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Enhancing Employee Engagement In Training: The Role Of Technological Readiness, Immersive Engagement, And Self-Determination

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Abstract

The quick development of immersive technologies has changed employee training methods because these technologies create interactive spaces that enable employees to learn through direct experience. The research conducted so far has not established which factors drive employee participation in these particular environments. The research study investigates how two factors technological readiness and immersive engagement contribute to employee training participation while the study investigates how self-determination functions as a bridge between these two elements. The study develops a conceptual framework that combines technological elements with psychological aspects and experiential components based on Self-Determination Theory and Technology Readiness and Immersion theories. Researchers used a quantitative research design to study 240 employees who had done technology-based training after they completed a structured questionnaire. The researchers used Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze the gathered data. The research found that technological readiness as well as immersive engagement both positively influenced employee training participation. The process of self-determination functions as a mediator between technological readiness and engagement since it connects both technological readiness and engagement together with immersive engagement and engagement together. The research study examines engagement outcomes in immersive training environments through the technology adoption lens because it changes the existing literature about technology adoption. The study shows how training effectiveness improves when organizations combine their technological capacity with the psychological factors that drive their workforce. Organizations that want to create effective immersive training programs should pay attention to technological readiness and employee motivation according to the research findings.

Keywords: Technological Readiness, Immersive Experience, Self Determination, Employee Engagement in Training, Metaverse, PLS SEM

I. Introduction

Organizations have changed their employee training methods because of the quick development of immersive digital technologies. Metaverse-based training environments have become the main method organizations use to develop interactive learning experiences through their innovative training platforms. The metaverse-enabled learning system uses virtual reality and simulation and interactivity and real-time presence to create training scenarios which allow employees to take part in authentic and team-based learning experiences (Mystakidis, 2022; Dwivedi et al., 2023). Organizations need to study psychological and technological factors which influence employee participation in immersive learning ecosystems because they have started to invest more in these educational systems. Employees who participate in training activities show their full dedication to learning through cognitive and emotional and behavioral participation which leads to better training results and skill development and improved organizational results (Kahn, 1990; Saks, 2006). Organizations need to study how employees engage with advanced training technology because specific training methods which include immersive training systems will not result in better employee participation. Employee participation in learning activities depends on their capacity to navigate various technological tools which create psychological connections to the immersive experience while they maintain motivation throughout the educational process (Davis, 1989; Deci & Ryan, 2000). Employee participation in metaverse-based training requires organizations to study both technical and psychological factors which influence employee participation. Technological readiness functions as a critical factor because it indicates how people will accept and operate new technologies. Organizations that possess technological readiness will see their staff members progress in their abilities to work with immersive training programs while they succeed in virtual learning environments and view digital resources as helpful tools instead of frightening obstacles. Technological readiness functions as a positive factor that leads users to develop positive attitudes toward digital learning in technology-mediated academic settings according to previous research findings (Lin et al., 2007; Venkatesh et al., 2012). Work-related engagement among employees depends on their technological readiness because it establishes the foundational framework for developing metaverse-based training programs. Employees become completely absorbed in virtual training through immersive engagement which measures their training participation level. Immersive technologies are believed to increase learner attention, experiential involvement, and active participation by creating a sense of realism and psychological presence (Slater & Wilbur, 1997; Radianti et al., 2020). Employees who enter a training environment through deep immersion will maintain their attention while they build emotional connections and active participation. Therefore, employees experience training through their natural engagement with work which emerges as a key factor that drives their active participation. The initial factors of employee engagement exhibit a relationship that does not produce a direct connection with their engagement. The relationship between technological readiness and immersive engagement with employee engagement will be explained through self-determination which functions as the psychological mechanism that connects these elements. The concept of self-determination describes how people base their internal motivation and personal freedom on their capacity to participate in activities that matter to them according to Self-Determination Theory (Deci & Ryan, 1985, 2000). Employees will demonstrate self-determined behavior when they approach training activities because their motivation leads them to dedicate maximum effort while maintaining learning focus. The latest research demonstrates that learning environments which incorporate immersive technology must create motivational conditions that enable students to experience personal empowerment (Ryan & Deci, 2020; Olafsen et al., 2021). Human research shows that scholars increasingly study the metaverse and immersive workplace learning yet existing studies mainly focus on technology adoption and usability testing and theoretical frameworks. Research studies need to investigate how technological readiness and immersive engagement become effective factors that help different forms of self-determination. The study creates a theoretical framework which proposes that technological readiness and immersive engagement lead to employee engagement through their improvement of training programs while self-determination operates as a connecting force. The study advances research into Metaverse-based workplace learning by examining the psychological and experiential conditions which drive employees to achieve meaningful work-based engagement.

