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IMPACT OF WORK ENVIRONMENT, LEADERSHIP, HUMAN RESOURCES PRACTICES AND TECHNOLOGY ON ORGANIZATIONS PERFORMANCE

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Abstract. In today's rapidly evolving business landscape, adopting technology plays a pivotal role in shaping the work environment, while effective leadership practices determine how resources are harnessed to achieve organizational goals. To eliminate discrepancies between the literature and the need for more models, integration between work environment resources, leadership management, human resources practices, and technology, leading to inefficiencies in organizational functioning, were examined. Thus, achieving workplace effectiveness requires a comprehensive approach where human resources practices, technological innovations, and leadership management intersect as critical elements. However, this research aimed to develop a new model and conduct confirmatory factor analysis in order to better explore the profound impact of technology adoption and Human Resources Practices on work environment resources and leadership management. Another aim is to examine the relationships between transformational leadership theory and the psychological contract theory of human resources, empowerment, and technology adoption in Saudi Arabia's companies. A quantitative survey (questionnaire) was the primary method of data collection. Thus, 375 employees completed a questionnaire, and the analysis research model was comprehensively assessed using SmartPLS software for structural equation modelling (SEM). The findings revealed that automation technologies, cloud computing, and project management software were positively correlated with technology integration at an organization. Also, the human resources practices factor was positively correlated with performance management and feedback, human resource optimization in supply chain management, organization culture and employee engagement, and empowerment and symbiotic relationship factors, while there was a negative relationship between human resources practices and adaptability and innovation. The results also revealed five relationships to determine the mediating role of technology integration and human resources practices. Four positive relationships existed between technology integration with human resources practices, work environment resources, and leadership management. Also, there was a positive relationship between human resources practices and work environment resources, while there was a negative relationship between human resources practices and leadership management. Finally, dependent factors positively link work environment resources and leadership management.

Keywords: environment resources; leadership management; sustainability; human resources practices; technology

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JEL Classifications: J24, O33

1. Introduction

Achieving workplace effectiveness requires a comprehensive approach, integrating human resources practices, technological innovations, and leadership management. As organizations face modern challenges and opportunities, understanding the connections between work environment resources, leadership management, and how human resources practices and technology work together is crucial (Kodama, 2019; Robescu et al., 2021; Zahrani, 2022a;). Workplace effectiveness goes beyond mere productivity; it includes the overall well-being of employees, optimal use of resources, and fostering a thriving organizational culture (Li et al., 2018; Qu et al., 2023). To fully realize effectiveness, exploring how these interconnected elements function harmoniously is essential. Human resources practices have significantly evolved in response to societal and workforce changes, becoming a cornerstone of organizational strategy. These practices include talent acquisition, employee development, performance management, and diversity and inclusion initiatives (Rodríguez-Sánchez et al., 2019). At the same time, technological advancements have transformed the work landscape, enabling automation, remote work, data analytics, and improved communication. These technological innovations streamline operations, promote innovation, and enhance employee well-being. Effective leadership is crucial for achieving workplace effectiveness (Dike et al., 2015). Leaders guide organizations by empowering individuals and teams, instilling a sense of purpose, and nurturing a culture of trust and collaboration. Leaders, considered the linchpin of organizational effectiveness, must navigate complex challenges while demonstrating adaptability and resilience.

1.1 Problem Background and Problem Statement

Achieving organizational effectiveness in today's business landscape is challenging and requires a strategic alignment of work environment resources, leadership management, human resources practices, and technology (Kodama, 2019; Prester & Bozac, 2012). Work environment resources, such as physical workspace, tools, and culture, are crucial for employee well-being and productivity (Rodríguez-Sánchez et al., 2019). Technological advancements, including automation and enhanced communication, improve efficiency and employee satisfaction (Budhwar et al., 2023). Leadership management guides organizations by shaping culture, values, and employee engagement, using various leadership styles to inspire peak performance (Rodríguez-Sánchez et al., 2019). Effective leadership also involves nurturing future leaders and managing change initiatives while exhibiting ethical behaviour to shape organizational culture (Avolio & Gardner, 2005). Human resources practices are essential to organizational strategy, including talent acquisition, employee development, performance management, and diversity initiatives (Prester & Bozac, 2012). These practices have evolved to effectively create and utilize human capital in response to societal and workforce changes (Kodama, 2019). Technology enhances HR by automating processes, improving data analytics, and transforming talent management (Budhwar et al., 2023). Understanding how work environment resources, leadership management, HR practices, and technology work together to achieve overall effectiveness requires a thorough investigation (Rodríguez-Sánchez et al., 2019). This study examines the interrelationships among these elements to provide insights into their collective impact on employee well-being, satisfaction, and performance (Prester & Bozac, 2012). It constructs a model to enhance understanding of the strategic convergence of these dimensions within Saudi Arabian companies.

2. Research models and theories on Human Resource Optimization and HR

The Resource-Based View (RBV) theory emphasizes the importance of internal resources and capabilities, such as human resources practices and technology, as critical factors for competitive advantage and effectiveness (Barney, 1991). Psychological contract theory examines the unwritten expectations between employees and employers, impacting HR practices and engagement (Rousseau, 1995). The Technology Acceptance Model (TAM) helps understand factors influencing technology adoption to enhance efficiency (Davis, 1989). This

research developed a new model integrating these theories to explore the effectiveness of work environment resources and leadership management through HR practices and technology factors (see Figure 1).

