving, feature extraction and identification, reasoning, predicting, decision-making, generating, and acting (Hofmann et al., 2020). According to Dellermann et al. (2019), there are two ways in which humans and an AI system can collaborate: AI in the loop of human intelligence and human intelligence in the loop of AI. The first type describes the use of an AI that supports humans in making decisions – e.g., by processing data and making predictions based on that. The second way refers to supervised and interactive learning processes in which a human acts as AI’s teacher.

There are two major research streams, in which related work can be classified. The first deals with AI applications in human resource management (HRM), while the second examines the use of AI applications in companies for improving employee experience. Regarding the first stream, various papers concerning AI in HRM address the subordinate role played by onboarding. For example, Prikshat et al. (2021) focus on how to promote employee adoption of AI applications, while Votto et al. (2021) exemplify possible uses of AI applications in onboarding, such as work tracking, or training analysis. However, onboarding was only mentioned fleetingly here and there was no prior analysis of the onboarding process to identify possible areas of application in theory. In related work dealing with the use of AI to improve the employee experience, most of the focus was on chatbots. Thus, Meyer von Wolff et al. (2020) only suggested using chatbots to answer newcomers’ questions. He (2018) discusses AI onboarding approaches. He discusses chatbots for answering queries, but he also includes individualized training suggestions and automatic appointment suggestions with coworkers. Chowdhury et al. (2022) examines the AI-human partnership’s impact on business success. From the organizational socialization theory, only employee-related principles (e.g., role clarity) were chosen to indicate how to operate with AI in a company. In summary, AI’s onboarding application potentials are understudied.

3. Research Method

3.1 Literature review

First, a literature review is conducted to collect related work and best practices of onboarding processes. According to Baker (2000, p.219), such a literature analysis forms the “*essential first step and foundation when undertaking a research project*”. We followed the guidelines of Webster & Watson (2002) and Wolfswinkel et al. (2013), as these ensure a careful, comprehensible procedure.

The first step is the definition that establishes a suitable framework for the search (publication types and time frame). The second step includes the selection of suitable scientific disciplines and corresponding databases (Wolfswinkel et al., 2013). Since onboarding might involve management, information systems, and psychology, the following databases are searched: Business Source Ultimate, Information Science & Technology Abstracts, AIS eLibrary, Science Direct, and APA PsycNet. Since the onboarding process has evolved along with all other business processes in the age of digitization, only papers from the last 10 years are considered for the literature review. Furthermore, only academic papers (research & review papers) that deal with the current state of onboarding are considered. The third step is to determine appropriate keywords. According to Webster & Watson (2002), carefully selected keywords are vital for obtaining suitable literature. Consequently, the following keywords were selected to provide information on best practices in the onboarding process: “*onboarding*” AND “*employee*” AND (“*guide*” OR “*process*” OR “*best practice*”). The keyword “*employee*” was additionally chosen because a simple search for “onboarding” returned several results on irrelevant topics such as aviation and cruising. Once the criteria for definition have been satisfied, the search must be conducted accordingly. With the above-mentioned search string, the databases were searched for academic papers published within the last 10 years. This search yielded 1436 results.

We then proceeded with the selection process by filtering the results (Wolfswinkel et al. 2013). First, five duplicates were eliminated. The remaining 1431 results were evaluated based on their titles. This process resulted in the elimination of 1305 additional papers, which were not relevant for answering our research question either because the term “onboarding” was understood in the wrong context (i.e., regarding cruises) or because the title implied a completely different subject matter and AI was therefore only mentioned in a minor context. Of the remaining 126 papers, the abstract was checked for

relevance. This process led to the elimination of another 82 papers, resulting in 22 relevant papers. A backward-forward search was then performed, leading to eight additional relevant papers. Hence, there were 30 relevant papers in the final set. We conducted selective coding of the final data set (as for instance done by Halaweh, 2012) to identify seven categories of onboarding actions (preparation, welcome, orientation, support tools, coaching & support, training, and feedback tools) and provide a detailed list with identified onboarding actions in each category in the results section. During the coding, one author continuously compared, related, and associated categories and properties and discussed the coding results with another author.

3.2. Interview study

The next step was to evaluate the findings derived from the literature by experts with practical experience in AI and/or technology-based HRM. We chose semi-structured interviews to combine the advantages of a structured interview with the possibility of finding relevant points that have not been incorporated into the framework from theory. The guidelines by Myers & Newman (2007) were applied.

