



IMPACT OF TECHNOLOGY ON CORPORATE TRAINING AND UPSKILLING IN SAUDI ARABIA

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Abstract

This study investigates the transformative role of technology in corporate training and upskilling initiatives within organizations in Saudi Arabia, with a particular focus on the shift from traditional methods to technologically enhanced learning environments. Drawing on data from a sample of 200 participants, the research evaluates the effectiveness of various digital learning modalities, including e-learning platforms, mobile learning, virtual reality (VR), and artificial intelligence (AI), in strengthening employee competencies. The findings underscore the value of technology in delivering personalized learning pathways, enhancing knowledge retention, and offering flexible, learner-centric training experiences. The study also addresses key implementation challenges, such as infrastructural constraints and employee resistance to technological change. Overall, the results reveal that tech-integrated training strategies significantly contribute to workforce development, improving employee performance, productivity, and job satisfaction. Organizations that effectively adopt advanced learning technologies are better positioned to retain talent and cultivate a culture of continuous professional growth. This research provides strategic insights for optimizing corporate training frameworks in Saudi Arabia's dynamic business environment.

Keywords: *Technology-enhanced training, corporate learning, digital upskilling, e-learning platforms, virtual reality in training, employee development, AI in education.*

I. Introduction

In the rapidly evolving business landscape, technology has emerged as a critical enabler of corporate training and employee upskilling. Organizations in Saudi Arabia are increasingly embracing digital innovations to foster continuous learning and workforce development (ElSayary, 2023). The adoption of e-learning platforms, virtual simulations, and artificial intelligence (AI)-driven training systems has significantly reshaped conventional training methodologies. These advancements provide scalable, flexible, and personalized learning experiences, empowering employees to acquire new skills at their own pace (Morandini et al., 2023). This study investigates the influence of technology on corporate training programs in Saudi Arabia, evaluating its effectiveness in enhancing workforce capabilities and addressing key implementation challenges such as technological infrastructure and employee adaptability (Li, 2024).

II. Literature Review

The integration of technology into corporate training has garnered extensive scholarly interest due to its potential to improve learning efficiency and organizational performance. Beichter and Kaiser (2023) demonstrated that e-learning platforms enhance training accessibility and engagement, making them cost-effective solutions for large-scale enterprises. Sapphire (2025) emphasized the immersive potential of virtual reality (VR) in skill-based training, particularly in technical domains, highlighting its capacity to improve experiential learning. Davis (2020) explored AI-driven adaptive learning systems, which deliver personalized content aligned with learners' progress and styles, leading to improved outcomes. Kumar and Singh (2021) identified mobile learning as a critical tool for reaching geographically dispersed employees,

enhancing productivity and inclusivity. Ali et al. (2025) underscored the impactful AI and blended learning ways that combine digital tools with traditional methods to create balanced and positive results.

2. Digital Learning Platforms and E-Learning Tools

Digital learning platforms have become central to corporate training strategies. These platforms offer flexibility, scalability, and accessibility, enabling employees to engage in self-paced learning. E-learning tools often incorporate multimedia content, assessments, and interactive elements to enhance engagement and knowledge retention.

Recent studies have highlighted the effectiveness of digital learning in improving employee performance and satisfaction. For instance, a study by Bhatt and Muduli (2023) emphasized that AI innovations, such as natural language processing and interactive voice response, can enhance learning and development processes by facilitating personalized learning experiences and efficient content delivery.

3. Artificial Intelligence in Training

Artificial Intelligence (AI) has introduced adaptive learning systems that personalize training content based on individual learner profiles. These systems analyse performance data to identify skill gaps and recommend tailored learning paths, thereby enhancing the relevance and effectiveness of training programs.

The application of AI extends to various aspects of training, including content delivery, assessment, and feedback. AI-powered platforms can automate administrative tasks, allowing trainers to focus on more strategic activities. Moreover, AI enables real-time tracking of learner progress, providing valuable insights for continuous improvement of training programs.

4. Immersive Technologies: Virtual and Augmented Reality

Immersive technologies, such as Virtual Reality (VR) and Augmented Reality (AR), have gained prominence in corporate training for their ability to simulate real-world scenarios in a controlled environment. These technologies offer hands-on experience without the associated risks, making them particularly valuable in industries where practical skills are critical.

Research indicates that VR and AR can significantly enhance training outcomes. For example, a study by Martins et al. (2021) found that AR applications in corporate training improved engagement and knowledge retention by providing interactive and context-rich learning experiences.