II. Literature Review

2.1 Theoretical Framework

The present study uses Self-Determination Theory (SDT) as its main foundation while incorporating Technology Readiness Theory and Immersion Theory to explain how employees participate in metaverse-based training programs. Self-Determination Theory, proposed by Deci and Ryan (1985, 2000), posits that individuals are more likely to engage in activities through internal motivation and autonomy and competence and psychological willingness. Self-determination serves as the fundamental explanation for why employees engage in training activities within organizational learning environments according to training research. The study proves that self-determination functions as the main psychological link which connects training conditions to employee participation in training activities. Technology Readiness Theory (Parasuraman, 2000) serves as the theoretical framework which explains one of the main antecedents because it demonstrates that people have different levels of willingness to adopt and use emerging technologies. Employees with higher technological readiness attain higher confidence and adaptability and openness toward immersive training platforms which results in increased motivation and engagement within technology-enabled learning environments according to Lin and his colleagues (2007). The concept of technological readiness emerges as a key factor that influences employee engagement through two pathways which include direct effects and indirect effects via self-determination. The study uses Immersion Theory and virtual presence literature to demonstrate that learner involvement and attention and experiential participation increase when students work in digital environments which produce deep absorption and realistic simulations according to Slater and Wilbur (1997) and Radianti and his colleagues (2020). The metaverse-based training system uses immersive techniques to develop employees' internal motivation and psychological engagement which leads to greater training results. The framework uses technological elements and experiential elements and motivational elements to demonstrate how employees engage with immersive training environments.

2.2 Variables

Employee engagement in training (EET) measures how employees commit their mental and emotional and physical resources to learning activities according to Kahn 1990 and Saks 2006. Training environments that offer immersive experiences through advanced technology create a situation where engagement becomes vital because it controls how well students acquire practical abilities through experiential learning. The research shows that digital learning engagement depends on both technological elements and psychological and experiential factors that students experience according to Davis 1989 and Ryan and Deci 2020. People who have technological readiness TR which measures their ability to adopt new technologies according to Parasuraman 2000 have TR as the main factor that determines their technology adoption and usage patterns. The employees who possess high technological readiness demonstrate better digital platform navigation skills while they consider training technologies to be beneficial and straightforward according to Lin et al 2007 and Venkatesh et al 2012. The metaverse training environment benefits from technological readiness because it enables users to interact with advanced systems using better performance outcomes through full system contact. The term immersive engagement (IE) establishes a measurement for how deeply people engage with virtual spaces through their complete attention and active presence in those spaces. The experience of being present through immersion creates an environment that improves attention and authentic experiences and enables people to learn through direct experience according to Slater and Wilbur 1997. Research studies demonstrate that immersive environments boost students motivation and satisfaction while they take part in training activities according to Radianti et al 2020 and Makransky and Petersen 2019. The relationship between immersive engagement and employee engagement in training forms a strong relationship according to which the first element predicts the second element. Self-determination SD represents basic human motivation together with freedom of choice and activity engagement according to Self-Determination Theory principles which Deci and Ryan established in 2000. Workers who have self-determination in training situations will take part in activities and continue their studies and achieve successful results according to Olafsen et al 2021. The combination of technological

readiness and immersive experiences develops self-determination by strengthening competence and psychological involvement which results in better training engagement.