Subsequently, a script for the interview was constructed in German and English, ensuring that all relevant information vital for evaluating the categories was obtained during the interview. The translation of interview guideline was translated by all authors and discussed subsequently to minimize translation issues. This unified approach allows for a better comparison of the experts' responses to the same queries. The rough structure of the interview can be described as follows. First, the experts were given an introduction consisting of work already conducted and the goals of the interview. Questions were then asked to validate the experts' suitability for the interview. This stage was followed by general questions about AI and potential prior knowledge in onboarding. The main part of the interview includes questions about the AI application potentials in all seven onboarding categories from literature. To conclude the interview, the experts were asked which categories had the highest potential. Interview requests were sent to various experts with backgrounds in the practical application of AI or technology-based HRM. The experts were selected based on their LinkedIn profiles, if their work expertise indicated AI knowledge. Table 1 provides an overview of experts.

Table 1. Expert interviews.

Nr.	Position & Industry	AI Expertise (yrs)	Specific Experience
E1	Managing Director IT	7 (yrs)	AI product development
E2	Head of AI, Consulting	5 (yrs)	AI program management (academia), AI consulting
E3	Software Engineer	1 (yrs)	Coding, product development
E4	Quant Engineer	3 (yrs)	Machine learning, financial mathematics
E5	Managing Director IT	5 (yrs)	AI application fields, product management
E6	Professor Education	2 (yrs)	AI application fields, ethics in AI

E1	Managing Director IT	7 (yrs)	AI product development
E2	Head of AI, Consulting	5 (yrs)	AI program management (academia), AI consulting
E3	Software Engineer	1 (yrs)	Coding, product development
E4	Quant Engineer	3 (yrs)	Machine learning, financial mathematics
E5	Managing Director IT	5 (yrs)	AI application fields, product management
E6	Professor Education	2 (yrs)	AI application fields, ethics in AI

Consequently, six interviews were conducted between March and May 2022, of which the shortest lasted 30 minutes and the longest 90 minutes. We stopped conducting interviews when no new insights were revealed in the last interviews, according to the theoretical saturation by Glaser & Strauss (1976). The interviews took place online in German language (with E1, E3, E4, E5, E6) and in English language (with E2) and were recorded and transcribed verbatim afterward. Only slips of the tongue, filler words, and incomplete or abandoned sentences were omitted from the transcript. We used the software Atlas.ti for the coding the interviews into the seven categories of onboarding actions derived from literature based on the procedure of Mayring & Fenzl (2019). After the evaluation, we refined the categories by merging the two categories preparation and welcome because experts evaluated them as overlapping.

4. Results

Our final results are divided in the six onboarding categories originating from the literature and evaluated from experts. For each category, we first present the derived onboarding actions from the literature. Then, we reveal the potentials of AI applications for each category that have been evaluated by expert interviews.

4.1. Preparation

The preparation category includes best practices before and during the start of the new employee. Related literature recommends organizations take several measures to ensure a smooth start for the employee (see Table 2).

Table 2. Overview of preparation approaches.

Nr.	Identified Actions	Sources
1.1.	Implement the basics prior to the first job day	(Bauer, 2010)
1.2.	Prepared workplace (incl. equipment)	(Klein & Heuser, 2008; Klein & Polin, 2012)

1.3.	Preparing a list of assignments	(Krasman, 2015)
1.4.	Fixed timeline with expectations and events until first day	(Bauer, 2010)
1.5.	Web-based platform for info during preparation	(Krasman 2015)
1.6.	Personalized welcome by senior leader & manager and celebration	(Klein & Heuser, 2008; Klein & Polin, 2012)
1.7.	Welcome kit and gifts, e.g., company merch	(Klein & Heuser, 2008; Klein & Polin, 2012)
1.8.	Team activities with colleagues, e.g., lunch	(Klein & Heuser, 2008; Klein & Polin, 2012; Krasman, 2015)
1.9.	Announcement of newcomer via E-mail	(Klein & Heuser, 2008; Klein & Polin, 2012)

Regarding the usefulness of AI applications for preparation actions, we received mixed feedback from the experts. While E1, E2, and E3 had concrete ideas for application potentials, other experts could not immediately identify any meaningful use cases.

