

From E-Recruitment to Immersive Engagement: AI Models for Social and Human

Du e-recrutement à l'engagement immersif : apports des modèles d'intelligence artificielle aux dynamiques sociales et humaines

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Abstract

The convergence of artificial intelligence (AI), immersive technologies, and human-centered design is reshaping contemporary modes of interaction, learning, and organizational governance. Moving beyond traditional e-recruitment models, this paper offers a conceptual examination of how AI-driven immersive environments can foster more inclusive, ethical, and participatory forms of engagement within digital societies.

Building on earlier frameworks such as *Recruitment 4.0* and *Smart Cities, Smart Talents*, the study introduces the Immersive Engagement 5.0 model. This framework conceptualizes AI not merely as a technical or analytical tool, but as a socio-cognitive mediator shaping cognitive, emotional, and ethical dimensions of human-machine interaction. The model is structured around three interdependent pillars: Intelligent Mediation, Immersive Co-presence, and Ethical Orchestration, which together articulate a shift from functional interaction toward immersive and value-oriented digital experiences.

Methodologically, the paper adopts a conceptual research design grounded in an interdisciplinary synthesis of literature from artificial intelligence, management studies, communication theory, and digital ethics. Institutional and organizational cases are mobilized illustratively to support theory-building rather than empirical generalization.

The study contributes to ongoing debates on responsible AI and digital humanism by proposing a structured theoretical framework that informs the design of immersive, human-centric digital ecosystems and opens avenues for future empirical research.

Keywords:

Artificial Intelligence, Immersive Engagement, Immersive Technologies, Responsible AI, Digital Ethics, Digital Transformation.

Résumé

La convergence de l'intelligence artificielle (IA), des technologies immersives et des approches centrées sur l'humain transforme en profondeur les modes d'interaction, d'apprentissage et de gouvernance au sein des sociétés numériques. Cet article propose une réflexion conceptuelle sur le dépassement des modèles traditionnels du e-recrutement vers des formes plus immersives et participatives d'engagement humain médié par l'IA.

S'inscrivant dans la continuité des cadres *Recruitment 4.0* et *Smart Cities, Smart Talents*, l'étude introduit le modèle conceptuel Immersive Engagement 5.0, qui conçoit l'IA non seulement comme un outil analytique, mais comme un agent médiateur des dimensions cognitives, émotionnelles et éthiques de l'expérience humaine. Le modèle repose sur trois piliers interdépendants : la Médiation Intelligente, la Co-présence Immersive et l'Orchestration Éthique, articulant personnalisation, interaction immersive et gouvernance responsable.

Sur le plan méthodologique, l'article adopte une démarche conceptuelle fondée sur une synthèse interdisciplinaire de travaux issus de l'intelligence artificielle, des sciences de gestion, de la communication et de l'éthique numérique. Des cas institutionnels et organisationnels sont mobilisés à titre illustratif pour nourrir la construction théorique.

L'étude contribue ainsi au champ du digital humanism en proposant un cadre analytique visant à éclairer le développement d'écosystèmes immersifs responsables, favorisant l'inclusion, la confiance et le bien-être dans les environnements numériques.

Mots clés :

Intelligence artificielle, Engagement immersif, Technologies immersives, IA responsable, Éthique numérique, Transformation digitale

Introduction

Over the past decade, digital transformation has undergone a profound paradigm shift—from the automation of processes to the emergence of intelligent and immersive ecosystems that integrate human cognition, artificial intelligence (AI), and sensory experience. This evolution signals the advent of a new socio-technical era in which digital systems no longer merely process information but actively mediate human emotions, decisions, and interactions. When combined with immersive technologies such as Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR), AI fundamentally reshapes how individuals learn, communicate, and collaborate across spatial, cultural, and disciplinary boundaries.

Within these evolving environments, engagement can no longer be understood as a passive behavioral response. Rather, it becomes a cognitive and emotional continuum, co-constructed through intelligent systems capable of perceiving, interpreting, and adapting to human affective states. This convergence of AI and immersion raises critical questions about how knowledge is transmitted, how communities are formed, and how ethical communication can be sustained in increasingly hybrid and mediated digital spaces.