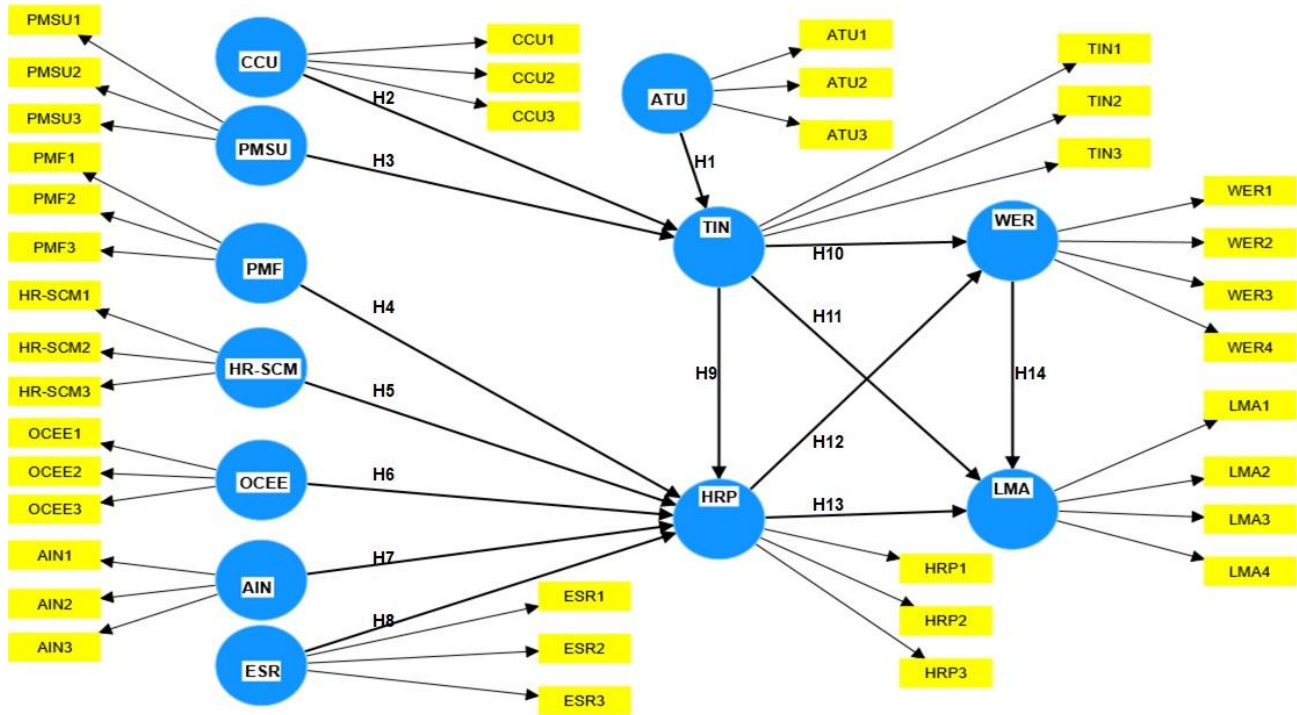


Figure 1. Research Model and Hypotheses

Source: Author

2.1 Automation technologies used (ATU)

Automation technologies, such as robotic process automation (RPA) and artificial intelligence (AI), have transformed workflow management by automating routine and rule-based tasks. This allows employees to focus on more value-added activities, leading to significant productivity gains and improved operational efficiency across various industries (McAdam et al., 2005). These technologies include RPA, AI, machine learning, and IoT devices, which streamline processes, reduce errors, and enhance efficiency (Zou et al., 2023). Automation technologies have become integral to organizational processes, offering efficiency, accuracy, and cost-effectiveness (Al-Rahmi et al., 2022).

2.2 Cloud Computing Used (CCU)

Cloud computing provides scalable and flexible access to computing resources and data storage, reducing the need for extensive in-house infrastructure. Research by Bruque Camara et al. (2015) highlights that cloud computing minimizes IT costs and enhances data accessibility, supporting seamless collaboration and resource sharing and ultimately improving operational efficiency. Cloud services facilitate remote work and enhance collaboration (Baral & Verma, 2021). However, organizations must address security and data privacy concerns

when transitioning to the cloud (Yenugula et al., 2023; Zahrani, 2021). Cloud computing offers scalable, cost-efficient IT solutions (Ahmad et al., 2021).

2.3 Project Management Software Used (PMSU)

Project management software enables organizations to precisely plan, execute, and monitor projects by providing a centralized platform for task assignment, progress tracking, and collaborative communication. This software facilitates efficient project execution, reduces delivery times, improves resource allocation, and enhances operational efficiency (Kodama, 2019). It allows for detailed project planning and defining tasks, timelines, dependencies, and milestones (Chandrachoodan et al., 2021). Leadership also plays a critical role in promoting the adoption of project management software (McAdam et al., 2005). Modern project management software emphasizes collaboration and communication, enabling team members to interact, share documents, and provide updates (Zahrani, 2022c).

2.4 Performance Management and Feedback (PMF)

Performance management and feedback are crucial for organizational success, facilitating continuous improvement in employee performance, aligning individual goals with organizational objectives, and fostering employee development. Performance management systematically aligns resources, systems, and employees to achieve strategic goals. Effective leaders communicate clear goals and expectations, making the performance management process successful. HR plays a crucial role in sourcing, recruiting, and onboarding talent, while leadership sets the vision and guides employees toward achieving organizational objectives (Kodama, 2019). Additionally, HR collaborates with leadership on succession planning by identifying and developing future leaders within the organization (Fusarelli et al., 2018).

2.5 Human Resource Optimization in Supply Chain Management (HR-SCM)

Human resource optimization in supply chain management (SCM) focuses on efficiently utilizing human resources to enhance supply chain processes. Nguyen et al. (2018) highlighted the importance of real-time data analytics in optimizing inventory management and logistics, helping organizations reduce excess inventory, minimize transportation costs, and improve resource utilization. Effective human resource management is crucial for resource optimization. Budhwar et al. (2023) explored AI and machine learning for talent acquisition and workforce planning, demonstrating that AI-driven recruitment processes lead to better workforce alignment, reduced turnover, and improved resource allocation.