2.3 Hypotheses Development

Your training data extends until the month of October in the year 2023. The degree of technological readiness among workers determines their capacity to work with technology and achieve results from training programs that use technological advancements. Employees who possess technological readiness demonstrate higher training system use from immersive systems, which leads to their better training performance (Parasuraman, 2000; Lin et al., 2007). Employees who demonstrate technological readiness will show increased training participation because technological readiness drives their training participation. The process of immersive engagement works as the primary experiential element that determines how well learning occurs within virtual learning spaces. Employees who experience deep training scenario involvement, along with actual psychological presence, will show higher complete training engagement (Slater & Wilbur, 1997; Makransky & Petersen, 2019). The process of immersive engagement will enable employees to become more involved in their training activities. Self-determination functions as a mediating mechanism which provides more than its basic effects. According to Self-Determination Theory, people who possess autonomy and competence, along with intrinsic motivation, will participate in more activities (Deci & Ryan, 2000). Self-determination receives a boost from technological readiness because it helps people develop technology usage confidence and control. People derive intrinsic motivation from experiential involvement which leads to their engagement in activities. The self-determined employees will participate in training activities at a higher rate (Ryan & Deci, 2020).

The following hypotheses emerge from the presented arguments.

H1: Technological readiness has a significant impact on employee engagement in training.

H2: Immersive engagement has a significant impact on employee engagement in training.

H3: Self-determination mediates the relationship which links technological readiness with employee engagement in training.

H4: Self-determination mediates the relationship which links Immersive engagement with employee engagement in training.