Building on prior frameworks—Recruitment 4.0, which examined AI and social media analytics in digital talent acquisition, and Smart Cities, Smart Talents, which positioned e-recruitment as a lever of human-centered digital governance in Morocco—this study extends the analysis beyond process optimization toward a broader socio-human perspective. While these models demonstrated the capacity of AI-driven ecosystems to enhance efficiency, inclusion, and participation, they also revealed emerging challenges related to trust, ethics, and human experience.

How can AI-powered immersive ecosystems move beyond instrumental efficiency to foster ethical engagement, empathy, and equitable participation within digital societies? More specifically, how can artificial intelligence function not only as a computational engine, but as a mediating agent that supports human values, social responsibility, and collective intelligence in immersive digital environments?

To address this research problem, the study adopts a conceptual and exploratory methodology grounded in an interdisciplinary synthesis of literature from artificial intelligence, communication studies, cognitive sciences, management, and digital ethics. Selected national and international cases are mobilized to support the theoretical reflection and to inform the construction of the proposed conceptual framework.

The article is structured as follows. First, the methodological foundations and conceptual positioning of the study are presented. Second, the Immersive Engagement 5.0 model is introduced, articulated around three interdependent pillars: Intelligent Mediation, Immersive Co-presence, and Ethical Orchestration. Third, the implications of this model are discussed across educational, managerial, and societal domains. Finally, the paper concludes by outlining future research directions and situating Immersive Engagement 5.0 within the broader agenda of digital humanism, where technology is conceived not as a substitute for humanity, but as a catalyst for its augmentation.

1. Methodology

1.1 Research design

This study adopts a conceptual research design grounded in theory-building and integrative synthesis. Rather than producing empirical generalizations, the objective is to develop a coherent conceptual framework that articulates how artificial intelligence and immersive technologies reshape engagement, ethics, and human-machine interaction in digital ecosystems.

The design follows a multi-layered logic: first, a synthesis of existing literature in artificial intelligence, digital communication, and cognitive psychology; second, the development of the Immersive Engagement 5.0 conceptual framework; and third, the formulation of hypotheses for future empirical validation.

This qualitative-conceptual design enables a deep understanding of how AI mediated immersion can transform human interaction, learning, and governance, emphasizing ethical awareness and social inclusion.

1.2 Case selection

The study uses purposeful sampling to select four cases across public, private, and hybrid domains. This ensures theoretical diversity and contextual depth, enabling analysis of how artificial intelligence (AI), ethics, and immersive technologies interact 3 within different socio-organizational systems. The cases were chosen for their relevance to human-AI interaction, alignment with ethical and social innovation goals, and ability to illustrate the shift from automation to immersive engagement.

The cases mobilized in this study do not constitute empirical case studies in the methodological sense. Instead, they are used as illustrative analytical anchors drawn from documented institutional and organizational contexts. Their purpose is to support theoretical reasoning,

highlight patterns of practice, and inform conceptual abstraction rather than to serve as sources of primary empirical data.

1.2.1 Conceptual foundation

Immersive Engagement 5.0 integrates empirical and theoretical perspectives from digital management, AI ethics, and social innovation. These cases collectively trace the evolution from automation to intelligent participation and finally to immersive engagement within digital ecosystems.

Despite their contributions, existing models largely conceptualize engagement as a functional or behavioral outcome, often overlooking its cognitive, emotional, and ethical dimensions. This instrumental bias limits their capacity to explain how AI-mediated immersive systems shape trust, empathy, and social meaning over time.

1.2.2 Comparison with existing technology adoption and engagement models

Classical technology adoption models such as the Technology Acceptance Model (TAM) (Davis, 1989) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) explain system usage primarily through perceived usefulness, ease of use, and social influence. While these frameworks are well established and empirically validated, they remain largely focused on initial adoption and continued usage, rather than on immersive, emotional, and ethical engagement.