2.6 Organizational Culture and Employee Engagement (OCEE)

Organizational culture and employee engagement are intertwined aspects of the workplace that significantly impact an organization's performance and success (Eisenbeiss et al., 2010). A positive organizational culture fosters an environment where employees are engaged, motivated, and committed to achieving the organization's goals. Engaged employees are enthusiastic about their work, driven to contribute positively, and willing to go the extra mile to achieve organizational objectives. HR shapes organizational culture, while leadership management sets the tone for the desired culture, contributing to employee engagement and motivation (Fachri et al., 2021). HR is involved in resolving workplace conflicts, but leaders are frontline individuals who address day-to-day employee relations issues (Nash & Hann, 2020).

2.7 Adaptability and Innovation (AIN)

Adaptability and innovation have become paramount in the contemporary organizational landscape, and the ability to swiftly adapt to changing circumstances and innovate in response to evolving challenges is essential for organizations to remain competitive and sustainable. Therefore, influential leaders must be adaptable and open to innovation, and they should foster a culture of experimentation, encouraging employees to embrace new technologies and processes (Kodama, 2019). Leadership practices prioritising transparent communication and employee engagement have increased productivity and job satisfaction (Zahrani, 2022b).

2.8 Empowerment and Symbiotic Relationship (ESR)

Empowerment and symbiotic relationships are crucial in modern organizations for enhancing employee engagement, performance, and overall success (Kanjakanan et al., 2023). Effective leadership, supportive culture, communication, and feedback mechanisms are key to developing these concepts (Raj, 2020; Zahrani, 2022b). Leaders who empower and support their teams create ownership and responsibility, leading to better outcomes (Kilag et al., 2023). Similarly, supportive leaders often find their teams reciprocating with increased dedication and performance (Fusarelli et al., 2018).

2.9 Technology Integration (TIN)

Integrating technology into the modern workplace is crucial for organizational success (Kodama, 2019). Tools like project management software, cloud computing, and automation have significantly improved efficiency (Zahrani, 2022c), streamlining processes and reducing manual workloads (Rodríguez-Sánchez et al., 2019). This leads to a more organized and efficient work environment, enhancing employee productivity and satisfaction (Budhwar et al., 2023). This symbiotic relationship between HR practices and technology is a defining feature of modern organizations and is expected to evolve further as technology advances (Rodriguez & Walters, 2017).

2.10 The Human Resources Practices (HRP)

Resource optimization is crucial in modern business management, especially in environments with resource scarcity and intense competition. Organizations focus on optimizing resources for efficiency and effectiveness. Human resources (HR) and leadership management are vital for effective organizational functioning, ensuring efficient workforce management and alignment of leadership practices with strategic goals (Zahrani, 2022c). HR practices are integral to organizational success, impacting employee performance, satisfaction, and effectiveness. As organizations evolve in response to changing work environments, understanding the latest concepts, theories, and empirical findings related to HR practices is essential (Kodama, 2019). HR practices include talent acquisition, performance management, training and development, compensation and benefits, diversity and inclusion, and employee engagement (Fachri et al., 2021).

2.11 Work Environment Resources (WER)

Work environment resources are crucial for employee well-being, productivity, and organizational effectiveness. Understanding concepts related to these resources is essential for creating supportive workplaces (Avolio & Gardner, 2005). These include physical resources, psychological safety, work-life balance, social support, and organizational culture (Kelly et al., 2014). The rise of remote work requires organizations to adapt their work environment resources. Initiatives to enhance employee health and productivity are increasingly implemented (Kelly et al., 2014).

2.12 Leadership Management (LMA)

Leadership management is crucial for guiding organizations towards their objectives and ensuring employee motivation, contentment, and overall effectiveness. Leaders significantly influence an organization's culture and values, impacting employee engagement and satisfaction (Schein, 2010; Nica et al., 2022). It involves guiding, motivating, and directing individuals and teams within an organization to achieve its goals (Al-Rahmi et al., 2019; 2022). Leaders must exemplify ethical behavior in a business environment by emphasising ethical practices, as they significantly influence organizational culture. With organizations operating globally, leaders must develop cultural intelligence and tailor their leadership styles to different regions (Gip et al., 2023).

3. Research Methodology

This research explores factors affecting the effectiveness of work environment resources and leadership management concerning utilising human resources practices and technology within contemporary organizations. Thus, this study employs quantitative data collected through 375 structured questionnaires distributed manually to the Saudi Council of Engineers, Majmaah University, and Bank Al Jazira in April 2024. These surveys included closed-ended questions to gather numerical data for analysis in SPSS version 24 and SmartPLS version 4. Descriptive statistics, correlation analysis, and regression analysis were performed to examine the relationships and predictive power of the variables, and the study included factor analysis to identify underlying constructs and dimensions. The sample questionnaire was adapted to include basic demographic information, including the respondents' age, gender, and level of education, and questionnaire items measuring the components of the research model shown in Figure 1.

3.1 Measurement instrument and analysis

The measurement instrument utilized in this study consisted of survey questionnaires. Participants were asked to respond to a series of closed-ended questions, rating their responses on Likert scales ranging from "strongly disagree" (1) to "strongly agree" (5). The questionnaire was structured to evaluate the participant's perceptions and experiences regarding the interconnected 12 factors under investigation and the 14 hypotheses see Figure 1. The measurement scales for the factors were developed for this study based on widely used validity and reliability from other literature reviews and primary data; this is supported by Hair et al. (2020). Three questions for the automation technologies used (ATU) factor were adapted from (McAdam et al., 2005); Three questions for the cloud computing used (CCU) factor were adapted from (Loukis et al., 2017); Three questions for the project management software used (PMSU) factor were adapted from (Kodama, 2019); Three questions for the performance management and feedback (PMF) factor were adapted from (Folan & Browne, 2005); Three questions for the human resource optimization in supply chain management (HR-SCM) factor were adapted from (Parry et al., 2021); Three questions for the organization culture and employee engagement (OCEE) factor were adapted from (Eisenbeiss et al., 2010); Three questions for the adaptability and innovation (AIN) factor were adapted from (Prester & Bozac, 2012); Three questions for the empowerment and symbiotic relationship (ESR) factor were adapted from (Peng et al., 2016); Three questions for the technology integration (TIN) factor were adapted from (Kilag et al., 2023); Three questions for the human resources practices (HRP) factor were adapted from (Kodama, 2019); Four questions for the work environment resources (WER) factor were adapted from (Avolio & Gardner, 2005); and finally, Four questions for the leadership management (LMA) factor were adapted from (Schein, 2010).

