THE INFLUENCE OF VIRTUAL HRM PRACTICES ON ORGANIZATIONAL CULTURE IN THE INFORMATION TECHNOLOGY (IT) SECTOR OF BANGLADESH

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Abstract: This study investigates the influence of Virtual Human Resource Management (VHRM) practices on organizational culture within the IT sector of Bangladesh. With the growing reliance on digital HR practices, it has become essential to understand how VHRM impacts cultural elements such as employee engagement, communication effectiveness, collaboration, and job satisfaction. This research focuses on four primary VHRM practices: tech-based remote work, e-recruitment, virtual team management, and e-learning and development. Data was collected through a survey distributed to IT professionals in various organizations across Bangladesh. Structural equation modeling (SEM) was used to analyze the relationships between VHRM practices and organizational culture components, providing a robust statistical foundation for the findings. Results reveal that tech-based remote work, virtual team management, and e-learning positively contribute to strengthening organizational culture by promoting flexibility, collaboration, and continuous learning. However, e-recruitment showed a limited effect on cultural alignment, highlighting a gap in the integration of new employees within existing cultural frameworks. These findings underscore the importance of a well-integrated VHRM system to foster a productive and engaging work environment in the rapidly evolving IT industry of Bangladesh.
Keywords: Virtual HRM; Organizational culture; Remote work; E-recruitment; Virtual teams; IT sector

1 INTRODUCTION

Due to the advancement in technology the work environment and the bureaucratic structures through which human resources are managed have changed leading to VHRM. VHRM in the context of this paper is the management of human resources using computer-based systems for activities like recruitment, training, performance evaluation and employee communications [1]. The mentioned practices are particularly significant in the case of IT industry since the usage of technologies is integrated into the business processes. For example, in countries such as Bangladesh the IT industry remains an emerging sector that seems poised for growth, the concept of VHRM practices can offer firms a competitive advantage.

As stated before, Organizational culture refers to the acknowledged norms of behavior that prevail in the organization and are related to its performance level. It defines the behavior of relationships at the workplace, the thinking and decision-making patterns and how the change process occurs. When business organizations are upgrading themselves from conventional models of human resource management to virtual ones, organizational culture of the business also undergoes a change. Technology as adopted by VHRM can help break bureaucracy and improve on working conditions, but it also comes with the demerit of constraining the cultural integration within the organization.

Although the literature on the positive effects of VHRM systems on financial and operational performances of organizations has experienced some growth, more consideration has not been given to the culture of the organization impacted by these systems especially in the case of developing countries like Bangladesh. In the IT sector especially, where the twin factors of innovation and flexibility are critical, the cultural aspects of VHRM are potentially very important [2]. The transition to adopting digital HRM practices can alter how workers approach and interact with job tasks, as well as how they interact with one another.

Still, there is a lack of research investigating how virtual HRM practices impact organizational culture in the context of the IT sector in Bangladesh to fill this gap, this study aims to do so. Of these, it explores how e-recruitment, e-performance management, and digital communication of VHRM practices influence the values, norms, and behavior within IT organizations. Due to the industry type specificity, such cultural changes should be useful and comprehensible for the managers and HR specialists to sustain an efficient and creative workplace and implement the possibilities of the digital HRM system.

Finally, this research seeks to enhance knowledge of VHRM and workplace culture by identifying how technology-intensive practices of HRM are influencing the workplace culture of the IT sector in Bangladesh. This knowledge will not only assist in the better understanding of potential improvements for organizational HR strategies but also benefit the organizational effectiveness by means of a technological cultural fit.

1.1 Problem Statement

The studies related to VHRM practices and their role on culture specifically in the contexts of Bangladesh IT industry are negligible. Despite the fact that, organizations have rush to adopt technologies and other related changes, hardly is effort made to assess on how these changes impact on internal culture. Due to its rapid expansion, professionalism, technology orientation and flexibility, the IT sector provides a stimulating background to examine the relationship between VHRM and the organizational culture. It reaches even when it comes to identifying possible difficulties that organizations might encounter when implementing VHRM alongside the existing cultural practices including how to maintain employee commitment, collaboration, and leadership style where working becomes virtual. This research also intends to address this gap by examining cultural effects of VHRM within the IT industry while providing information that can assist organizations in ensuring organizational cultural remain compatible with implemented technological advancements.

