

Balancing Onboarding Efficiency with Human-Centered Engagement: A Comparative Analysis of Traditional and AI-Enabled Approaches

Sharná L. Lee

*University of the Incarnate Word, School of Professional Studies, San Antonio, Texas
sharnallee@outlook.com*

Abstract: Traditional Onboarding is essential for employee engagement, fostering personal connections, mentorship, and cultural integration. This process enables organizations to build trust and a sense of belonging, although it often comes at the expense of administrative efficiency and consistency. In contrast, artificial intelligence (AI)-enabled onboarding tools can deliver a standardized experience that can scale across an organization. As AI continues to transform workplaces, organizations are recognizing the need to upgrade their HR practices to survive in the competitive landscape (Nawaz et al., 2024). However, overreliance on AI-driven onboarding tools may erode the interpersonal dimensions of onboarding. This paper presents a comparative analysis of the Traditional Onboarding process in contrast to an AI-Enabled Onboarding process, examining the tradeoffs between technological efficiency and human-centered engagement. By examining the intersection of AI-driven tools and traditional practices, the study identifies strategies for integrating automation while maintaining the interpersonal elements essential for effective onboarding. The analysis contributes guidance for HR leaders aiming to balance innovation with relational integrity to enhance employee engagement and retention.

Keywords: Onboarding, Artificial Intelligence (AI), Enterprise Resource Planning Systems (ERP), Human Resource Management, Automation ERP Systems, Algorithmic Bias

Introduction

There is growing recognition that automated onboarding procedures can improve the effectiveness and efficiency of acclimating new hires to their workplaces (Madanchian, 2024). A well-structured onboarding process helps new hires adjust to their roles, understand organizational values, and build meaningful relationships with peers and mentors. Due to the COVID-19 pandemic, organizations had to shift to remote work (Elbawab, 2022). As a result, key business processes such as onboarding, which is heavily human-centered, became partially digitally mediated. Digitizing the HR onboarding process using generative artificial intelligence (AI) solutions is a growing practice. Generative AI is positioned as a precursor providing the foundation, with AI agents advancing through tool integration, prompt engineering, and reasoning enhancements (Sapkota et al., 2025). This shift has moved from the use of standalone Large Language Models (LLMs) to more autonomous, task-oriented frameworks. As a result, two post-generative phases have emerged: AI Agents and Agentic AI. As described by Russell and Norvig (2021), an AI Agent is anything that can perceive its environment through sensors and act upon that environment through actuators. An AI Agent is usually a software-based entity that uses AI to perceive its environment, reason about it, and take action to achieve a goal with some degree of autonomy. Agentic AI constitutes a paradigm shift in artificial intelligence, enabling systems to act independently, pursue broad objectives rather than isolated decisions, and carry out complex tasks that require reasoning elements such as planning and reflection (Sun et al., 2025). This progression toward increasingly autonomous and interactive systems is exemplified by the evolution of chatbots. Originally created as rule-based conversational tools, chatbots have progressed into intelligent conversational agents that utilize LLMs to comprehend natural language, provide contextually relevant responses, and execute task-oriented functions. AI chatbots assist with employee onboarding by guiding new hires through documentation, training

schedules, and organizational policies... by providing instant responses, chatbots reduce dependency on HR personnel and streamline the onboarding experience (Mercy et al., 2025).

Enterprise Resource Planning (ERP) systems are fundamental to the operation of contemporary businesses, effectively streamlining processes, optimizing resources, and enabling data-driven decision-making (Mhaskey, 2024). As discussed by Mhaskey (2024), major ERP players like SAP and Oracle have integrated Generative AI into their enterprise applications, and SAP has revealed the widespread integration of its natural-language AI copilot, Joule, across its technology platform and suite of business applications. El Garem's (2024) study finds that implementing AI technologies leads to increased efficiency and effectiveness in the onboarding process. However, overreliance on AI-driven onboarding tools may erode the interpersonal dimensions of onboarding.

This study presents a comparative analysis of traditional and AI-Enabled Onboarding processes, focusing on the trade-offs between technological efficiency and human-centered engagement. By evaluating their respective strengths, limitations, and implications for employee experience, the research aims to determine how AI technologies can complement rather than replace human interaction. Ultimately, the study seeks to provide a framework for organizations to optimize onboarding outcomes, enhancing engagement, efficiency, and retention in the evolving digital workplace.