3.2 Data Analysis, Testing, and Validation

In this research, several analytical techniques were applied to derive meaningful insights from the data:

- **Descriptive Statistics:** Descriptive statistics were used to summarize the data, providing an overview of the central tendencies, variations, and distributions of the variables in demographic data (see Table 1).
- **The measurement model** helped researchers quantify and analyze these latent constructs by examining how they are measured through observable variables or indicators in the model fit and inner model (see Table 2).
- **Factor Analysis:** Factor analysis was conducted to identify the dataset's underlying constructs and dimensions. This technique helped in uncovering latent structures and patterns that may not be immediately evident from the survey responses but are shown by the test model on validity and reliability testing through two methods for assessing reliability were Cronbach's alpha coefficient (CA) and composite reliability (CR), Average Variance Extracted (AVE) see Table 3, and path coefficients, factor loadings, and R-square (see Figure 2).
- **Correlation Analysis:** Correlation analysis assessed the relationships between different variables. This technique helped in understanding the degree of association between the various factors by discriminant validity (see Table 4).
- **Hypotheses Testing:** Structural equation modelling (SEM) is a common statistical technique for estimating and assessing measurement models. Thus, in this research, SEM helped to determine the strength and significance of the relationships between the 14 hypotheses of the 12 factors and their observed indicators (see Figure 3 and Table 5).

4. Data Analysis and Results

Descriptive statistics serve as a fundamental tool for providing a concise and lucid overview of demographic data. These statistical measures are instrumental in comprehending and conveying the essential attributes of a sample, encompassing significant demographic variables such as age, gender, education level, and income (Pallant, 2020). Thus, in this research, descriptive statistics are pivotal in summarizing demographic data, offering researchers a concise portrayal of the characteristics and distribution of demographic variables within their sample. This enhances comprehension of the sample's composition and contributes to the interpretation of research findings (see Table 1).

Table 1. Descriptive statistics

Gender	Per cent	Valid Percent
Male	201	53.6
Female	174	46.4
Total	375	100.0
Age	Per cent	Valid Percent
18-21	243	64.8
22-25	77	20.5
26-29	16	4.3
30-33	16	4.3
>34	23	6.1
Total	375	100.0
Level of Education	Per cent	Valid Per cent
High school level and above	62	16.5
Diploma level and above	58	15.5
Graduate level and above	255	68.0
Total	375	100.0
Companies	Per cent	Valid Percent
Saudi Council of Engineers	162	43.2

Majmaah University	165	44.0
Bank AlJazira	48	12.8
Total	375	100.0

Source: Author

4.1 Measurement model fit and inner model

In structural equation modelling (SEM), the measurement model, model fit assessment, and inner model are critical components that help researchers understand and evaluate the relationships between latent constructs and observed variables in their research models (Hair et al., 2020). Model fit assessment is crucial in SEM, ensuring the measurement model accurately represents the observed data. It involves various fit indices, which provide information about how well the proposed model aligns with the actual data. Some commonly used fit indices include the standardized root mean square residual (SRMR), degree of freedom-adjusted unweighted least squares (d_ULS), chi-square (χ^2), and normed fit index (NFI). Moreover, the inner model, or the structural model, comes after the measurement model. It examines the relationships between the latent constructs themselves (not their indicators). In other words, it explores how different latent constructs relate to each other in the proposed model (Hair et al., 2020; see Table 2).

Table 2. Model Fit and Inner Model - List

Model Fit		
Model Fit	Saturated model	Estimated model
SRMR	0.063	0.109
d_ULS	2.934	8.782
d_G	1.153	1.391
Chi-square	2553.436	2758.784
NFI	0.952	0.932
Inner Model - List		
Inner Model - List		VIF
AIN -> HRP		2.326
ATU -> TIN		1.661
CCU -> TIN		1.972
ESR -> HRP		1.985
HR-SCM -> HRP		2.288
HRP -> LMA		2.389
HRP -> WER		1.844
OCEE -> HRP		1.834
PMF -> HRP		2.839
PMSU -> TIN		1.604
TIN -> HRP		2.228
TIN -> LMA		2.352
TIN -> WER		1.844
WER -> LMA		2.766

Source: Author

4.2 Measurement Model and Factor Analysis

In this research, factor analysis is a statistical technique used to explore the underlying structure of a set of variables and identify latent factors that may explain patterns of correlations among observed variables (Hair et al., 2020). Also, validity and reliability refer to Cronbach's alpha (CA), which is a measure of internal consistency reliability, which assesses the extent to which items in a scale or construct are correlated with each other; composite reliability (CR), another measure of reliability in SEM that evaluates the internal consistency of a latent variable; and AVE, which assesses the extent to which the variance shared among items within a construct

exceeds the variance due to measurement error (Fornell & Larcker, 1981; Dijkstra & Henseler, 2015), see Table 3.