E1 and E3 commented on a *"fixed timeline with expectations and events until first day"*. E1 asserted that rule-based algorithms can overtake this task, but also points out that AI applications are extremely useful when used to identify a newcomer's expectations, for instance, based on questions provided by the newcomer. This knowledge could serve to personalize the newcomer's timeline. E3 believes that AI applications can analyze data on the newcomer's background, knowledge level, and skills to predict optimal first tasks when *"preparing a list of assignments"*. Thus, E1 and E2 both mention AI applications' capacity to discern patterns and preferences and suggest appropriate tasks for the newcomer. This may lead to reduced overload. E2 also suggested that before the new employees start, a digital twin of the newcomer can be built based on information from their curriculum vitae (CV), transcripts, etc. Further, E2 suggests using such a persona to modularize the onboarding process, which could then be applied to *"Fixed timeline with expectations and event till first day"* and *"Prepare a list of assignments"*. In this way, an AI application might be used to optimize the "get to know colleagues" activity (E2). E1 suggests this use case for "team activities with colleagues," connecting eligible personnel for lunch on the first day. E5 mentioned that an AI could personalize the "welcome package" information depending on the newcomer's interests.

However, experts (E1, E4, E6) warn that AI applications cannot provide a "personalized welcome"

to encourage social welcome aspects, communication, and informal engagement with the team.

4.2. Orientation

Orientation includes onboarding actions that take place immediately after a newcomer starts the new position. This comprises the formal onboarding program to integrate the new employee into the organization and his/her new position (see Table 3).

Table 3. Overview of orientation approaches.

Nr.	Identified Actions	Sources
2.1	Formal orientation program	(Bauer, 2010; Keisling & Laning, 2016)
2.2.	Clear communication of objectives, timelines, roles	(Bauer, 2010)
2.3.	Provide working with client pack	(Gregory et al., 2022)
2.4.	Q&A Session	(Klein & Heuser, 2008; Klein & Polin, 2012)
2.5.	Tour of the company facilities	(Bauer, 2010)
2.6.	Explain terms, conditions, rules and culture	(Sharma & Stol, 2020)
2.7.	Set up contact with peers	(Bauer, 2010; Keisling & Laning, 2016)
2.8.	Sharing insider tips	(Krasman, 2015)

Overall, the experts considered that incorporating onboarding in the orientation category is suitable. Both actions *"Socialize with newcomer"* and *"Set up contact with peers"* were highlighted by E1-E4, indicating the matchmaking already discussed in previous categories as an AI potential here. Matchmaking could be performed based on newcomers' personal profiles. E4 specified that using a clustering algorithm based on an organization graph is beneficial. According to E5, these measures could be customized for the newcomer using AI applications, e.g., by personalizing insider tips and grouping employees based on similarities.

In addition, experts also see the potential for using AI applications in more formal actions. The following quote from E2 provides a rationale for this: *"Orientation in my opinion is one of those things where it is widely acceptable to have AI play a big role. So [...] this is a phase where you can really push on the pedal and let AI drive more because it is kind of expected for a company to modulate and personalize the orientation phase toward whatever the person is going to do and toward the wishes and dislikes and idiosyncrasies of the person"*. E4 and E5 noted that AI applications might customize Q&A sessions and terms & conditions. E3 said AI-based conversational agents

could be useful for Q&A for newcomers, which could act like a “central point of contact” (E6).

Nevertheless, the lack of human relationships worries our experts. E4 says human relations are vital during the onboarding. Social measures like *“contact peers”* and *“share insider tips”* should be performed partly by humans together with AI recommendations.

4.3. Support Tools and Processes

The category support tools and processes comprises standardized actions and tools to improve the newcomer’s onboarding experience (see Table 4).

Table 4. Overview of support tools and processes.

Nr.	Identified Actions	Sources
3.1.	Fixed onboarding plan with milestones	(Bauer, 2010; Graybill et al., 2013)
3.2.	Use of online onboarding tools	(Bauer, 2010; Klein & Heuser, 2008; Klein & Polin, 2012)
3.3.	Introduce communication tools	(Gregory et al., 2022; Klein & Heuser, 2008; Klein & Polin, 2012)
3.4.	List of important names & contact information	(Klein & Heuser, 2008; Klein & Polin, 2012)
3.5.	Glossary of company-specific abbreviations	(Klein & Heuser, 2008; Klein & Polin, 2012)

For this category, E1 proposed that an AI application can improve communication and especially increase access to all relevant information for the newcomer. In this regard, E4 states an example of a search engine for internal company knowledge that incorporates a knowledge graph of the organization and can therefore directly refer to a person who should be able to answer the question. Considering the *“fixed onboarding plan”*, E3 proposed an intelligently adapted onboarding plan (based on the prior information of the employee). This measure would transform this action into a *“variable onboarding plan”*.