2 LITERATURE REVIEW

2.1 IT Sector of Bangladesh

Bangladesh IT sector has turned into an important key player of Bangladeshi economy in recent years that has transformed into one of the fastest growing industries during the last two decades. This growth has been mainly driven by government led activities for example 'Digital Bangladesh' which also entails the use of technology for economic transformation and for better governance [4]. Due to the government's focus to improve the infrastructure and education sectors, Bangladesh has emerged as a favorable player to IT outsourcing industry to invest and create jobs [5].

At present, there are more than 4600 IT companies in Bangladesh where over 300000 IT professionals are working Here they are involved in software development, ITES and BPO companies [6]. The enhancement of the relevant growth is explained by the following benefits: governmental support, the increasing number of young people with adequate background in technologies, and relatively low expenses. The ICT Policy of the government under its "Digital Bangladesh" framework contains policies on infrastructure, capacity, and investment within the IT industry which has been essential in creating the growing environment of IT [7].

Besides the governmental regulation with incentives, another strength was the source of talent through educated young workforce to the IT sector. Tens of thousands of graduates are being produced each year in computer science and related fields and the quality of IT education has increased, many institutions providing specializations [8]. Still, the sector has some small particulars associated with the skills gaps especially concerning new innovative and innovative technologies namely Artificial Intelligence Machine Learning, and Blockchain [3]. To fill these vacancies, a number of firms particularly in IT sector have adopted comprehensive organizational training aimed at creating learning organizations.

IT outsourcing in Bangladesh has claimed global attention: it has become a preferred destination for companies in North America, Europe, and Asia in search of affordable offerings to meet their IT needs [9]. This has greatly helped in establishment of the country as one of the most preferred outsourcing centres in the world, being often compared to India and the Philippines by Gartner and AT Kearney firms [10]. Moreover, the "freelancing" has emerged as a notable segment of IT industry, the freelancers of Bangladesh are second in Upwork and Fiverr in the global scale.

Nevertheless, there are certain challenges that may act as the impediments to sustainable growth in IT sector of Bangladesh. Network and other related infrastructural challenges such as connectivity are still a big problem [11]. Although there is an advancement in internet connection majority of the regions they still lack quality connections which are essential for IT services. In addition, volatility in power supply will definitely affect operations of businesses most especially in the areas which are not centrally located [5]. Another is cybersecurity since with the swine Improvement in digital solutions, security is critical and hard for many SME firms to address [13].

The skills shortage is also an issue, because students are not as technologically proficient as experts in the field. Education and training for the modern world will also become critical because with advances in technology such as Artificial intelligence AI training and big data the workforce will require specific training to be relevant to the market and to match the market needs [12].

Therefore, it can be said that though constraint in infrastructure, security and skill development issues exist in Bangladesh IT sector there is a good scope for its growth. Education, Infrastructural development and technology must continue to be funding priorities in order to steer Bangladesh towards the envisioned international premiere in IT service delivery as a profitable industry and part of the world economy.

2.2 Virtual HRM Practices in the IT Sector

Currently, there has been a tremendous increase in IT firms' implementation of VHRM due to the general digitization process [13]. VHRM entails integrating technology into human resource practices to improve operations' effectiveness and employees' outcomes, as integrating technology is critical in rapidly evolving industries, like the IT industry [7]. Some of the specific best VHRM practices include technology enabled remote working, e-recruitment, virtual teaming, e-learning, digital performance management all of which are areas that support the overall IT organization strategies.

2.2.1 Tech-based remote work

Tech-Based Remote Work as an essential element of VHRM has proven to transform workplace scheduling into an absolute necessity after the COVID-19 outbreak as flexibility boosts output and staff morale [14]. The IT sector depends on technology, which allows for remote work with strong backing through cloud support and collaborate

software [12]. This self-organizing feature helps IT professionals to design working environment according the nature and tendency of their work, which usually results in more effective working outcomes. However, issues like the lack of cohesiveness of a team and interfacing with company culture remain to be addressed, which is why the remote and office combination remains popular among companies today. Another point is that HR is responsible for many logistical aspects of remote work, always making sure they have what they need [15].