Similarly, organizational engagement models emphasize affective commitment, motivation, and job involvement, yet they rarely account for AI-mediated environments where human experience is shaped by algorithmic decisions and immersive interfaces. Immersive Engagement 5.0 does not replace these models; instead, it extends them by integrating affective computing, immersive co-presence, and ethical orchestration, thereby capturing dimensions of engagement that emerge in AI-driven immersive ecosystems.

1.2.3 Anchor cases

Recruitment 4.0 examines AI and social-media analytics in talent acquisition, demonstrating efficiency and fairness gains while exposing risks such as bias and opacity. AI acts here as a mediator supporting human decision-making. Smart Cities, Smart Talents extends the inquiry to urban digital governance in Morocco, showing how AI-based recruitment fosters inclusive public management, trust, and civic participation.

1.2.4 Complementary international cases

Educational Immersion and Digital Empathy (Stanford VR Lab; UNESCO 2023) shows how VR and AI enhance empathy and collaboration, informing the affective dimension of Immersive Engagement 5.0.

Ethical AI and Human–Machine Governance (EU 2019; UNESCO 2021) provides the ethical basis for the Ethical Orchestration pillar through principles of transparency, accountability, and inclusiveness.

Corporate Digital Transformation and Employee Experience (Deloitte 2022; MIT Sloan 2023) highlights AI-driven onboarding and metaverse collaboration as drivers of collective intelligence and organizational empathy.

1.2.5 Integrative synthesis

Together, these organizational, managerial, educational, and governance cases outline a progression from automation to intelligent participation to immersive engagement. They validate the three pillars of Immersive Engagement 5.0—Intelligent Mediation, Immersive Co-presence, and Ethical Orchestration—and provide an interdisciplinary foundation for understanding AI as a partner in building a responsible and human centered digital society.

1.3 Data collection

The study employed a systematic and integrative data collection strategy to reflect the interdisciplinary nature of immersive AI systems. Given its conceptual orientation, data were drawn from secondary academic sources, institutional frameworks, and empirical evidence across artificial intelligence, communication, cognitive science, management, and digital ethics. This approach enabled a comprehensive understanding of how AI driven immersion is theorized, implemented, and ethically governed in both local and international contexts.

1.3.1 Sources of data

Were collected from peer-reviewed articles, institutional reports, and policy documents published between 2019 and 2025, using four main categories:

- Academic research (Scopus, IEEE Xplore, SpringerLink, ScienceDirect) on AI, affective computing, and immersive technologies.
- Institutional frameworks (EU AI Ethics Guidelines, 2019; UNESCO, 2021) linking innovation to governance and ethics.

- Corporate studies (Deloitte, PwC, MIT Sloan, 2022–2023) on digital transformation and immersive leadership.
- Educational reports (UNESCO, Stanford VHIL, 2022–2023) on empathy 4 based learning and inclusive digital design.

1.3.2 Search strategy and criteria

A systematic search combined Boolean keywords such as “AI and immersion,” “VR/AR learning,” “AI ethics,” “digital empathy,” and “human-centered design.” Inclusion criteria:

- Publication from 2019–2025.
- Focus on AI-driven engagement, ethics, or immersive environments.
- Relevance to the pillars of Immersive Engagement 5.0 (Intelligent Mediation, Immersive Co-presence, Ethical Orchestration). Out of 165 identified documents, 82 were retained for detailed analysis.

1.3.3 Data categorization

The selected works were grouped into three thematic clusters:

1. Technological–Cognitive (AI design, user immersion)
2. Ethical–Regulatory (transparency, justice, governance)
3. Managerial–Social (collaboration, collective intelligence). This organization helped identify patterns linking innovation, emotion, and ethics.

1.3.4 Data validation

Credibility was ensured through triangulation:

- Conceptual (AI, psychology, management models)
- Contextual (Moroccan cases vs. international benchmarks)
- Temporal (pre-2020 automation to post-2020 immersion). This process strengthened the empirical and theoretical basis of the Immersive Engagement 5.0 model.