E2 criticized the necessity of AI in this category which could be handled with simple algorithms: *“So these are the tools that are being used and AI here... I do not see a lot of cognitive necessities here, like it's easy peasy. I would not really employ too much intelligence from AI or from a person to handle this”*.

4.4. Coaching

The category of coaching includes more individualized actions based on the newcomer, e.g., assigning a mentor to continuously help (see Table 5).

Table 5. Overview of coaching approaches.

Nr.	Identified Actions	Sources
-----	--------------------	---------

4.1.	Assign mentor, buddy, or welcome coordinator	(Bauer, 2010; Graybill et al., 2013; Gregory et al., 2022; Klein & Heuser, 2008; Klein & Polin, 2012)
4.2.	Role-modelling	(Gregory et al., 2022)
4.3.	Encourage learning	(Gregory et al., 2022; Sharma & Stol, 2020)
4.4.	Exercise empathy	(Gregory et al., 2022)
4.5.	Continuous availability of help	(Sharma & Stol, 2020)

Regarding the coaching category, experts were confident that an AI application can be used at various points. All experts proposed working with a clustering algorithm that finds similar newcomers and potential mentors and buddies based on their skill profiles to generate suggestions for suitable matches. However, E2 and E5 highlighted that the final assignment should ultimately be made by a human, supported by suggestions from the AI, again in the sense of human-AI collaboration. Hence, E1 mentioned that the function of a buddy or mentor could be also supported through a conversational agent, which he named a *“personal buddy”*. Thus, such a buddy could be used to provide a single point of contact for questions (E1, E4, E6). E2 summarized this up: *“Humans [...] can use the AI in order to get useful information”*.

Despite the great potential of applying AI during the coaching, E3 said that solutions can only be introduced based on a sufficiently large dataset and would, therefore, only be more useful for large companies. On another note, E2 and E4 referred to the point of human interaction, which should not be neglected.

4.5. Training

The training category includes actions for the newcomers to gain all knowledge and skills to execute the job for which they were hired (see Table 6). This includes position-based re- & upskilling measures or courses that aim to close skill gaps of newcomers.

Table 6. Overview of training approaches.

Nr.	Identified Actions	Sources
5.1.	Scaffolding during problem-solving	(Bauer, 2010; Rabel & Stefaniak, 2018)
5.2.	Offer re- & upskilling training offline and on-demand	(Gregory et al., 2022; Klein & Heuser, 2008; Klein & Polin, 2012; Snell, 2006)
5.3.	On-the-job training and live coaching session	(Klein & Heuser, 2008; Klein & Polin, 2012; Sharma & Stol, 2020)
5.4.	Presentation by expert colleagues	(Klein & Heuser, 2008; Klein & Polin, 2012)

5.5.	Class-based learning (with other newcomers)	(Klein & Heuser, 2008; Klein & Polin, 2012; Sharma & Stol, 2020)
------	---	--

Most experts had a clear expectation about the potential of AI applications for training. In principle, according to the experts, AI applications can intelligently augment by providing responsible persons with suitable information and recommendations. In this context, E2 confirms that he sees AI application play a facilitator role within the organization, for instance, it can help to recommend suitable re-& upskilling courses to the newcomer, while the training itself is then executed by the organizational trainers and educators. Additionally, E3 referred to the term “people analytics” by proposing that the analysis of training data (e.g., assessments or behavioral data) could predict newcomers’ difficulties and identify skill gaps. E4 and E5 proposed an AI-based learning tool that is able to directly be recommended either for the completion of further modules or the implementation of alternative courses. In line with the statements made by E2, it does not matter whether the training is conducted digitally on-demand or face-to-face.

However, the interviewees voiced criticisms in this category. E3 pointed out that sensitive situations could arise when an employee’s behavior is tracked even if it is anonymized.

4.6. Feedback

When newcomers enter the organization, they generally lack an understanding of the unique organizational context and culture (Johnson & Senge, 2010). Thus, feedback is an important tool, and identified actions relate to an open feedback culture (see Table 7).

Table 7. Overview of feedback approaches.

Nr.	Identified Actions	Sources
6.1.	Regular feedback sessions	(Snell, 2006; Bauer, 2010; Krasman, 2015)
6.2.	Accessible feedback tools	(Bauer, 2010)
6.3.	Offer one-to-ones with senior staff	(Gregory et al., 2022)
6.4.	Provide immediate feedback	(Gregory et al., 2022)
6.5.	Open & honest communication	(Keisling & Laning, 2016)

E2 stated that for the action “*accessible feedback tools*” the use of a text-based conversational agent would be helpful to regularly collect feedback.