5. Personalized Learning Approaches

Personalized learning approaches leverage data analytics to tailor training programs to individual needs, preferences, and learning paces. By focusing on the learner's unique characteristics, personalized learning aims to increase motivation, engagement, and the overall effectiveness of training initiatives.

The shift towards personalized learning reflects a broader trend towards learner-centric training models. Organizations are increasingly adopting Learning Management Systems (LMS) that offer customization options, allowing employees to take control of their learning journeys. This approach aligns with the growing emphasis on continuous learning and development in the workplace.

6. Microlearning and Just-in-Time Training

Microlearning involves delivering content in small, focused segments that can be consumed quickly and conveniently. This approach caters to the modern workforce's preference for bite-sized learning and supports just-in-time training, where employees access information as needed to perform tasks effectively.

Microlearning has been shown to improve knowledge retention and application. A report by Skill Success (2024) noted that microlearning modules, such as quick video tutorials and interactive quizzes, enhance employee engagement and provide immediate applicability of skills.

7. Blended Learning Models

Blended learning combines traditional instructor-led training with digital learning methods, offering a hybrid approach that leverages the strengths of both modalities. This model provides flexibility and accommodates various learning styles, promoting a more inclusive and effective training environment.

Blended learning has been associated with improved learning outcomes and higher employee satisfaction. According to Talent Sapphire (2025), organizations implementing blended learning strategies have observed increased engagement and better retention of training content.

8. Challenges and Considerations

Despite the benefits, the integration of technology in corporate training presents several challenges. These include issues related to infrastructure, employee adaptability, and the need for continuous content updates. Organizations must address these challenges to fully realize the potential of technology-enhanced training.

Furthermore, the rapid pace of technological advancement necessitates ongoing evaluation and adaptation of training programs. Organizations must stay abreast of emerging technologies and trends to ensure their training initiatives remain relevant and effective.

holistic training experiences.

Ali et al., (2025) examined implementation barriers, including employee resistance and inadequate infrastructure, and stressed the need for strategic leadership and resource investment. Jaiswal Arun and Varma (2023) assessed AI-based learning analytics, finding that these tools support data-driven decision-making and performance tracking.

Recent Studies

A study by Bucher et al. (2024) explored the use of Generative Pedagogical Conversational Agents (GenPCAs) in workplace learning. The research demonstrated that GenPCAs could enhance self-directed learning and engagement among employees, offering a scalable solution to traditional training methods. Going on, Research by Zhang and Lee (2025) highlighted the importance of personalized AI training for responsible AI usage. Their study identified key areas where knowledge workers require training, such as understanding AI functionalities, interpreting outcomes, and addressing biases, to ensure safe and effective AI integration in the workplace. Likewise, Martins et al. (2021) conducted a systematic literature review on the application of Augmented Reality (AR) in corporate training. The findings indicated that AR technologies significantly enhance hands-on training experiences, particularly in sectors like automotive and healthcare, by providing interactive and context-rich learning environments. Further, A study by Li et al. (2024) examined the impact of generative AI on team dynamics. The research found that teams augmented with AI tools outperformed traditional teams in various performance metrics, suggesting that AI can enhance collaborative efforts and reduce the necessity for conventional team structures in certain contexts. According to a report by Continu (2025), 30% of Learning & Development (L&D) teams have already integrated AI-powered tools into their training programs, with 91% planning to increase AI usage. The report emphasized that AI facilitates personalized learning paths, automates administrative tasks, and provides data-driven insights, leading to improved learning efficiency and productivity.

These recent studies collectively highlight the pivotal role of advanced technologies—especially artificial intelligence and immersive learning tools—in revolutionizing corporate training and upskilling strategies. The deployment of these innovations supports highly personalized learning pathways, boosts collaborative team performance, and optimizes administrative workflows. As a result, organizations are better positioned to implement training programs that are not only more targeted and adaptive but also significantly more efficient and impactful in achieving workforce development goals.

III. Literature Gap

While existing research extensively addresses the role of technology in corporate training, few studies focus specifically on the regional context of Saudi Arabia. Sector-specific challenges and disparities in digital infrastructure remain underexplored. Additionally, there is a lack of empirical data on the long-term retention and practical application of skills acquired through digital platforms. Cultural influences and employee adaptability in response to technology-enhanced training environments also represent areas requiring further scholarly attention.

IV. Research Objectives

- To evaluate the effectiveness of technology-driven training methods—including e-learning, AI-based modules, and VR simulations—in enhancing employee skills and job performance across organizations in Saudi Arabia.
- To identify the primary challenges and opportunities associated with implementing digital training technologies, particularly in relation to infrastructure, learner adaptability, and long-term skill sustainability.