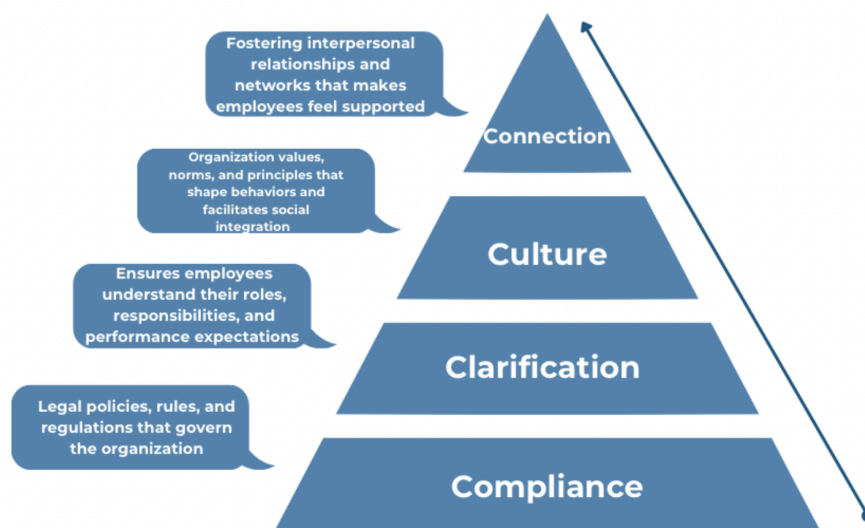
Traditional Onboarding

Traditional Onboarding is a comprehensive and well-established process that emphasizes a human-centered approach to welcoming new employees. A successful onboarding experience provides opportunities to better acclimate to a new environment, perform key job tasks more quickly, learn about the organization's mission and values, learn how to access resources, and determine how he or she may contribute to institutional growth and success (Baker & DiPiro, 2019). This vital procedure helps integrate newcomers into the organization's structure, culture, and workflows, ensuring that they feel valued and supported from day one. Organizations that are more active and more effective in onboarding new employees enjoy a 2.5 times as great revenue growth and a 1.9 times as great profit margin than organizations that are less active and effective in relation to onboarding their newcomers (Frögeeli et al., 2023). Employee turnover in organizations can cost employers millions of dollars annually in replacement costs (Jabutay & Rungruang, 2021). Moreover, employee turnover related to ineffective onboarding processes can cost an organization up to 40% of an employee's annual salary (Carpenter, 2023; Friedman & Neutze, 2020). While the specific methods employed may vary among organizations, they all share a common focus on fostering personal interaction and promoting experiential learning. These approaches are considered crucial for ensuring that employees can successfully acclimate to their new work environment, enabling them to build relationships, adapt to the company culture, and develop the necessary skills to thrive in their roles.

The effectiveness of Traditional Onboarding lies in its ability to foster human connection, engagement, and organizational commitment. Interacting with supervisors and colleagues allows new hires to ask questions, receive immediate feedback, and build trust. Bauer (2010) research suggests that employees who experience structured, human-led onboarding are more likely to report higher satisfaction, stronger role clarity, and greater retention. Bauer (2010) outlines the Four C's of Onboarding as essential components of an effective onboarding process. The most basic element is *compliance*, which helps new employees understand the legal policies, rules, and regulations that govern the organization. The next level, *clarification*, ensures that employees thoroughly understand their roles, responsibilities, and performance expectations. *Culture* encompasses the organization's values, norms, and unwritten rules that shape employee behavior and facilitate social integration. Lastly, *connection* involves fostering interpersonal relationships and informational networks that make new employees feel supported and engaged in the

workplace. Together, these four elements create a comprehensive framework that promotes both organizational alignment and long-term employee success. At their core, the Four C's of onboarding illustrate that successful employee integration extends beyond procedural efficiency. While administrative components such as completing employment forms, reviewing policies, and attending compliance training may seem procedural, working directly with new employees provides HR professionals with a first-hand opportunity to guide, support, and embody the principles of the Four C's. These personal interactions enable HR staff to ensure that new hires not only understand organizational policies and job expectations but also experience the company's culture and create meaningful connections. This hands-on approach transforms onboarding from a merely transactional process into a relational experience that fosters trust, belonging, and long-term commitment.