However, experts agreed that the feedback process itself should be maintained through personal

interaction. E4 questions the use of AI applications in this category, as the use of such an AI algorithm would not be worth it. In his opinion, such an approach would fall into the category “*to crack a nut with a sledgehammer*”. E2 mentions that actions “*Offer one to ones with senior staff*” and “*Meeting with HR representative*” are best carried out personally.

4.7. Potentials of AI Applications in Onboarding

In this section, we provide a holistic evaluation of the AI application potentials in onboarding by summarizing previous points. We, therefore, asked experts to rank the onboarding categories according to the potential each one has to provide meaningful AI use cases. A majority of experts assessed the biggest potential of AI applications in the coaching category. Secondly, half of the experts evaluated support tools and processes, as well as training categories as important potential application areas of AI. In contrast, the categories preparation, orientation, and feedback did not seem to provide many application potentials for AI. Consequently, we derived three main propositions regarding the potential of AI applications in onboarding, which were prominent in all interviews.

The first proposition addresses the general role of AI applications in the onboarding processes. All experts agreed that AI applications can play a facilitating role in the onboarding actions to intelligently augment the measures of humans. Thus, AI applications should not overtake actions themselves, but rather facilitate them. For instance, an AI application that can identify people with similar interests, an AI-based conversational agent that can improve access to relevant onboarding documents, or an organizational knowledge graph that can help newcomers to find responsible persons for their questions. We propose that AI applications should take a facilitating role in the onboarding process.

The second proposition reports the relevance of individualized onboarding facilitated by AI applications. All experts spoke about the relevance of adapting the onboarding process to the individual newcomer’s skills, personalities, and preferences. AI applications can process large data and thus, could facilitate this personalization of the onboarding process. For instance, intelligent recommender systems can select re-& upskilling courses or suitable learning material for the newcomer based on his/her skills and help to close skill gaps (Bauman & Tuzhilin, 2018). Consequently, we propose that AI applications have the potential to facilitate an individualized onboarding process.

The third proposition involves the creation of a skill profile that captures all current skills of the newcomer as a foundation of AI applications in onboarding processes. First, such a profile enables AI applications, like matchmaking, to connect newcomers with similar colleagues and other employees. This can help newcomers establish social contacts. Second, a skill profile can be used to identify skill gaps and recommend suitable re- & upskilling measures. Therefore, we propose that the implementation of a personal skill profile for each unleashes many use cases of AI applications.

5. Discussion

This work aims to explore the potential of AI applications in organizational onboarding processes. Therefore, we conducted a literature review of onboarding practices and then categorized these into six onboarding categories. Then, we evaluated these categories with experts and reveal insights into how AI applications can be used in all six categories. Moreover, we create new knowledge and have developed three propositions about the potential of AI applications for onboarding. Therefore, according to Gregor (2006) we contribute design knowledge and in particular, propositions to describe principles of form and function on how to construct the onboarding.

According to the experts, one aspect to highlight is the relevance of text-based conversational agents as a support tool. Since newcomers raise many questions, such a “*personal buddy*” (E1) can be used throughout the whole onboarding process. Current research by Majumder & Mondal (2021) or confirms that intelligent conversational agents are in the forerun and will also impact practices of HRM.

AI in the loop of human intelligence describes the use of an AI that supports humans in making decisions (Dellermann et al., 2019). Hence, experts often considered this type of collaboration process as successful, e.g., an AI application that proposes matchmaking of newcomers with buddies, the application may be more accurate and less biased than done by humans. However, meeting a similar colleague is still carried out personally. This supports our first proposition, saying that AI applications should facilitate onboarding actions.

Legal and ethical topics have also been discussed in the interviews and a heated debate is ongoing about the impact of a biased or unfair AI. This could also happen when applying AI in onboarding and influencing newcomers’ retention. The use of a biased data set for AI can, for instance, return racist decisions about the recidivation of a criminal (Angwin et al., 2016). Further, Mujtaba & Mahapatra (2019) identify

causes for biases of AI applications in HR (including resume screening or candidate ranking) and propose several methods and tools to decrease biased results. Cohen (2019) insists on eliminating bias from the start of AI adoption and argues that consequently, higher employee diversity can be achieved within an organization. Another ethical aspect that arises is the data privacy question of employees. Data must be always anonymized, and organizations must ask for permission and should not be able to draw conclusions about individual employees (Suhonen et al., 2011).