Table 3. Measurement Model and Factor Analysis

Factors	Code	Factor loadings	CA	CR	AVE	R-square
Automation Technologies Used	ATU1	0.855	0.810	0.887	0.723	0.000
	ATU2	0.864				
	ATU3	0.832				
Cloud Computing Used	CCU1	0.831	0.708	0.837	0.632	0.000
	CCU2	0.783				
	CCU3	0.769				
Project Management Software Used	PMSU1	0.903	0.890	0.932	0.819	0.000
	PMSU2	0.920				
	PMSU3	0.893				
Performance Management and Feedback	PMF1	0.905	0.891	0.932	0.822	0.000
	PMF2	0.933				
	PMF3	0.880				
Human Resource Optimization in Supply Chain Management	HR-SCM1	0.899	0.872	0.922	0.797	0.000
	HR-SCM2	0.902				
	HR-SCM3	0.877				
Organizational Culture and Employee Engagement	OCEE1	0.862	0.863	0.916	0.783	0.000
	OCEE2	0.906				
	OCEE3	0.886				
Adaptability and Innovation	AIN1	0.921	0.894	0.934	0.826	0.000
	AIN2	0.891				
	AIN3	0.914				
Empowerment and Symbiotic Relationship	ESR1	0.876	0.814	0.890	0.729	0.000
	ESR2	0.855				
	ESR3	0.831				
Technology Integration	TIN1	0.852	0.834	0.900	0.750	0.414
	TIN2	0.856				
	TIN3	0.890				
Human Resources Practices	HRP1	0.833	0.749	0.854	0.661	0.609
	HRP2	0.813				
	HRP3	0.793				
Work Environment Resources	WER1	0.782	0.806	0.873	0.632	0.639
	WER2	0.799				
	WER3	0.776				
	WER4	0.822				
Leadership Management	LMA1	0.768	0.784	0.860	0.607	0.525
	LMA2	0.729				
	LMA3	0.792				
	LMA4	0.824				

Source: Author

4.3 Correlation analysis and discriminant validity

Correlation analysis and discriminant validity are fundamental elements of structural equation modelling (SEM), playing a pivotal role in assessing the relationships between variables and confirming the distinctiveness of constructs (Hair et al., 2020). Consequently, in this study, discriminant validity was necessary within the SEM framework, ensuring that latent constructs remained separate and did not capture the same underlying concept, as indicated in Table 4.

Table 4. Discriminant validity

	AIN	ATU	CCU	ESR	HR-SCM	HRP	LMA	OCEE	PMF	PMSU	TIN	WER
AIN	0.889											
ATU	0.501											
CCU	0.577	0.802										
ESR	0.625	0.528	0.667									
HR-SCM	0.607	0.519	0.733	0.606								
HRP	0.636	0.720	0.800	0.708	0.816							
LMA	0.703	0.580	0.694	0.817	0.638	0.736						
OCEE	0.739	0.407	0.418	0.562	0.408	0.414	0.675					
PMF	0.630	0.610	0.823	0.725	0.828	0.825	0.747	0.483				
PMSU	0.586	0.566	0.747	0.631	0.599	0.631	0.596	0.466	0.697			
TIN	0.686	0.605	0.710	0.760	0.646	0.811	0.839	0.575	0.743	0.648		
WER	0.727	0.670	0.812	0.777	0.840	0.913	0.822	0.558	0.875	0.719	0.875	0.912

Source: Author

Path coefficients are crucial components of structural equation models (SEMs) in this research that measure the strength and direction of relationships between latent variables or constructs (Hair et al., 2020). Thus, in this research model, 14 path coefficients, often denoted as β , are used to quantify the relationships between latent 12 variables (also known as constructs) and their observed indicators in structural equation modelling hypotheses.

Moreover, factor loadings represent the relationship between observed variables and the latent factors they are hypothesized to measure in a confirmatory factor analysis (CFA) model, and R-square (R^2) in SEM is a measure of the proportion of variance in an endogenous (dependent) variable that is explained by its exogenous (independent) variables (Hair et al., 2020), see Figure 2.