2.2.2 E-recruitment

E-Recruitment is a strategic Human Resource Management solution in the technology sector that has transformed the HR process of talent acquisition by helping firms to advertise and recruit employees in the competitive job market comprehensively [16]. Social media especially, LinkedIn and other specific sites for example GitHub offer easy access to talents from across the globe. AI and Automation in e-recruitment has been found to improve processes, the candidate journey, and decrease biases [7]. However, issues that include algorithmic bias as well as high volumes of applications to these areas call for investment in AI tools for diversity and inclusion.

2.2.3 Team in virtual environment

Team in Virtual Environment is important in IT field since assignments are usually carried out by team members from different locations [8]. Managing virtual teams requires employ of e-communication solutions such as Trello, and zoom that enables work progress and organizational order to be sustained. Strengthening bonds of trust and cohesiveness in the virtual groups are cumbersome due to hindrance of normal face-to-face communication. Organizations are using virtual means to ensure team bonding and encouraging proper communication in IT companies [3]. The leadership in virtual teams has its specificity, which is oral and computer literacy, and awareness of the issues that virtual staff face. Virtual team management is supported by HR in that it offers training and help for team leaders for virtual assignments [17].

2.2.4 E-learning and development

E-Learning and Development have made procedural change in the employee training IT sector that is mandatory for the skill development of new technologies [9]. Web-based solutions such as Coursera and LinkedIn Learning provide scalable learning delivery methods or training that addresses the employee's training need and is relatively cheap. However, problems like, how to engage the employees to practice concepts taught in a course and how to ensure that the employees retain what they learn remains as an issues that necessitated the development of chances for real-life application of the knowledge acquired [5].

However, application of VHRM practices in IT industry has improved the management of organizational workforce and provided organization advantages such as effective, versatile and expandable. Though such practices create such issues, mitigating the benefits of such cultures alongside their operations unlocks a more empowered and creative staff, placing IT companies squarely in this dynamic domain.

2.3 Organizational Culture

The organizational culture, which is regarded as a complex pattern of social interaction that is composed of the system of values, shares, norms, and behaviors, is one of the determinative factors that affect the way people engage and work within organizations' frameworks towards their objectives [30]. For the case of the IT sector, a vigorous organizational culture is highly relevant for promoting creativity, teamwork, and flexibility that are essential in the fast changing forces of technology [8]. The present summary defines and discusses the certain features of organizational culture – employee engagement, effectiveness of communication, collaboration, organizational commitment and job satisfaction and their effect on the performance of IT companies.

2.3.1 Employee engagement

Employee Engagement can be described as the state where workers are emotionally and psychologically active towards their work and organization. Such employees are more productive, and work more towards the objectives of the organization, which is quite important in the IT field where people are required to work for prolonged periods and be ready to undergo continuous education [1]. The important aspects that drive engagement are work that is meaningful, responsibilities with chances to grow, appreciation, and shared organizational culture [16]. However, the sustainability of employee engagement is challenging when employees are forced to work in remote locations, in which circumstances, the individual may experience emotions of disconnection [8]. Organizations need to take proactive measures to secure employee engagement, communicative channels, and barriers to limitations.

2.3.2 Communication effectiveness

Communication Effectiveness is an integral component of strong organizational culture since it allows for effective information flow and interactions among members [8]. In the industry of IT, email and messengers, as well as voice, and video calls are used for better cooperation between people that are not placed at the same geographical location [14]. But at times, over-dependence on communication technology may reduce the chances of non-verbal forms of communication, which may lead to misinterpretation [16]. For better communication, IT organizations should draw and enforce a definite code of engagement, coupled with the recommendation for informal communication for the creation of a social environment.

2.3.3 Collaboration and teamwork

Collaboration and Teamwork are essential in the IT field in which its work structure is always project driven and requires consultants from different areas of specialization [3]. But such divisions can be bridged through effective collaboration, which can be enhanced through collaboration tools such as project management applications and other

communication applications [2]. At the same time, some factors, including geographical and even cultural differences may restrict collaboration [8]. In terms of collaboration, IT companies would benefit from a strong culture of inclusive communication, goal-orientation, and respect between parties, while HR departments would contribute by supporting such education and recognizing those efforts [16].