Additionally, the implementation and adoption of AI applications in organizations must be planned carefully so that the system achieves high accuracy when taking over onboarding tasks. Such a self-developed system might not be worthwhile for smaller companies because of the enormous development effort and the risk of poor results due to several reasons (e.g., lack of data, biased data), that may not lead to a satisfactory cost-and-return ratio. Future research is vital to determine where the critical company size lies, as this influences the success of AI initiatives.

6. Conclusion

The use of AI applications is expected to increase significantly in the coming years and will shape new work processes and practices (Brynjolfsson & McAfee, 2017). The aim of this work was twofold. First, we aimed to create a holistic overview of literature-based onboarding to integrate research insights from an interdisciplinary field. In such nascent research fields such as implementation of AI in organizations, a synthesis of representative literature is needed (Torraco, 2005). Second, based on these best practices we strived for identifying concrete potentials for AI applications regarding these measures. To answer our research question, we analyzed the literature and conducted qualitative expert interviews.

The results contribute to research in two ways. First, a comprehensive overview of current practices in the onboarding process was presented. Second, we elaborated on potentials for AI applications for each identified onboarding action and derived three propositions about the application of AI in onboarding. While there exists some research on AI in HRM, our research is among the first to evaluate the potential of AI applications for onboarding practices. Therefore, it might be beneficial for researchers in the new work domain and can help organizations to design a successful onboarding process post-COVID-19.

In spite of these significant results, this paper does not come without limitations. First, despite the advantages of this study’s approach, the onboarding framework is based on theoretical principles alone,

while the AI application fields are derived from practical experience. The results might have been different if the overview had included practical principles, or if the identification of AI potential had included theoretical methods. Ideally, both the onboarding model and the AI implementations should be based on theoretical foundations and then validated in practice. However, future research could use this work as a starting point to shed more light on the potential of AI in onboarding. Second, the number of expert interviews was relatively small. Although the semi-structured approach and lengthy interviews provided rich data, more interviews would increase the validity of the results. However, this work lays a valuable foundation for more effective employee onboarding processes in the digital world.