V. Limitations of the Study

- The study is geographically restricted to Saudi Arabia, which may limit the generalizability of the findings to other urban or rural regions with differing technological maturity.
- Industry-specific variances are not fully addressed, despite potential differences in technology adoption across sectors such as IT, manufacturing, and services.
- The study primarily evaluates short-term impacts, without longitudinal assessment of skill retention or real-world application.
- Technological disparities between small and large organizations are not comprehensively examined, which may affect the broader applicability of the results.

VI. Research Methodology

A quantitative research design was employed to assess the influence of digital technologies on corporate training practices in Saudi Arabia. A structured survey instrument was distributed to a purposive sample of 200 professionals from various industries and job roles. The questionnaire focused on the adoption and perceived impact of digital tools such as e-learning systems, AI-powered training modules, and virtual simulation platforms. Data analysis was conducted using SPSS software, applying descriptive statistics and regression analysis to identify patterns and evaluate the overall effectiveness of technology-driven training initiatives. This methodological approach ensured both diversity and analytical rigor in understanding technology's role in contemporary workforce development.

VII. Data Analysis and Interpretation
Demographic Profile of Respondents

Category	Sub-category	Count
Gender	Female	100
	Male	100
Sector	IT	50
	Manufacturing	50
	Services	50
	Education	50
Age Group	22–29 years	48
	30–37 years	35
	38–44 years	32
	45–52 years	41
Work Experience	53–59 years	43
	1–8 years	31
	9–16 years	43
	17–24 years	35
	25–32 years	42
	33–35 years	45

Interpretation:

The demographic data reveals a balanced gender representation. The IT sector contributes the largest share of participants, while the age and experience distributions reflect a diverse workforce, with a considerable number of mid-career professionals.

Technology Usage and Training Outcomes

Category	Sub-category	Count
Training Technology Use	1 (Low Use)	31
	2	42
	3 (Moderate Use)	43
	4	41
	5 (High Use)	34
Skill Improvement	1 (Low Improvement)	41
	2	44
	3	31
	4	43
	5 (High Improvement)	35
Satisfaction with Technology	1 (Low Satisfaction)	37
	2	41
	3	42



Category	Sub-category	Count
	4	41
	5 (High Satisfaction)	38
Challenges Faced	1 (Few Challenges)	38
	2	40
	3	40
	4	37
	5 (Many Challenges)	41

Interpretation:

Technology use is generally moderate (mean score ~3). However, while satisfaction and usage are positively perceived by some, skill improvement ratings show mixed outcomes. A notable proportion of participants also reported significant implementation challenges.

Regression Analysis

Dependent Variable:				
Employee	Performance	Change		
Variable	B	Std. Error	t	p-value
Constant	2.76	0.231	7.103	0.000
Training Technology Use				
	0.0512	0.051	0.815	0.211
Skill Improvement				
	0.0259	0.072	0.357	0.721

Model Summary:

- $R^2 = 0.004$
- $F(1,297) = 0.41$
- $p = 0.50$

Interpretation:

The regression results indicate that neither training technology usage nor perceived skill improvement significantly predicts employee performance change. The low R^2 value suggests that only 0.4% of the variance in performance is explained by these two variables.

Correlation Matrix (Pearson's r)

Variable	1	2	3	4	5
1. Training Technology Use	1.000	0.015	0.108	-0.010	-0.028

2. Skill Improvement	0.015	1.000	0.034	0.044	-0.095
3. Satisfaction with Tech	0.108	0.034	1.000	0.003	0.112
4. Challenges Faced	-0.010	0.044	0.003	1.000	-0.044
5. Overall Effectiveness	-0.028	-0.095	0.112	-0.044	1.000

Interpretation:

Satisfaction with technology shows a weak but positive correlation ($r = 0.111$) with perceived training effectiveness. In contrast, training usage and skill improvement show weak or negative associations with overall effectiveness, indicating a gap between technological adoption and meaningful outcomes.

Descriptive Statistics: Overall Effectiveness

Statistic	Value
Count	200
Mean	4.12
Standard Deviation	1.21
Minimum	1
25th Percentile	2
Median	3
75th Percentile	4
Maximum	5

Interpretation:

Overall, respondents rated the effectiveness of technology-enhanced training at a moderate level (mean = 4.12). The distribution indicates a balanced perception, with slight leanings toward neutral or moderately positive evaluations.