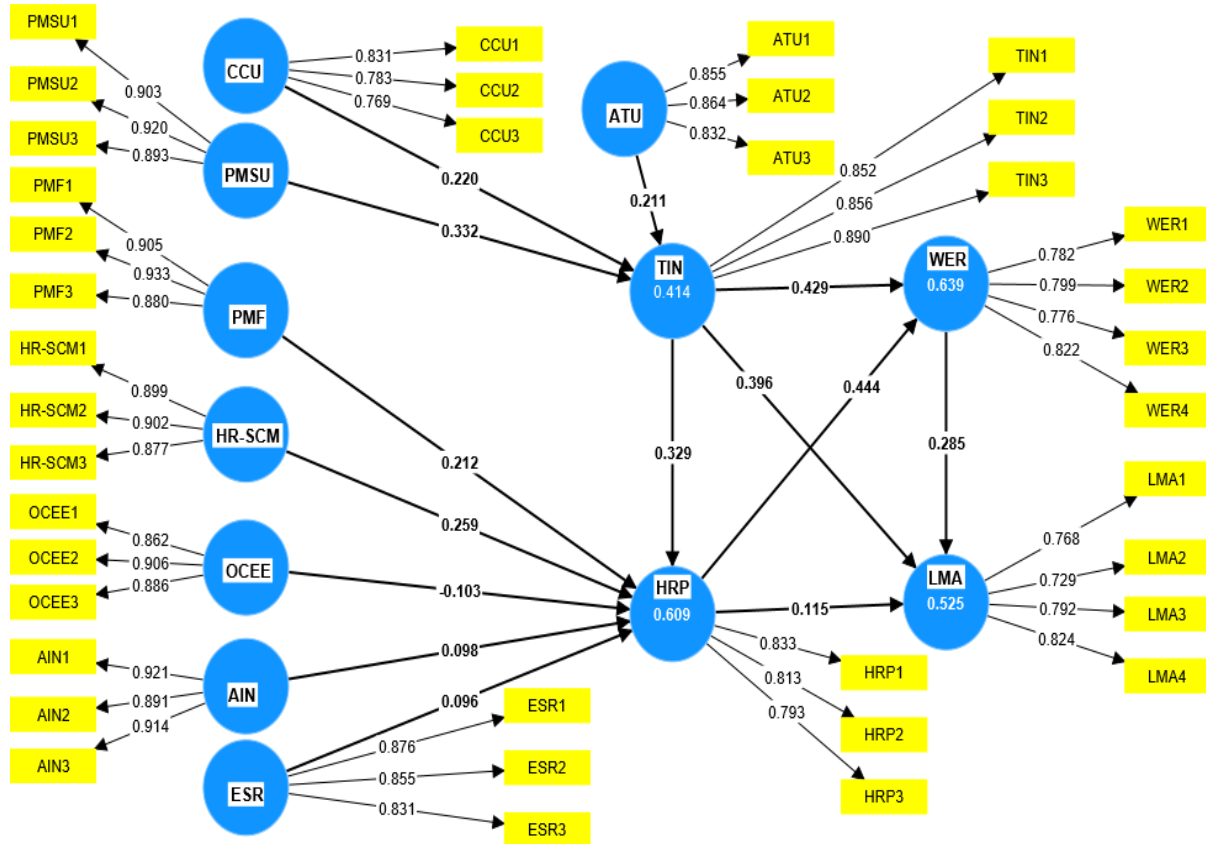


Figure 2. Research Model and Path coefficients, Loadings and R-square

Source: Author

4.4 Hypotheses testing using SEM

Hypothesis testing using structural equation modelling (SEM) is a robust method for evaluating relationships between variables in research. SEM combines measurement and structural models to test hypotheses, assessing relationships between variables and the impact of one variable on another. It allows researchers to analyze the model's fit to the data, calculate path coefficients, and determine the significance and direction of relationships. Path coefficients represent the strength and direction of relationships between variables, and their significance is assessed to determine if proposed relationships are statistically supported. This approach provides a comprehensive understanding of structural relationships within a theoretical framework (Hair et al., 2020), see Table 5.