7. References

- Almeida, F., Duarte Santos, J., & Augusto Monteiro, J. (2020). The Challenges and Opportunities in the Digitalization of Companies in a Post-COVID-19 World. *IEEE Engineering Management Review*, 48(3), 97–103. <https://doi.org/10.1109/EMR.2020.3013206>
- Angwin, J., Larson, J., Mattu, S., & Kirchner, L. (2016, May 23). *Machine Bias*. ProPublica. <https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing>
- Bauer, T. (2010). Onboarding New Employees: Maximizing Success. *SHRM Foundation's Effective Practice Guidelines Series*.
- Bauer, T. (2016). Manager: Take accountability for onboarding. *Workforce Solutions Review*, 7(4), 34–35.
- Bauer, T. N., & Erdogan, B. (2011). Organizational socialization: The effective onboarding of new employees. In *APA handbook of industrial and organizational psychology, Vol 3: Maintaining, expanding, and contracting the organization*. (pp. 51–64). American Psychological Association. <https://doi.org/10.1037/12171-002>
- Bauman, K., & Tuzhilin, A. (2018). Recommending Remedial Learning Materials to Students by Filling Their Knowledge Gaps. *MIS Quarterly*, 42(1), 313–332. <https://doi.org/10.25300/MISQ/2018/13770>
- Berente, N., Gu, B., Recker, J., & Santhanam, R. (2021). Managing Artificial Intelligence. *MIS Quarterly*, 45(3), 1433–1450.
- Brynjolfsson, E., & McAfee, A. (2017). The Business of Artificial Intelligence: What it Can - and Cannot - Do for Your Organization. *Harvard Business Review*.
- Carucci. (2018). To Retain New Hires, Spend More Time Onboarding Them. *Harvard Business Review*. <https://hbr.org/2018/12/to-retain-new-hires-spend-more-time-onboarding-them>
- Chowdhury, S., Budhwar, P., Dey, P. K., Joel-Edgar, S., & Abadie, A. (2022). AI-employee collaboration and business performance: Integrating knowledge-based view, socio-technical systems and organisational socialisation framework. *Journal of Business Research*, 144, 31–49. <https://doi.org/10.1016/j.jbusres.2022.01.069>
- Cohen, T. (2019). How to leverage artificial intelligence to meet your diversity goals. *Strategic HR Review*, 18(2), 62–65. <https://doi.org/10.1108/SHR-12-2018-0105>
- Dai, G., & de Meuse, K. P. (2007). *A review of onboarding literature, 1-9*. (Inc.: A subsidiary of K. I. Lominger Limited, Ed.).
- Dellermann, D., Ebel, P., Söllner, M., & Leimeister, J. M. (2019). Hybrid Intelligence. *Business & Information Systems Engineering*, 61(5), 637–643. <https://doi.org/10.1007/s12599-019-00595-2>
- Fitriasari, F. (2020). How do Small and Medium Enterprise (SME) survive the COVID-19 outbreak? *Jurnal Inovasi Ekonomi*, 5(02). <https://doi.org/10.22219/jiko.v5i3.11838>
- Glaser, B. G., & Strauss, A. (1976). *Discovery of grounded theory: Strategies for qualitative research*. Sociology Press.
- Graybill, J. O., Taesil Hudson Carpenter, M., Offord, J., Piorun, M., & Shaffer, G. (2013). Employee onboarding: identification of best practices in ACRL libraries. *Library Management*, 34(3), 200–218. <https://doi.org/10.1108/01435121311310897>
- Gregor. (2006). The Nature of Theory in Information Systems. *MIS Quarterly*, 30(3), 611. <https://doi.org/10.2307/25148742>
- Gregory, P., Strode, D. E., Sharp, H., & Barroca, L. (2022). An onboarding model for integrating newcomers into agile project teams. *Information and Software Technology*, 143, 106792. <https://doi.org/10.1016/j.infsof.2021.106792>
- Halaweh, M. (2012). Integration of Grounded Theory and Case Study: An Exemplary Application from E-commerce Security Perception Research. *Journal of Information Technology Theory and Application*, 13(1).
- He, E. (2018). Can artificial intelligence make work more human? *Strategic HR Review*, 17(5), 263–264. <https://doi.org/10.1108/SHR-10-2018-146>
- Heimbürger, L., Buchweitz, L., Gouveia, R., & Korn, O. (2020). *Gamifying Onboarding: How to Increase Both Engagement and Integration of New Employees* (pp. 3–14). https://doi.org/10.1007/978-3-030-20145-6_1
- Hofmann, P., Jöhnk, J., Protschky, D., & Urbach, N. (2020). Developing Purposeful AI Use Cases - A Structured Method and Its Application in Project Management. *15th International Conference on Wirtschaftsinformatik*.
- Johnson, M., & Senges, M. (2010). Learning to be a programmer in a complex organization. *Journal of Workplace Learning*, 22(3), 180–194. <https://doi.org/10.1108/13665621011028620>
- Keisling, B., & Laning, M. (2016). We Are Happy To Be Here: The Onboarding Experience in Academic Libraries. *Journal of Library Administration*, 56(4),