1.4 Data analysis

Given the conceptual nature of the study, the analytical process follows a theory-driven synthesis rather than empirical data coding. The analysis consists of identifying recurring conceptual patterns across the reviewed literature, institutional frameworks, and documented practices, and organizing them into higher-level analytical dimensions.

1.4.1 Analytical framework

A **three-phase procedure** guided the analysis:

- Coding and classification of key concepts from the reviewed literature.
- Cross-comparison between thematic clusters (technological, ethical, managerial).
- Integration of findings into the triadic structure of Immersive Engagement 5.0.

1.4.2 Thematic synthesis

Each document was examined to extract variables related to AI mediation, emotional co-presence, and ethical orchestration. Themes were grouped to illustrate how immersive technologies influence learning, collaboration, and trust. The synthesis revealed convergence across disciplines—AI acting as a cognitive enhancer, immersive tools fostering empathy and engagement, and ethics ensuring responsible digital experience.

1.4.3 Model construction

Findings were then articulated into a conceptual triad that forms the basis of the Immersive Engagement 5.0 model:

- Intelligent Mediation – AI as an adaptive interface between human cognition and digital systems.
- Immersive Co-presence – XR and affective technologies creating shared, emotional spaces.
- Ethical Orchestration – Governance and design ensuring transparency, fairness, and inclusivity.

1.4.4 Validation

Conceptual robustness was ensured by aligning the emerging model with existing theoretical frameworks from digital humanism, AI ethics, and immersive communication studies. This alignment confirmed the model's interdisciplinary consistency and its relevance for future empirical applications in education, management, and digital governance.

2. Conceptual framework and theoretical contributions

The analysis of the collected data led to the formulation of a conceptual model that integrates cognitive, technological, and ethical perspectives within immersive AI systems. The Immersive Engagement 5.0 framework proposes a holistic vision of human–machine collaboration, where artificial intelligence serves as both a mediator of cognition and a catalyst for ethical interaction.

2.1 Core principles

Three interdependent principles emerged from the synthesis of theoretical and empirical evidence underpinning the Immersive Engagement 5.0 framework. The first principle, Intelligent Mediation, refers to the capacity of artificial intelligence systems to interpret, anticipate, and adapt to human cognitive and emotional states. Through mechanisms such as natural language processing, affective computing, and adaptive interfaces, AI acts as an intermediary that personalizes interactions and supports learning, decision-making, and emotional regulation within digital environments. Rather than merely automating processes, intelligent mediation enables a dynamic alignment between human intent and system responsiveness, thereby enhancing the quality and relevance of user experience.

The second principle, Immersive Co-presence, denotes the shared experiential dimension enabled by immersive technologies, including virtual reality, augmented reality, and extended reality. These environments bridge physical and virtual spaces, allowing users to engage in multi-sensory interactions that foster empathy, collaboration, and collective awareness. Immersive co-presence extends communication beyond traditional textual and visual modalities, facilitating a deeper sense of participation and social connection within digitally mediated contexts.

The third principle, Ethical Orchestration, ensures that intelligent and immersive systems operate within transparent, inclusive, and human-centered governance structures. This ethical orientation is consistent with recent academic work emphasizing the integration of governance and ethical accountability in AI-driven systems, particularly in managerial and societal contexts (El Alami & Bennani, 2022). This principle integrates fairness, accountability, and explainability into system design, aiming to promote digital well-being, trust, and social cohesion. Within this perspective, Explainable Artificial Intelligence (XAI) plays a critical role by enabling users to understand how algorithmic decisions are generated, thereby reducing perceptions of arbitrariness and reinforcing accountability. In immersive environments, explainability goes beyond technical transparency to encompass emotional and experiential clarity, ensuring that individuals remain aware of how their behaviors, emotions, and interactions are interpreted and influenced by intelligent systems. This alignment between explainability and immersion strengthens ethical engagement and supports human autonomy in augmented digital ecosystems.