Figure 1. The Four C's of Onboarding



Source: Own elaboration, drawing on Bauer (2010)

Large organizations with geographically dispersed teams often struggle to deliver consistent onboarding experiences (Sanchez & Song, 2024). In today's remote and hybrid work environments, in-person onboarding can limit accessibility and scalability. New hires in different locations may receive inconsistent support, which can impact their engagement and productivity. While Traditional Onboarding excels at building relationships and aligning with company culture, it often lacks the speed and data-driven insights that modern organizations require. As a result, many organizations are turning to AI-enabled digital onboarding solutions that aim to blend technological efficiency with the personal touch of traditional practices.

AI-Enabled Onboarding

AI-Enabled Onboarding involves the use of artificial intelligence technologies integrated into ERP systems to enhance the onboarding process. Studies such as El Garem (2024) and Sanchez and Song (2024) have shown that AI tools significantly reduce administrative workload by automating data entry, document management, and policy dissemination. Generative AI can analyze employee profiles, including prior experience, learning preferences, and career goals, to create tailored onboarding experiences (Sanchez & Song, 2024). Another notable benefit is scalability (Sanchez & Song, 2024). Using AI enhances scalability and consistency by standardizing onboarding experiences across departments and geographic locations, ensuring that all employees receive the same experience, regardless of when or where they join. Given that

much of the onboarding process involves repetitive tasks such as form filling, ID card issuance, and benefit enrolment, HR chatbots efficiently handle routine inquiries and provide thorough responses (Kylliäinen, 2024). Predictive algorithms utilize advanced data analytics and machine learning models to identify specific knowledge gaps, process inefficiencies, and accurately forecast employee engagement trends. By transforming raw behavioral data into actionable insights, these systems empower HR professionals to implement proactive, data-driven interventions that enhance workforce integration. When combined with intelligent automation and adaptive learning frameworks, these technologies transform onboarding from a static, one-size-fits-all program into a dynamic, continuously evolving ecosystem. This adaptive ecosystem operates seamlessly across digital platforms, integrating user analytics, personalized content delivery, and real-time feedback loops to provide a responsive, data-informed onboarding experience. This approach enhances engagement, accelerates proficiency, and drives long-term employee retention.

While AI-driven onboarding offers numerous benefits, it also possesses considerable challenges. One of the primary concerns is security, as the onboarding process involves handling a substantial amount of personal information from new hires. “Security for AI” means designing, implementing security measures for AI technologies, since every technology has limitations, vulnerabilities and prone to attacks so it is imperative to secure AI infrastructure especially if it’s crucial to the business and nation state infrastructure (Shetty, 2024). There is a clear connection between security and the traditional, interpersonal onboarding model, as the process depends on trust and the responsible handling of personal information. However, as AI becomes more integrated into the onboarding process, inadequate security measures can create new vulnerabilities that compromise both data integrity and employee confidence. According to Mushtaq and Hameeda (2025), in the current digital landscape, ensuring confidentiality, integrity, and accessibility is vital, as AI technologies face dual security challenges at both the user and service-provider levels. Protecting this data is crucial given the potential risks associated with unauthorized access or data breaches. As organizations strive to integrate AI technologies into their onboarding practices, ensuring robust security measures is essential to safeguard the trust and privacy of new hires.

The fourth industrial revolution also raised concerns on issues such as job losses, robot taxes, accountability in AI along with security, hacking and privacy concerns due to AI implementation (Kim & Heo, 2018; Mushtaq & Hameeda, 2025). Addressing the issue of potential job displacement, a significant reduction in onboarding staff could result in an overreliance on AI models. This dependence may reduce accountability and obscure the rationale behind decisions and processes. AI solutions rely on data-sets that they are trained in and the models that have been built based on algorithms, its constantly evolving and learning based on these pre-set factors or lets call it pre-defined rules (Shetty, 2024). Without human oversight, there is a risk of diminished transparency and a lack of contextual understanding.

AI-Enabled Onboarding offers consistency and scalability; however, it cannot completely replicate the relational and cultural aspects of Traditional Onboarding. The most effective strategy is a hybrid model that combines the efficiency of AI with the empathy and mentorship provided by human HR professionals. This approach ensures that technology enhances rather than replaces the human experience central to the onboarding process.