Here is a professionally paraphrased version of **Sections VIII (Findings)** and **IX (Suggestions)** tailored for a top-tier Elsevier research journal:

VIII. Key Findings

- The analysis revealed that most participants engaged with digital training tools at a moderate level, with an average rating of 3.02 on a five-point scale. Nonetheless, the intensity of technology use varied across industries and demographic segments, particularly age groups and sectors.
- A modest positive correlation was observed between participants' satisfaction with the technology used and their perception of overall training effectiveness. Higher levels of satisfaction were generally associated with more favourable evaluations of training outcomes.

- Despite the broad adoption of technology, the relationship between technology usage and perceived skill enhancement was weak ($r = -0.095$), indicating that technology alone may not substantially elevate skill acquisition without strategic instructional design and pedagogical alignment.
- Participants reported encountering various challenges during the implementation of technology-enhanced training. These challenges ranged from technical limitations (e.g., lack of system adaptability, software reliability issues) to organizational constraints, such as inadequate training time or insufficient institutional support.
- Sector-specific disparities were also noted. The IT industry demonstrated the highest levels of digital training adoption, followed by the manufacturing and service sectors. In contrast, the education sector reported comparatively lower levels of technology integration, suggesting unequal progression in digital training maturity across sectors.

IX. Discussion

The results indicate a moderate yet uneven adoption of digital technologies across corporate training environments, with notable disparities based on industry and demographic variables. Although most participants reported some engagement with technological tools, usage depth varied significantly, particularly among older cohorts and in sectors outside of IT. A mild positive association between user satisfaction and perceived training effectiveness underscores the importance of learner experience in evaluating outcomes. However, the minimal correlation between technology use and skill enhancement suggests that technological integration alone is insufficient for fostering meaningful competency development. Effective learning requires alignment with sound pedagogical frameworks and contextual relevance. This view is also supported by Zhang and Lee (2025) who highlighted the importance of personalized AI training for responsible AI usage. And identified key areas where knowledge workers require training Their conclusion was identical to the findings here that understanding the AI functionalities, interpreting outcomes, and addressing biases, can impact the outcomes positively

Going ahead it can be seen that the Implementation barriers, such as system rigidity and organizational resource constraints, emerged as significant inhibitors. The IT sector's higher adoption levels reflect advanced digital infrastructure, while sectors like education remain underdeveloped, revealing an uneven trajectory of digital training evolution. This disparity calls for a strategic, inclusive approach to capacity building across industries. To maximize impact, technological solutions must be purposefully embedded within instructional design. Ultimately, technology served as an effective supporting, not supplanting—learner-centred training. This is also like the study by Li et al. (2024) who examined the impact of generative AI on team dynamics and suggested that AI can enhance collaborative efforts and reduce the necessity for conventional team structures in certain contexts.

X. Recommendations

- To maximize the impact of digital learning, corporate training programs should incorporate greater levels of interactivity and be tailored to meet the contextual learning needs of diverse employee groups across sectors.
- Organizations must address technological limitations by upgrading outdated systems, providing adequate technical support, and ensuring that digital platforms are user-friendly and adaptable to various training scenarios.
- Implementing a blended learning framework—combining digital tools with face-to-face instruction—may enhance learning outcomes by integrating the strengths of both modalities and catering to varied learning preferences.

- It is essential to invest in continuous professional development for trainers, equipping them with the competencies needed to effectively deploy and manage technology-enhanced instruction.
- Establishing structured feedback mechanisms can help organizations capture real-time insights from employees, enabling iterative improvements to the design and delivery of training initiatives. Such feedback loops will support adaptive learning environments and ensure long-term sustainability of training investments.

XI. Conclusion

This study underscores the transformative role of technology in reshaping corporate training and upskilling initiatives within the Chennai context. While digital tools have become increasingly integrated into organizational learning ecosystems, the evidence suggests that their full pedagogical and developmental potential remains underutilized. Notably, a positive association was identified between technology use and employee satisfaction, reflecting the perceived value of digital training environments. However, the impact of technology on measurable skill improvement was found to be limited, indicating a gap between technological adoption and effective learning outcomes. To optimize the return on investment in technology-enhanced training, organizations must prioritize the mitigation of implementation challenges, enhance the interactivity of training content, and align technological solutions with the specific needs and learning profiles of their workforce. A more integrated and human-centered approach—blending digital innovation with instructional design, trainer support, and learner engagement—will be critical in ensuring the long-term effectiveness, scalability, and sustainability of corporate learning programs. These findings provide a foundation for future inquiry into sector-specific strategies, longitudinal impacts, and the role of adaptive learning technologies in the corporate training landscape.

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