2.3.4 Organizational commitment

Organizational Commitment is defined as the emotional link employees have to their work, which helps to lower turnover and increase output [8]. Three categories are identified: affective, continuance, and normative. IT organizations should target Affective commitment since employees must always be retained and adhere to organizational culture. [16]. It is vital for leadership to be responsible for creating an environment where employees perceive such factors as opportunities for advancement and a positive culture as contributing to their Organizational Commitment [7].

2.3.4 Job satisfaction

Job Satisfaction is a measure of how satisfied employees are with their respective jobs and is correlated to productivity and a reduction in turnover rates [7]. In broad terms, determinants of job satisfaction encompass pay, work-life balance, ego and recognition and career development [12]. Still, due to the demanding nature of IT work, job satisfaction can be threatened thus hounding the need to implement appropriate HR strategies that enhance well-being and optimal workloads [1].

As a final assessment, company culture plays an important role in employee engagement, communication parameters, collaboration, organizational commitment and job satisfaction in the IT sphere. As such, in creating a strong organizational culture that nurtures these elements, innovative growth for IT firms is guaranteed in the future. HR departments have the greatest responsibility in upholding this culture especially in a virtual setup, by developing practices which seek to enhance employee and client satisfaction.

2.4 Impact of Virtual HRM Practices on Organizational Culture

With the advances in technology, Virtual Human Resource Management (VHRM) practices have considerably changed the working environment in organizations including the organization of work from home in the case of the IT industry. These include: online technologies for off-site work, recruitment over the internet, management of teams through the web, educational activities through the internet, and the management of the staff performance and reward systems electronically. They, like any other system, have their impact on the organizational aspects which in this particular case relate to the bonding aspects in social terms [1].

Organizational culture, as a concept consisting of a system of common goals and actions, determines the level of employee participation and devotion in tasks. Cultural factors, for example, may be significantly changed by the practices of VHRM with good or adverse consequences [9]. The upside is that VHRM practices enhance flexibility and potential independence of employees who can work away from the office and manage their time with relative ease which cultivates a culture of trust and empowerment [18]. In addition, tools such as Slack or Zoom make it easier to collaborate and communicate across regions, which increases inclusivity and transparency in the company [8]. E-learning platforms also help in building a culture of upskilling that is critical now especially for sustenance in the ever-changing IT scene, thus driving employee's engagement and creativity [7]. What is more, VHRM practices allow looking for talent from other regions, making it easier to promote diversity and innovation while not compromising equity due to the data driven approach to recruitment [19].

On the other hand, it has been noted that VHRM practices can also have an adverse influence on the organizational culture by negatively affecting employees to employees as well as team building because there is less face to face contact with fellow employees which can make people feel lonesome [14]. Working virtually from home may also lead to emotional alienation with the foundational values of the company which leads to lower organizational commitment and loyalty from the employees [12]. Also, relying too much on the use of digital communication tools can lead to ineffective building of relationships as there is a lack of body language which results in miscommunication [3].

It can be concluded that VHRM practices do help in creating a healthy environment for employees within organizations that guarantees autonomy, collaboration, learning, and inclusion. However, compromising such culture may also come from adopting VHRM practices. There is a possibility of compromised dynamics such as commitment, relationships, communication and general well-being. For VHRM to be fully utilized, it requires HR teams to be proactive.

3 CONCEPTUAL FRAMEWORK

The visual and theoretical conceptual framework for the research on the subtitle "Influence of Virtual HRM Practices on Organizational Culture in the IT Sector of Bangladesh" outlines all the related practices for every component of organizational culture with various Virtual HRM (VHRM) elements [32]. This suggests that the independent variables such as tech-based remote work, e-recruitment, virtual team management, and e-learning are predictors of dependent variables such as employee engagement, communication effectiveness, collaboration, organizational commitment, and job satisfaction.

Tech-based remote work improves flexibility and independence, whereas, e-recruitment improves diversity and efficiency during hiring. In addition, virtual team management shapes the nature of teamwork, while e-learning improves skills and creativity. Together, these VHRM practices constitute the general culture of the organization since