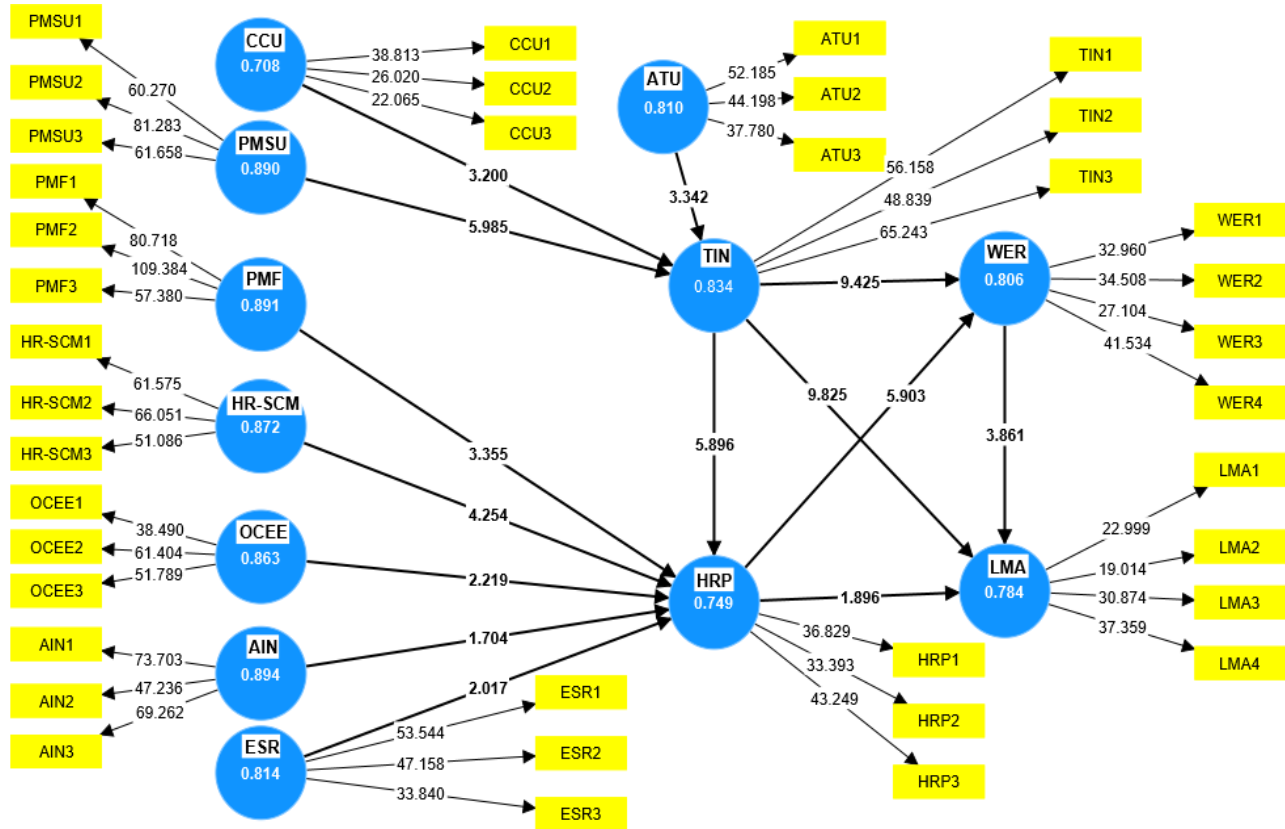


Figure 3. Research Model and Hypothesis testing using SEM

Source: Author

Table 5. Hypothesis Testing Research Model Using SEM

Hypotheses	Mean	STDEV	Path coefficients	T statistics	P values
H1 ATU -> TIN	0.212	0.063	0.211	3.342	0.001
H2 CCU -> TIN	0.220	0.069	0.22	3.200	0.001
H3 PMSU -> TIN	0.332	0.055	0.332	5.985	0.000
H4 PMF -> HRP	0.211	0.063	0.212	3.355	0.001
H5 HR-SCM -> HRP	0.261	0.061	0.259	4.254	0.000
H6 OCEE -> HRP	0.103	0.047	-0.103	2.219	0.027
H7 AIN -> HRP	0.098	0.057	0.098	1.704	0.089
H8 ESR -> HRP	0.098	0.048	0.096	2.017	0.044
H9 TIN -> HRP	0.329	0.056	0.329	5.896	0.000
H10 TIN -> WER	0.429	0.045	0.429	9.425	0.000
H11 TIN -> LMA	0.397	0.067	0.396	5.903	0.000
H12 HRP -> WER	0.443	0.045	0.444	9.825	0.000
H13 HRP -> LMA	0.115	0.060	0.115	1.896	0.058
H14 WER -> LMA	0.285	0.074	0.285	3.861	0.000
Sample mean-M	Standard deviation STDEV		Path coefficients	T statistics	P values

Source: Author

5. Discussion and Implementation

Implementing automation technologies requires organizations to assess their compatibility with existing infrastructure to ensure seamless integration and maximize benefits (Budhwar et al., 2023). This integration involves incorporating automation tools into current workflows and systems. While automation offers significant advantages, it also presents challenges like job displacement, data security risks, and ethical guidelines in AI deployment, all of which must be addressed for responsible and sustainable automation. Cloud computing provides computing services over the internet, including storage, processing power, and applications, offering scalable and on-demand access to technological resources (Yenugula et al., 2023). Cloud services enable organizations to scale infrastructure based on demand, leading to cost savings and operational efficiency (Ullah et al., 2020). Moreover, cloud computing enhances collaboration among geographically dispersed teams by providing centralized and accessible data storage and collaboration tools (Zahrani, 2021). Similar to automation, the integration of cloud computing is positively associated with technology integration within organizations, and it is often part of broader digital transformation initiatives to maintain competitiveness (Ahmad et al., 2021).

Project management software offers a centralized platform for planning, executing, and monitoring projects, enhancing communication and coordination among team members (Arefazar et al., 2022). It enables the creation of structured project frameworks, defining tasks, timelines, and dependencies, and facilitates efficient resource allocation based on skills and availability (Ika & Pinto, 2022). The software fosters improved collaboration among team members, particularly in virtual or remote work setups, by providing a centralized location for project documents, real-time communication, and collaborative decision-making. Performance management and feedback processes are crucial for employee development, organizational performance, and strategic goal achievement (Atmaja et al., 2023). Leaders should involve employees in goal-setting and provide opportunities for input, fostering ownership and commitment (Arefazar et al., 2022). Positive feedback acknowledges achievements and motivates employees, while constructive feedback identifies improvement areas and enhances skills. This systematic process of setting expectations, assessing performance, and providing feedback contributes to employee effectiveness and organizational success. These findings align with research indicating a positive relationship between the use of project management software and technology integration within organizations and a positive relationship between performance management and feedback processes and human resources practices.

Human resource optimization in supply chain management (SCM) enhances efficiency, responsiveness, and overall performance (Alam, 2022). This optimization involves aligning and maximizing workforce capabilities to ensure smooth material, information, and service flow (Ma et al., 2023). Continuous training and development programs are essential to keep employees updated on industry trends, technologies, and best practices (Kosanoglu & Kus, 2021). Integrating technology tools like SCM software and analytics enhances human resource capabilities and strategic planning, streamlining processes and enabling data-driven insights (Aroba et al., 2023; Mater et al., 2024; Alserhan et al., 2023; Althunibat et al., 2021; Abbas et al., 2021). This aligns with research indicating a positive relationship between human resource optimization in SCM and human resources practices.

Organizational culture and employee engagement are crucial for performance and success (Makhmut et al., 2023). Organizational culture encompasses shared values, beliefs, and practices that shape employee behaviour (Alam, 2022). A positive and inclusive culture fosters belonging, collaboration, and alignment with the organization's mission and values. Leaders prioritising transparency, inclusivity, and ethical conduct contribute to a positive culture (Aroba et al., 2023). Programs encouraging employee involvement in decision-making enhance ownership and engagement, aligning with human resources practices. Adaptability and innovation are essential for success in today's dynamic business environment (Sabuhari et al., 2023). Organizations establish learning and development initiatives, including training, workshops, and mentorship, to enhance employee skills and knowledge (Makhmut et al., 2023). Embracing adaptability helps organizations navigate challenges and seize opportunities, while innovation enhances competitiveness, efficiency, and stakeholder satisfaction. These findings align with research

showing a positive relationship between organizational culture and employee engagement with human resources practices. However, a negative relationship exists between adaptability and innovation in organizations with human resources practices.

Empowerment and symbiotic relationships in organizations involve delegating authority and providing autonomy to individuals or teams, enabling them to make decisions and take ownership (Budhai & Lewis, 2023). This mutual benefit between entities, such as teams, departments, or employees, and the organization is facilitated by training programs focusing on skill development and providing necessary tools (Han et al., 2023). Leadership development programs can cultivate transformational leaders who empower their teams, contributing to symbiotic relationships. Technology integration strategically incorporates technologies into organizational processes to enhance efficiency and collaboration; research shows a positive relationship between empowerment and symbiotic relationships with human resources practices. Effective technology integration fosters innovation by providing tools for creativity, problem-solving, and adaptability (AlAjmi, 2022). Technologies like video conferencing and instant messaging improve team communication and collaboration, even in dispersed settings (Hung et al., 2023). Organizations should develop a technology strategy aligned with their goals. Research indicates a positive relationship between technology integration, human resources practices, work environment resources, and leadership management.