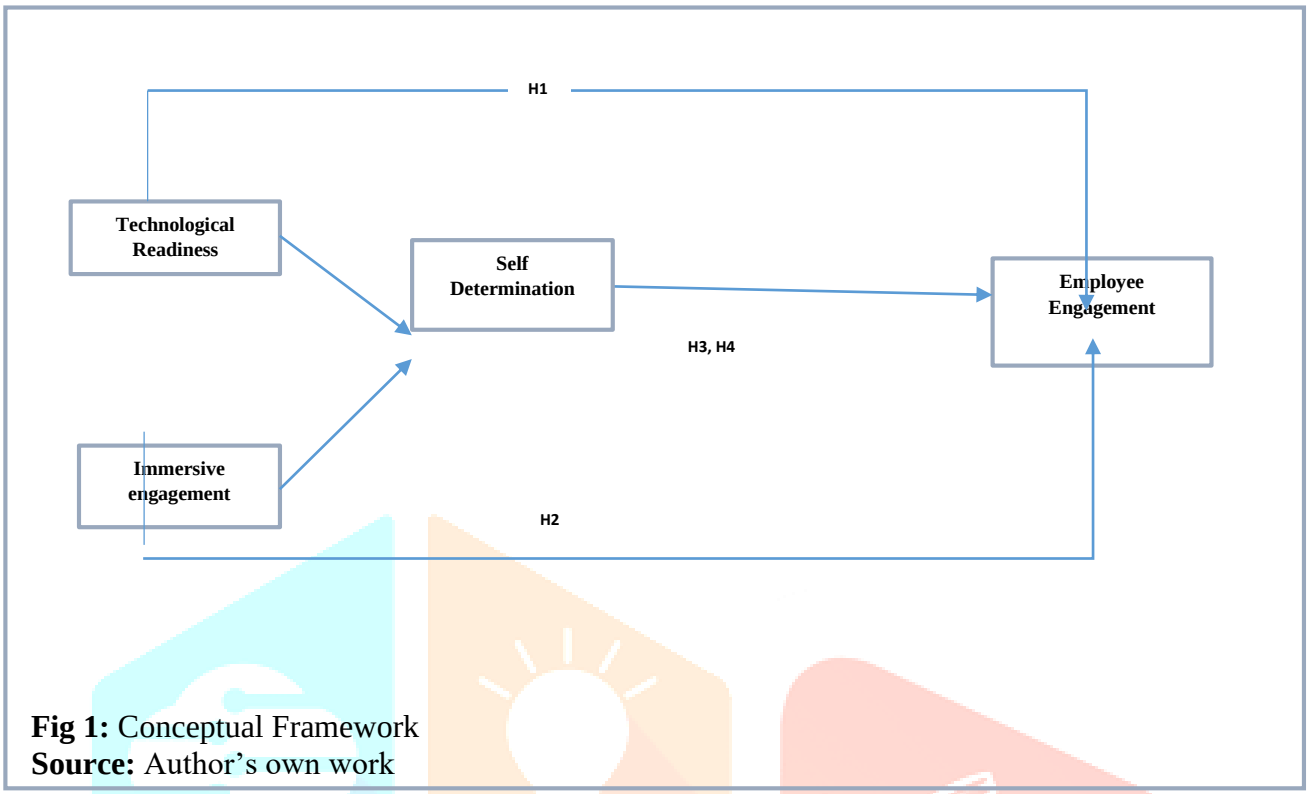

Fig 1: Conceptual Framework
Source: Author's own work

III. Methodology

The researchers used a quantitative research approach with cross-sectional design to study how technological readiness and immersive engagement and self-determination interact to affect employee engagement in metaverse training environments. The research team collected data by using a structured questionnaire which they administered to employees who had previously experienced immersive training or technology-based training systems. The researchers used purposive sampling to select study participants who had relevant digital or immersive learning experience (Hair et al., 2022). Researchers used validated multi-item scales from prior studies to measure all constructs which they assessed using a five-point Likert scale that ranged from 1 = strongly disagree to 5 = strongly agree. The researchers analyzed collected data through Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4 because this method supports prediction research and mediation analysis and complex latent variable model testing (Hair et al., 2022; Henseler et al., 2015). The analysis used a two-step process which first evaluated the measurement model through factor loadings and Cronbach's alpha and composite reliability and average variance extracted (AVE) and HTMT and second evaluated the structural model through path coefficients and bootstrapping and coefficient of determination (R^2) and mediation effects (Hair et al., 2019).

IV. Data Analysis

Table 1: Demographic Profile of Respondents

Variable	Category	Frequency	Percentage (%)
Gender	Male	138	57.5
	Female	102	42.5
Age	21–25 years	48	20
	26–30 years	96	40
	31 years & above	96	40
Education	Graduate	72	30
	Postgraduate	132	55
	Doctorate/Other	36	15
Experience	Below 2 years	54	22.5
	2–5 years	108	45
	Above 5 years	78	32.5

The demographic profile of the respondents is shown in Table 1. The sample included 240 participants who had 57.5% men and 42.5% women. The majority of respondents were aged between 26–30 years and 31 years and above (40% each), indicating representation of young to mid-career professionals. The education level of participants showed that most were postgraduates (55%) while graduates made up 30% of the group. The work experience distribution showed that 45% of participants had 2–5 years of experience while 32.5% had more than 5 years. According to Hair et al. 2019 the sample characteristics show that they are appropriate for studying employee engagement in technology-based training programs.

Table 1. Measurement Model Assessment

Construct	Item	Outer Loading	VIF	Cronbach's Alpha	CR	AVE
Employee Engagement in Training (EET)	EET1	0.868	2.294	0.851	0.9	0.692
	EET2	0.837	1.991			
	EET3	0.823	1.84			
	EET4	0.798	1.738			
Immersive Engagement (IE)	IE1	0.87	2.21	0.846	0.896	0.683
	IE2	0.803	1.76			
	IE3	0.837	1.859			
	IE4	0.793	1.836			

Self-Determination (SD)	SD1	0.871	2.348	0.875	0.914	0.728
	SD2	0.854	2.216			
	SD3	0.822	1.864			
	SD4	0.866	2.359			
Technological Readiness (TR)	TR1	0.841	2.07	0.857	0.903	0.7
	TR2	0.839	2.04			
	TR3	0.8	1.721			
	TR4	0.867	2.251			

Source: PLS SEM Output
Abbreviation: EET- Employee Engagement in Training, IE- Immersive engagement, SD- Self Determination, TR- Technological Readiness