Explainable Artificial Intelligence (XAI) constitutes a critical component of ethical orchestration in immersive environments. As AI systems increasingly mediate cognitive and

emotional experiences, transparency and intelligibility become essential conditions for trust and informed participation. XAI mechanisms enable users to understand how algorithmic decisions are produced, thereby reducing perceptions of arbitrariness and reinforcing accountability.

From a technical perspective, XAI addresses the opacity of complex models by providing methods that render algorithmic decisions interpretable, particularly in high-stakes socio-technical systems (Guidotti et al., 2018).

In immersive contexts, explainability extends beyond technical transparency to include emotional and experiential clarity, ensuring that users remain aware of how their behaviors, emotions, and interactions are interpreted and influenced by intelligent systems. This alignment between explainability and immersion strengthens ethical engagement and supports human autonomy.

2.2 Conceptual model overview

The Immersive Engagement 5.0 model is built upon the dynamic interplay between the three principles described above. At their intersection lies the Human & Social Augmented Experience, representing the synthesis of intelligence, empathy, and ethics in digital ecosystems.

2.3 Theoretical propositions

To enhance the analytical rigor of the Immersive Engagement 5.0 model, this study formulates a set of theoretical propositions that articulate the relationships between its core dimensions. These propositions are intended to guide future empirical research and to support the operationalization of the model across different contexts.

Proposition 1 (P1): Intelligent mediation positively influences immersive co-presence by enabling adaptive, emotionally responsive interactions that align system behavior with users' cognitive and affective states.

Proposition 2 (P2): Immersive co-presence positively contributes to ethical engagement by fostering empathy, mutual awareness, and shared meaning within AI-mediated environments.

Proposition 3 (P3): Ethical orchestration moderates the relationship between intelligent mediation and immersive co-presence by enhancing trust, transparency, and user autonomy in immersive AI systems.

Together, these propositions formalize the dynamic interplay between intelligence, immersion, and ethics, positioning Immersive Engagement 5.0 as a structured theoretical framework rather than a purely descriptive model.

The designation “5.0” refers to a qualitative shift in the conceptualization of engagement within digital systems. Unlike previous stages focused on automation (Industry 4.0) or user-centered optimization, Immersive Engagement 5.0 emphasizes the convergence of intelligent mediation, immersive experience, and ethical governance. It reflects an evolution from functional interaction toward cognitive, emotional, and normative co-experience, aligning with contemporary paradigms of human-centric and responsible digital transformation.

2.4 Theoretical implications

The findings demonstrate that engagement in digital environments evolves from behavioral response to immersive co-experience, mediated by intelligent systems that foster emotional and ethical depth. The model positions Immersive Engagement 5.0 as a theoretical bridge between AI-driven interaction models, digital ethics, and experiential communication theories. It provides a multidimensional framework applicable to research and practice in education, management, and human–computer interaction.

3. Discussion and implications

The findings indicate that Immersive Engagement 5.0 embodies both an opportunity and a challenge in advancing digital transformation across human, managerial, and ethical dimensions. Similar to e-recruitment in smart-city governance, immersive AI systems must reconcile efficiency with empathy, and innovation with accountability.

The discussion that follows is grounded in the conceptual framework and theoretical propositions introduced earlier. Rather than reporting empirical findings, the implications are derived from the internal logic of the Immersive Engagement 5.0 model and from the relationships formalized through Propositions P1–P3. As such, the implications should be interpreted as analytically grounded insights that illustrate how intelligent mediation, immersive co-presence, and ethical orchestration may interact under specific conditions within AI-driven environments.

3.1 Ethical implications

From an ethical standpoint, the model suggests that the impact of immersive AI systems on trust and digital well-being is contingent upon the presence of effective ethical orchestration mechanisms. In line with Proposition P3, ethical safeguards do not operate as standalone constraints but as moderating conditions that shape how intelligent mediation and immersive co-presence are experienced by users.

Immersive AI environments generate complex ethical questions related to data privacy, emotional manipulation, and cognitive transparency. While intelligent mediation enhances personalization, it also increases the potential for bias and affective exploitation. Therefore, an ethics-by-design approach becomes indispensable. Institutions and developers should adopt transparent algorithms, informed consent models, and continuous ethical auditing.