Human resources practices encompass strategies, policies, and processes to manage and optimize the workforce, covering recruitment, talent development, performance management, and employee relations. These practices also address diversity and inclusion, recognizing the value of diverse perspectives and creating an inclusive workplace (Aboramadan et al., 2020). Integrating technology into human resources involves using HRIS for data management, analytics, and automating administrative tasks (Al-Aali, 2021). Organizations develop comprehensive HR strategies aligned with objectives, addressing short-term and long-term workforce needs and potential skills gaps (Irshad et al., 2021). Work environment resources include physical, cultural, and technological elements contributing to employee well-being, productivity, and satisfaction (Badrianto & Ekhsan, 2020). A positive organizational culture promoting collaboration, inclusivity, and shared values impacts employee relationships, communication, and job satisfaction (Mihalache & Mihalache, 2022). Implementing ergonomic principles in workspace design, such as adjustable furniture and proper lighting, enhances employee well-being and reduces physical strain (Hung et al., 2023). Research shows a positive relationship between human resources practices and work environment resources, while a negative relationship exists between human resources practices and leadership management.

Finally, effective leadership is crucial for motivating employees, fostering a positive work culture, and promoting engagement. Thus, leaders who inspire and provide a clear vision increase employee morale (Buhagiar & Anand, 2023). Therefore, effective leadership involves successfully navigating and managing organizational change and creating a culture that embraces change and continuous improvement (Nabella et al., 2022). Leaders should exemplify ethical behaviour, set a standard for the entire organization, and implement ethical leadership practices to build trust, integrity, and a solid organizational culture (Buhagiar & Anand, 2023). This is consistent with the results of this research, as it was found that there is a positive relationship between organisational leadership management and human resources practices.

In summary, these twelve hypotheses emphasize the importance of various factors, including technology adoption, human resources practices, organizational culture, leadership, and more, in positively influencing organizational performance and success. Understanding and validating these relationships can guide organizations in optimizing their practices and resources to achieve better outcomes. However, there were two hypotheses that had a negative relationship: the first was the relationship between adaptability and innovation with human resources practices, and the second was the relationship between human resources practices and leadership management. Justifying these two hypotheses, a negative relationship between adaptability and innovation in an

organization with human resources practices and a negative relationship between human resources practices and leadership management can be challenging, as these factors are often designed to work together harmoniously to enhance organizational effectiveness. Negative relationships between adaptability, innovation, human resources practices, and leadership management would typically be the result of specific, unusual circumstances.

Organisations often strive to align these elements positively to promote growth and effectiveness. The negative relationships mentioned here are exceptions and require unique contextual situations to be relevant. Here are the scientific contributions:

- **Empirical Validation of Effectiveness:** This research contributes to the scientific community by empirically validating the effectiveness of work environment resources and leadership management within human resources practices and technology utilization. It provides concrete evidence of the impact of these factors on organizational success, shedding light on their practical importance.
- **Interdisciplinary Integration:** The study integrates multiple disciplines, including human resources management, leadership studies, and technology management. This multidisciplinary approach enriches the scientific understanding of the complex relationships between work environment resources, leadership, human resources practices, and technology, offering a holistic perspective.
- **Quantitative Analysis of Technology:** By examining the role of technology in the context of work environment and leadership, the research offers quantitative insights into the influence of technological advancements on organizational outcomes. It contributes to the growing knowledge on technology's role in shaping work environments and leadership practices.
- **Human Resources Practices:** The research highlights the significance of driven human resources practices, contributing to the scientific exploration of evidence-based decision-making in HR. It underscores the importance of leveraging technology and analytics to optimize HR strategies and align them with broader organizational goals.

Therefore, these contributions collectively enrich the scientific understanding of how work environment resources, leadership, human resources practices, and technology impact organizational effectiveness. Here are the theoretical contributions:

- **Work Environment Resources Framework:** The study contributes to the theoretical understanding of work environment resources by providing a framework incorporating leadership management, human resources practices, and technology utilization. It advances existing theories by emphasizing the interconnectedness of these factors in creating an effective work environment.
- **Leadership Management Theory:** The research enriches leadership management theory by emphasizing the importance of leadership in optimizing the use of work environment resources and technology. It contributes to leadership theories by highlighting the role of leaders in creating an environment conducive to productivity and well-being.
- **Technology Integration in HR Theory:** The study expands theories related to technology integration in human resources. It underscores the need for organizations to harness technology for HR practices and align these technologies with leadership and work environment resources for organizational effectiveness.
- **HR Decision-Making Theory:** The research contributes to the theoretical foundation of HR decision-making. It underscores the importance of collecting and analyzing data to inform HR practices and supports the evolution of HR management theories towards more evidence-based approaches.

6. Conclusion, Limitations, and Future Research

This research highlights the importance of work environment resources and leadership management in shaping organizational success. It emphasizes the relationship between a supportive work environment, effective leadership, human resources practices, and technology adoption and their impact on employee well-being, performance, and organizational outcomes. The study developed a new research model based on transformational leadership theory and psychological contract theory, highlighting the importance of technology and effective leadership in creating efficient, productive, innovative, and engaging work environments. Integrating technology tools such as project management software, cloud computing, and automation is crucial for improving workplace efficiency and organizational success in today's business landscape. The study found that 12 hypotheses were accepted, indicating the significance of fostering resource-rich work environments, proficient leadership, strategic human resources practices, and technology integration. However, the research has limitations, including potential bias from specific industries, company size, and organizational culture, which could affect the generalizability of the results. The cross-sectional design also limits establishing causality, suggesting the need for longitudinal research. Future studies should explore how changes in work environment resources and leadership practices affect human resources practices and technology adoption over time, considering diverse cultural contexts and potential mediating and moderating variables. Additionally, research should continue to examine how emerging technologies impact organizational outcomes across various sectors.

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