Comparative Analysis

The comparative analysis between traditional and AI-Enabled Onboarding reveals a clear distinction between human-centered relational value and technology-driven operational efficiency. Traditional Onboarding often emphasizes human-centered relational value, fostering personal connections and engaging interactions that help new employees acclimate to the company's culture. Onboarding technology platforms cannot perform the socialization activities

that are so integral to successful onboarding (Snell, 2006). In contrast, AI-Enabled Onboarding focuses on technology-driven operational efficiency, streamlining processes, and minimizing administrative burdens. Reduced data re-entry decreases the time spent by the organization on administrative tasks and also provides a better experience for the new hire, promoting positive employee engagement (Snell, 2006). This shift indicates a greater reliance on automation, machine learning, and data analysis to enhance productivity, potentially at the expense of the human element, which can enhance employee satisfaction and integration. Each method has specific benefits and drawbacks, depending on the organization's structure, culture, and strategic goals.

Overall, onboarding implementation processes should focus on building long-term relationships and commitment, which should translate into employee satisfaction and performance (Jankowski, 2025). Having established that both traditional and AI-Enabled Onboarding offer distinct advantages and challenges, building on these distinctions, it becomes essential to examine how traditional and AI-Enabled Onboarding differ across key dimensions such as efficiency, engagement, scalability, and personalization. A comparative analysis provides deeper insight into how each approach supports or constrains organizational goals, employee integration, and long-term retention outcomes. According to Bauer (2010), this relational depth strengthens emotional commitment and helps new hires build interpersonal networks that are crucial for long-term success. Table 1 provides a comparative analysis of Traditional Onboarding to AI-Enabled Onboarding. The goal of the table is to help HR leaders balance innovation with relational integrity to enhance employee engagement and retention.

Table 1. Comparative Analysis of Traditional Onboarding to AI-Enabled Onboarding

Dimension	Traditional Onboarding	AI-Enabled Onboarding
Efficiency	Time consuming; manual processes managed by HR	Highly efficient through automation of forms, scheduling, and training
Engagement	High human interaction foster trust and belonging	Limited emotional engagement; relies on digital interfaces
Scalability	Difficult to scale across large or dispersed organizations	Easily scalable; provides consistent experience across locations
Personalization	Tailored through personal mentorship and feedback	Personalized through data-driven algorithms and adaptive learning
Consistency	Variable depending on HR staff and departmental practices	Standardized and uniform across the organization
Cultural Integration	Strong focus on transmitting norms, values, and culture	Requires deliberate design to embed culture in digital content
Retention Impact	Builds long-term loyalty through relationships	Enhances retention via efficiency but may lack emotional depth
Feedback Mechanisms	Feedback is immediate and delivered personally by HR staff, supervisors, mentors through ongoing dialogue.	Feedback is automated and data-driven, and may lack emotional nuance as it is based on metrics.
Cost Efficiency	Increased expenses resulting from staff time, printed materials, and facility usage.	Lower operational cost once implemented; high initial investment cost, but long term savings in automation.

Accessibility	Limited by location, time zone, and availability of HR staff. Remote workers can be excluded during in-person sessions.	Accessible 24/7 Cultural Integration and Provides a consistent experience for all users
Ethical & Privacy Concerns	Minimal ethical concerns as data is handled directly by HR Staff under existing protocols.	Raises issues around data privacy, algorithmic bias, and transparency. Required strong governance, legal, and ethical oversight.
Security Concerns	While physical documentation and in-person verification can reduce cybersecurity risks, they also increase the potential for handling errors or data loss.	Involves the digital storage and transfer of sensitive employee data, which increases exposure to cybersecurity threats; it requires encryption, access control, and compliance.
Emotional Intelligence	Human mentors can detect anxiety and non-verbal cues, providing empathy and reassurance.	Lack genuine emotional understanding; they simulate empathy but cannot fully replicate human responsiveness or intuition

The comparative analysis reveals that Traditional Onboarding and AI-Enabled Onboarding, though both designed to facilitate the integration of new employees within an organization, utilize fundamentally different approaches. From a strategic perspective, these differences highlight the necessity for a hybrid onboarding framework that merges the strengths of both models. Organizations that integrate the empathy and cultural transmission of Traditional Onboarding with the scalability and efficiency of AI-enabled systems can develop a more comprehensive approach, one that is both technologically advanced and deeply human.

Integration Strategy: The Hybrid Model

Instead of seeing automation and human involvement as opposing forces, this model views them as complementary elements of a cohesive process. The aim is to achieve both technological efficiency and human connection, ensuring that employees receive a smooth and sociotechnical introduction to the organization. AI can reduce costs and streamline processes, but personalized service, as demanded by customers, can only be provided to a limited extent (Khan & Iqbal, 2020; Reinhard et al., 2024). The remedy is a combination in which humans perform personal customer interaction, but AI augments them in problem-solving (Reinhard et al., 2024). Dellermann et al. (2019) introduce the concept of hybrid intelligence, emphasizing that AI system developers must coordinate novice interactions with AI to maximize synergies in hybrid intelligence. The objective is to achieve both technological efficiency and human connection.