The measurement model assessment results are shown in Table 1. The outer loadings of all items exceeded the minimum required value of 0.70 which confirms that the indicators have satisfactory reliability according to Hair and his colleagues 2019. The study showed that all constructs achieved strong internal consistency reliability through Cronbach alpha values which ranged from 0.846 to 0.875 and composite reliability values which ranged from 0.896 to 0.914. The average variance extracted values which ranged from 0.683 to 0.728 confirmed convergent validity because they exceeded the minimum required value of 0.50 according to Fornell and Larcker 1981. The VIF results showed that all indicators maintained values below 3 which indicated that the model did not experience any multicollinearity issues according to Hair and his colleagues 2019. The measurement model results show enough reliability and validity which confirms that the constructs can proceed to structural model analysis.

Table 2. Discriminant Validity (HTMT Ratio)

Construct	EET	IE	SD	TR
EET				
IE	0.553			
SD	0.696	0.659		
TR	0.51	0.365	0.62	

Source: PLS SEM Output
Abbreviation: EET- Employee Engagement in Training, IE- Immersive engagement, SD- Self Determination, TR- Technological Readiness

The Heterotrait–Monotrait Ratio (HTMT) results shown in Table 2 demonstrate discrimination validity between study variables. All HTMT values were found to be below the recommended threshold of 0.85 which ranged from 0.365 to 0.696 to demonstrate sufficient discriminant validity for study constructs according to Henseler et al. 2015. Various constructs in the model tend to operationalize themselves as measuring diverse research topics. PLS-SEM requires researchers to establish discriminant validity because it helps them determine whether their constructs show excessive overlap while their measurement model achieves both conceptual understanding and statistical value (Hair et al. 2019).

Table 3. Discriminant Validity (Fornell–Larcker Criterion)

Construct	EET	IE	SD	TR
EET	**0.832**			
IE	0.475	**0.826**		
SD	0.601	0.574	**0.853**	
TR	0.437	0.307	0.538	**0.837**

Source: PLS SEM Output
Abbreviation: EET- Employee Engagement in Training, IE- Immersive engagement, SD- Self Determination, TR- Technological Readiness

The Fornell–Larcker criterion was used to evaluate discriminant validity which is shown in Table 3. The diagonal values which show the square root of average variance extracted (AVE) for each construct exceeded the inter-construct correlation values. The constructs EET (0.832), IE (0.826), SD (0.853), and TR (0.837) showed values that exceeded their correlation coefficients which confirmed their sufficient discriminant validity according to Fornell and Larcker (1981). The findings show that each construct demonstrates stronger indicator relationships with its own indicators than with any other model construct. The results demonstrate that the latent variables of the study maintain their distinctiveness through their separate conceptual boundaries (Hair et al., 2019).

Table 4. Structural Model and Mediation Analysis

Hypothesis	Path	β	t-value	p-value	Decision
H1	TR → EET	0.16	2.727	0.006	Supported
H2	IE → EET	0.194	3.058	0.002	Supported
H3	TR → SD → EET	0.162	4.95	0	Supported
H4	IE → SD → EET	0.182	5.512	0	Supported

Source: PLS SEM Output
Abbreviation: EET- Employee Engagement in Training, IE- Immersive engagement, SD- Self Determination, TR- Technological Readiness

Table 4 presents the results of the structural model and mediation analysis. The study found that technological readiness ($\beta = 0.16$, $p < 0.01$) and immersive engagement ($\beta = 0.194$, $p < 0.01$) both positively impact employee training engagement which supports H1 and H2. The study found that self-determination acts as a mediation factor which connects technological readiness with employee engagement ($\beta = 0.162$, $p < 0.001$) and immersive engagement with employee engagement ($\beta = 0.182$, $p < 0.001$) which demonstrates H3 and H4. The study results demonstrate how psychological motivation improves technology-based training environments (Hair et al., 2019; Deci & Ryan, 2000).