- 381–394.
<https://doi.org/10.1080/01930826.2015.1105078>
- Kelly, J. A. (2020). The New “Covid-19” Home Office Worker: Evolving Computer-Human Interactions and the Perceived Value of Workplace Technology. *Technium Social Sciences Journal*, 575–581.
- Klein, H. J., & Heuser, A. E. (2008). *The learning of socialization content: A framework for researching orientating practices* (pp. 279–336).
[https://doi.org/10.1016/S0742-7301\(08\)27007-6](https://doi.org/10.1016/S0742-7301(08)27007-6)
- Klein, H. J., & Polin, B. (2012). *Are Organizations On Board with Best Practices Onboarding?* Oxford University Press.
<https://doi.org/10.1093/oxfordhb/9780199763672.013.0014>
- Klein, H. J., Polin, B., & Leigh Sutton, K. (2015). Specific Onboarding Practices for the Socialization of New Employees. *International Journal of Selection and Assessment*, 23(3), 263–283.
<https://doi.org/10.1111/ijssa.12113>
- Krasman, M. (2015). Three Must-Have Onboarding Elements for New and Relocated Employees. *Employment Relations Today*, 42(2), 9–14.
<https://doi.org/10.1002/ert.21493>
- Majumder, S., & Mondal, A. (2021). Are chatbots really useful for human resource management? *International Journal of Speech Technology*, 24(4), 969–977. <https://doi.org/10.1007/s10772-021-09834-y>
- Makarius, E. E., Mukherjee, D., Fox, J. D., & Fox, A. K. (2020). Rising with the machines: A sociotechnical framework for bringing artificial intelligence into the organization. *Journal of Business Research*, 120, 262–273.
<https://doi.org/10.1016/j.jbusres.2020.07.045>
- Makridakis, S. (2017). The forthcoming Artificial Intelligence (AI) revolution: Its impact on society and firms. *Futures*, 90, 46–60.
<https://doi.org/10.1016/j.futures.2017.03.006>
- Mayring, P., & Fenzl, T. (2019). Qualitative Inhaltsanalyse. In *Handbuch Methoden der empirischen Sozialforschung* (pp. 633–648). Springer Fachmedien Wiesbaden.
https://doi.org/10.1007/978-3-658-21308-4_42
- Meyer von Wolff, R., Hobert, S., Masuch, K., & Schumann, M. (2020). Chatbots at digital workplaces—a grounded-theory approach for surveying application areas and objectives. *Pacific Asia Journal of the Association for Information Systems*.
- Mujtaba, D. F., & Mahapatra, N. R. (2019). Ethical Considerations in AI-Based Recruitment. *2019 IEEE International Symposium on Technology and Society (ISTAS)*, 1–7.
<https://doi.org/10.1109/ISTAS48451.2019.8937920>
- Myers, M. D., & Newman, M. (2007). The qualitative interview in IS research: Examining the craft. *Information and Organization*, 17(1), 2–26.
<https://doi.org/10.1016/j.infoandorg.2006.11.001>
- Narayanamurthy, G., & Tortorella, G. (2021). Impact of COVID-19 outbreak on employee performance – Moderating role of industry 4.0 base technologies. *International Journal of Production Economics*, 234, 108075. <https://doi.org/10.1016/j.ijpe.2021.108075>
- Prikshat, V., Malik, A., & Budhwar, P. (2021). AI-augmented HRM: Antecedents, assimilation and multilevel consequences. *Human Resource Management Review*.
<https://doi.org/10.1016/j.hrmr.2021.100860>
- Rabel, K., & Stefaniak, J. (2018). The Onboarding of Instructional Designers in the Workplace. *Performance Improvement*, 57(9), 48–60.
<https://doi.org/10.1002/pfi.21824>
- Russell, S., & Norvig, P. (2021). *Artificial Intelligence* (4th ed.). Pearson Education. <https://elibrary.pearson.de/book/99.150005/9781292401171>
- Scott, C. P. R., Dieguez, T. A., Deepak, P., Gu, S., & Wildman, J. L. (2022). Onboarding during COVID-19. *Organizational Dynamics*, 51(2).
<https://doi.org/10.1016/j.orgdyn.2021.100828>
- Sharma, G. G., & Stol, K.-J. (2020). Exploring onboarding success, organizational fit, and turnover intention of software professionals. *Journal of Systems and Software*, 159,
<https://doi.org/10.1016/j.jss.2019.110442>
- Snell, A. (2006). *Onboarding: Speeding the way to productivity*.
<http://www.eitrainingcompany.com/wp-content/uploads/2012/04/taleoresearch-oboarding-speeding-way-recovery.pdf>
- Suhonen, R., Stolt, M., Virtanen, H., & Leino-Kilpi, H. (2011). Organizational ethics: A literature review. *Nursing Ethics*, 18(3), 285–303.
<https://doi.org/10.1177/0969733011401123>
- Talmundo, & Vlerick Business School. (2022). *Expectations Vs Reality of OnBoarding*.
https://cdn2.hubspot.net/hubfs/2297455/Marketing-Sales_Content/Vlerick-Talmundo_Onboarding_Study.pdf
- Torraco, R. J. (2005). Writing integrative literature reviews: Guidelines and examples. *Human Resource Development Review*, 4(3), 356–367.
- Votto, A. M., Valecha, R., Najafirad, P., & Rao, H. R. (2021). Artificial Intelligence in Tactical Human Resource Management: A Systematic Literature Review. *International Journal of Information Management Data Insights*, 1(2),
<https://doi.org/10.1016/j.ijime.2021.100047>
- Webster, J., & Watson, R. T. (2002). Analyzing the Past to Prepare for the Future: Writing a Literature Review. *MIS Quarterly*, 26(2), xiii–xxiii.
- Wolfswinkel, J. F., Furtmueller, E., & Wilderom, C. P. M. (2013). Using grounded theory as a method for rigorously reviewing literature. *European Journal of Information Systems*, 22(1), 45–55.
<https://doi.org/10.1057/ejis.2011.51>
- Zeadally, S., Adi, E., Baig, Z., & Khan, I. A. (2020). Harnessing Artificial Intelligence Capabilities to Improve Cybersecurity. *IEEE Access*, 8,
<https://doi.org/10.1109/ACCESS.2020.2968045>