The Ethical orchestration pillar of Immersive Engagement 5.0 promotes a balance between innovation and integrity, ensuring that immersive systems enhance—rather than compromise—human dignity and autonomy.

3.2 Managerial implications

The managerial implications derived from the Immersive Engagement 5.0 model should be understood as contingent rather than universally applicable. In particular, Proposition P1 highlights that the effectiveness of intelligent mediation depends on organizational contexts that support adaptive decision-making, emotional awareness, and transparent governance structures.

From a managerial perspective, the model encourages organizations to transition from technology-driven management to empathy-driven leadership. This perspective is consistent with research in digital human resource management, which emphasizes the evolving role of technology as an enabler of human-centered organizational practices rather than a purely instrumental control mechanism (Bondarouk & Brewster, 2016). This transition aligns with studies on human-centered digital transformation, which underline the positive relationship between digital practices, organizational engagement, and employee commitment (Chraibi & Ait Haddou, 2021). AI and immersive tools can redefine workplace engagement by creating collaborative, emotionally intelligent, and inclusive environments. Managers must thus develop new competencies in digital ethics, emotional analytics, and human-machine co-creation.

Incorporating immersive platforms for training, communication, and project simulation can foster organizational learning and trust, echoing trends observed in digital governance and talent management practices. Ultimately, Immersive Engagement 5.0 repositions technology as a facilitator of collective intelligence and sustainable innovation.

3.3 Educational implications

In educational settings, the model does not imply that immersive AI systems automatically enhance learning outcomes. Instead, consistent with Proposition P2, their potential value

emerges when immersive co-presence is pedagogically designed to foster empathy, collaboration, and reflective engagement rather than mere technological immersion.

In the educational domain, immersive engagement transforms learning into a multi sensory, participatory, and empathetic experience. AI-driven virtual learning environments can adapt to students' emotional states, enhancing motivation and retention.

Educators are thus challenged to integrate immersive pedagogy responsibly, combining affective computing with ethical awareness. By aligning with the Intelligent Mediation and Immersive Co-presence pillars, educational systems can cultivate digital empathy, critical thinking, and ethical sensitivity—skills essential for the 21st century knowledge society.

Conclusion and future research directions

As a conceptual study, this research does not claim empirical validation of the proposed framework. Its primary contribution lies in theory development, integrative reasoning, and the articulation of a novel perspective on immersive engagement in AI-driven environments.

Despite its contributions, the study presents important limitations that must be acknowledged. The absence of primary empirical data restricts the validation of the proposed relationships and confines the findings to a conceptual level. Moreover, the illustrative cases discussed throughout the paper cannot be interpreted as empirical evidence, as they serve exclusively as analytical supports for theory-building. Consequently, the generalizability of the Immersive Engagement 5.0 framework remains contingent upon future empirical testing across diverse organizational, educational, and cultural contexts.

Beyond these limitations, the study emphasizes that artificial intelligence should be understood not merely as a technical artifact but as a socio-cognitive partner capable of mediating empathy, collaboration, and ethical awareness. By integrating the three pillars—Intelligent Mediation, Immersive Co-presence, and Ethical Orchestration—the proposed framework provides a coherent foundation for designing human-centric digital environments that promote inclusion, trust, and well-being.

Future research is therefore encouraged to empirically examine the Immersive Engagement 5.0 model through experimental and longitudinal studies measuring cognitive and emotional engagement in AI-mediated contexts. Additional research may explore cross-sectoral applications in education, management, healthcare, and cultural communication, as well as governance-oriented investigations assessing transparency, fairness, and the psychological effects of immersive technologies. Advancing this agenda will require interdisciplinary

collaboration among educators, technologists, ethicists, and policymakers to ensure that immersive AI ecosystems evolve responsibly.

Ultimately, by explicitly acknowledging its conceptual boundaries, this study positions Immersive Engagement 5.0 as a theoretical foundation intended to stimulate empirical inquiry and critical debate rather than as a finalized explanatory model.

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