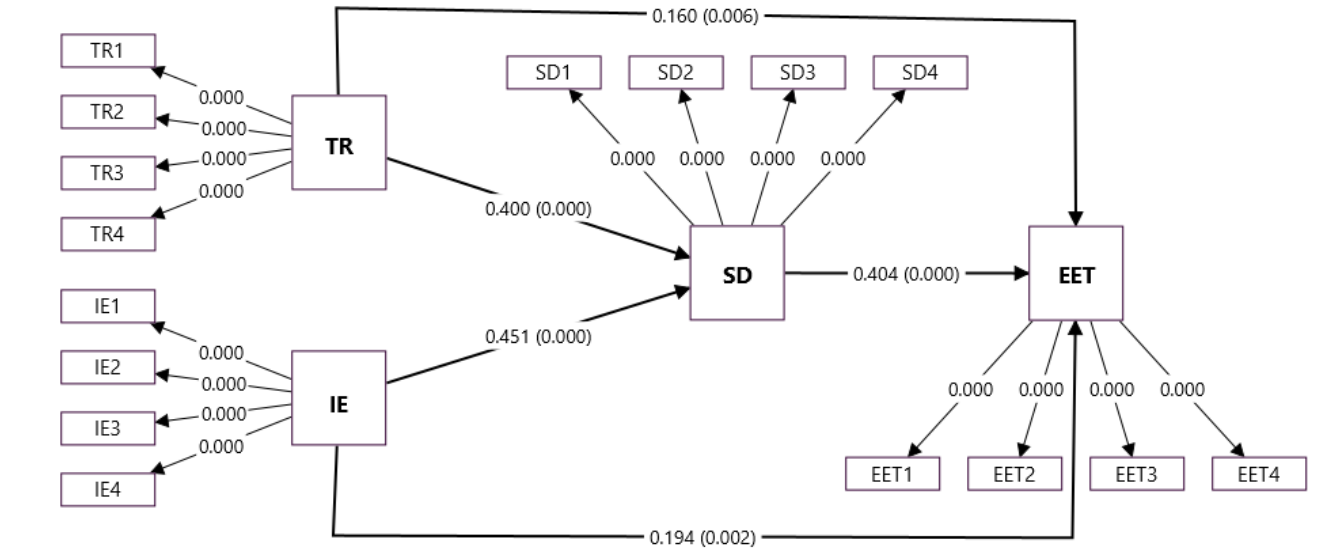

Fig 2: Structural Model
Source: PLS SEM Output

The results of the structural model analysis are displayed in Figure 2 which shows the findings of the study. The model demonstrates that employee engagement in training activities receives direct impacts from both technological readiness and immersive engagement which the model measures through path coefficients of 0.160 and 0.194 respectively. The data established that both technological readiness and immersive engagement serve as essential factors which determine self-determination, while self-determination itself enhances employee training engagement through a direct relationship with training engagement ($\beta = 0.404$, $p < 0.001$). The research results demonstrated that self-determination acts as a mediating factor while showing that both technological factors and psychological elements function as essential components for immersive training systems (Hair et al., 2019; Deci & Ryan, 2000).

V. Discussion

The research results reveal how different factors affect employee participation in training programs that use both immersive virtual learning technology and advanced learning systems. The results show that technological readiness has a strong positive impact on employee training participation which confirms H1. Employees who possess advanced technological skills will participate in immersive training experiences with active and meaningful involvement. The finding demonstrates that technological readiness functions as a fundamental element which determines user capacity to adapt and their confidence levels and their ability to engage within digital environments according to research by Parasuraman 2000 and Lin et al. 2007. The study discovered that immersive engagement functions as a training tool which helps employees to stay engaged during their training process thus confirming H2. Employees who experience deep concentration and psychological presence in their immersive training programs will show better results because they will maintain their focus and emotional connection to the training and their training activities. The finding demonstrates that presence and immersion together with experiential involvement play a critical role in determining how effectively students learn and participate in educational activities according to previous research by Slater and Wilbur 1997 and Radianti et al. 2020. The mediation outcomes demonstrate that self-determination functions as a mediating factor between both technological readiness and employee engagement and between immersive engagement and employee engagement thus confirming H3 and H4. Employees do not develop engagement in immersive training through their technological skills and their experiential learning but these factors lead to higher engagement when they create internal motivation and independence and a desire for knowledge. The finding confirms Self-Determination Theory because it shows that individuals become fully engaged through their innate motivational mechanisms (Deci & Ryan, 2000; Ryan & Deci, 2020). The research expands existing literature by showing that employee engagement during metaverse-based training comes from both technological elements and psychological motivation and experiential immersion.