Table 2 illustrates the division of onboarding tasks between automated and interpersonal approaches when implementing an AI solution. Administrative and repetitive processes are best managed through automation to enhance efficiency and accuracy. However, interpersonal functions, those aligned with the Four C's of communication, collaboration, critical thinking, and creativity, should remain under the purview of HR staff to preserve human connection, empathy, and contextual understanding within the onboarding experience.

Table 2. Recommended Distribution of Onboarding Processes Between AI Automation and HR Interpersonal Interaction

Onboarding Process	Recommended Approach	Rationale
Employee account creation and system access setup	Automated	Routine, rules-based tasks that can be completed efficiently by automated workflows, ensuring accuracy and consistency.
Collection of employee personal and banking details	Automated	Structured data collection that can be securely managed through chatbot or digital form automation.
Digital document submission and verification (e.g., ID, contracts, certifications)	Automated	Streamlines administrative steps while maintaining secure data handling and verification processes.
Overview of company policies and compliance documentation	Automated	Standardized information dissemination; AI can provide summaries, acknowledgment tracking, and policy updates.
Guidance on registering work hours and navigating internal systems	Automated	Repetitive procedural information suited for an AI assistant to reduce manual queries to HR staff.
Training module enrollment and completion tracking	Automated	Automated systems can manage scheduling, reminders, and progress tracking for mandatory training programs.
Overview of employee benefits and compensation structure	Partially Automated	AI can provide general explanations and FAQs; HR should clarify personalized or sensitive details.
Introduction to organizational structure and role-based resources	Partially Automated	Chatbots can share organization charts and resources, while HR contextualizes team culture and collaboration norms.
Scheduling initial meetings and orientation sessions	Partially Automated	AI can coordinate calendars and send invitations; HR facilitates the meetings and leads engagement.
Orientation meetings and culture induction	HR-led (Interpersonal)	Requires human interaction to communicate values, norms, and social expectations effectively.
Clarification of role expectations and performance objectives	HR-led (Interpersonal)	Involves critical discussion, goal setting, and mutual understanding—best supported through human dialogue.
Mentorship pairing and relationship building	HR-led (Interpersonal)	Relies on interpersonal compatibility, empathy, and collaboration—core to the Four C's framework.
Addressing employee concerns or emotional well-being	HR-led (Interpersonal)	Requires empathy, discretion, and nuanced understanding that AI cannot replicate.
Feedback and continuous improvement discussions	HR-led (Interpersonal)	Encourages reflective thinking, creativity, and collaboration between employees and HR staff.
Long-term career development planning	HR-led (Interpersonal)	Strategic and individualized in nature; involves coaching, critical thinking, and creative problem-solving.

Conclusion and Implications

Traditional and AI-Enabled Onboarding offer distinct strengths that, together, create a more effective approach than either can deliver alone. Traditional Onboarding is highly effective at promoting a strong company culture, building trust, clarifying roles, and fostering meaningful human connections. These elements are essential for creating a sense of belonging and ensuring long-term commitment from employees. On the other hand, AI-Enabled Onboarding focuses on efficiency, accuracy, scalability, and consistency. It reduces administrative burdens and allows new hires to become productive more rapidly.

Due to these complementary strengths, adopting a hybrid onboarding model is the most strategic approach. In this model, AI manages the transactional and repetitive tasks while HR professionals and managers focus on the relational and interpretive aspects of onboarding that technology cannot replicate.

A responsible integration of AI requires establishing clear guidelines, including data privacy protections, measures to mitigate algorithmic bias, transparency about how AI tools use employee information, and strict security protocols. These safeguards are essential for maintaining employee trust, a core component of effective onboarding, regardless of the delivery method utilized.

For HR leaders, a hybrid onboarding model has both strategic and measurable implications. It supports key outcomes like reduced time to proficiency, enhanced belonging and trust, higher engagement, and improved retention. As AI capabilities continue to advance, organizations may increasingly explore opportunities for further automation, adaptive learning, and predictive personalization to enhance their onboarding workflows. At present, blending AI efficiency gains with human supervision, organizations can create onboarding experiences that are operationally effective and meaningful, positioning new employees and the organization for success in a digital workplace.

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