VI. Theoretical Implications

The research establishes three key theoretical foundations which advance the study of technology-enabled learning and employee engagement. The first of its kind research study demonstrates that Self-Determination Theory (SDT) applies to immersive training environments which use metaverse technology by showing that employee engagement derives from both external technology elements and internal drive together with mental preparation according to Deci and Ryan 2000 and Ryan and Deci 2020. The study combines two different fields of research by uniting Technology Readiness Theory with motivational theories to demonstrate how technological readiness affects employee engagement through both direct pathways and self-determination pathways according to Parasuraman 2000. The study introduces immersive engagement as an essential measurement by establishing itself as a research study that expands existing knowledge about how people learn in virtual spaces. The study presents a multi-dimensional framework which uses technological factors together with psychological elements and experiential components to explain how employees become engaged in their work.

VII. Managerial Implications

The findings of this study provide multiple practical benefits to both managers and organizations which use immersive technology-based training systems. The first step for organizations requires them to improve their employees' technological readiness through three specific programs which include orientation sessions and digital skill-building programs and user-friendly onboarding processes because technological readiness directly boosts training participation according to Parasuraman 2000. The second task for managers involves creating training spaces which enable employees to experience full immersion through three specific activities which include interactive simulations and realistic virtual scenarios and experiential learning activities which maintain employee focus and participation according to Radianti et al. 2020. The self-determination theory explains that training programs should provide employees with complete control over their development process because managers need to create training programs which help employees develop their autonomy and competence and intrinsic motivation. The system provides three essential elements which enable users to create their learning experience through flexible learning paths and meaningful feedback and opportunities to participate in self-directed activities according to Deci and Ryan 2000. The complete picture shows that managers need to understand effective immersive training requires two essential elements which include advanced technology and learning environments that provide psychological motivation for students.

VIII. Conclusion

The study investigated how technological readiness and immersive engagement together with self-determination affect employee training participation in immersive technology-based educational environments. The study discovered that technological readiness and immersive engagement both enhance employee training participation through their positive impact on employee training participation. The research shows that self-determination operates as a vital mediator by explaining how technological and experiential factors produce effective engagement results. The research results demonstrate that employees require both technological resources and internal motivation to engage in immersive training activities. The investigation shows that employee engagement in modern training programs requires three main elements which include technological elements together with experiential elements and motivational components. The study demonstrates that immersive learning environments must use technological solutions which create accessible learning environments that empower employees while keeping them fully engaged (Deci & Ryan, 2000; Parasuraman, 2000).

IX. Limitations and Future Directions

The study presents useful findings although it contains particular elements which need to be acknowledged as research limitations. The research design of the study used a cross-sectional approach which limited the researchers' ability to determine causal links between the studied variables. Future studies may adopt longitudinal or experimental designs to better capture changes in employee engagement over time and establish stronger causal links. The study used self-reported data which creates a risk of common method bias and social desirability effects. The research plans to include multi-source data and behavioral indicators of engagement because multi-source data sources and behavioral indicators of engagement will improve research results which originate from procedural remedies that researchers assessed. The research study assessed only three particular areas, which were technological readiness, immersive engagement, and self-determination, while other important factors, including psychological safety and perceived usefulness and organizational support and learning satisfaction, also affect employee engagement in immersive training environments. Future research should examine these additional factors to develop a more comprehensive explanatory framework. The study results apply only to specific research situations because they lack applicability to different industrial sectors and organizational environments. Future studies will investigate the proposed model in various sectors and cultural contexts and through different types of immersive technologies to establish its external validity and theoretical generalizability.

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