they impact on employee engagement which is defined as emotional attachment, and communication which is a key component for resolving issues in the digital world. Furthermore, collaboration and teamwork are likely to be influenced by the virtual management tools, and organizational commitment depicts the emotional attachment which employees have with the organization depending on how coherent the VHRM practices are with the culture of the organization (Figure 1) [34].
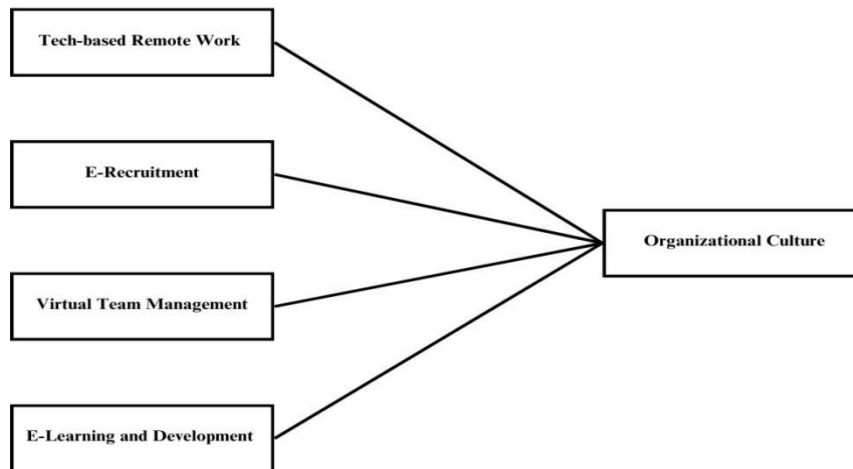

Figure 1 Conceptual Framework (Proposed by Author)

The arrows in the form of a diagram have shown the direction of the practice in relation to the elements of culture, that is, how the VHRM originated from various components of culture. For instance, tech-based remote work not only leads to an increase in communication and the ability to attract employees but also in employee engagement as well as job satisfaction and organizational commitment through e-recruitment.
In practical terms, this framework helps HR practitioners in customizing the implementation of VHRM so as to focus on specific cultural elements, reduce probable adverse effects, and support cultural change efforts that are in line with the organizational goals. With these dynamics in mind, IT businesses can make more focused use of VHRM in developing a desirable organizational culture that is positive, productive, and satisfying to the employees, thereby achieving better performance [34].

4 RESEARCH METHODOLOGY

The methodology of this research presents the specific procedures and strategies used to the quest of how Virtual Human Resource Management (VHRM) practices influence organizational culture in the context of the IT industry of Bangladesh [20]. The research however uses a multiple case study design that utilizes different VHRM practices which include tech driven remote work, e-recruitment, virtual work teams, e-learning and development and e-performance management reviewing how these impact on employee engagement, communicative effectiveness, collaboration, job satisfaction and commitment to the organization [21].

4.1 Research Design

The population of the study comprised employees of IT companies therefore a cross-sectional survey was adopted employing a quantitative research design to obtain survey data from the employees of the surveyed firms. The formulated questionnaires of the structured surveys are designed with the objective of establishing the perception of employees regarding the effects of VHRM on the organizational culture. Relationships among the variables integrated through VHRM and its cultural dimensions were subjected to testing of hypotheses [22].

4.2 Population and Sample

The population of the research study comprises people working in various IT firms in Bangladesh including BJIT Limited and DataSoft Systems Bangladesh Ltd. which actively use VHRM practices. A simple random sampling technique was used to select a sample size of 210 employees in order to achieve diversity and representativeness in terms of different levels of the organization structure [23].

4.3 Research Instrument

A structured questionnaire is designed and formulated from the conceptual framework that articulates VHRM practices and organizational culture. It outlines the areas and the divisions of the section that deals with tech based remote work, e-recruitment, virtual team management, e-learning and organizational culture seen with agreement on the Likert scale given by respondents [24].

4.4 Reliability of Scale

Questionnaires were administrated to a total of twenty employees with 30 employees in the pilot test assessing both clarity and internal consistency of the questionnaire. The data collected was measured through Cronbach's Alpha testing with 0.70 being the cut off point for the measure [32].

4.5 Data Collection Procedures

An online survey was administered over a period of 4 weeks, where reminders were sent one the respondents failed to respond with the aim of increasing the response rate. Anonymity was provided to the respondents (Xu et al., 2024).

4.6 Data Preparation and Analysis

Respondents had their data, after collection, cleaned, coded, as well as outliers identified, before partial least squares structural equation modeling was undertaken using smart PLS software. Various methods including descriptive statistics, measurement model assessment, structural model assessment and evaluation of goodness of fit metrics are applied for result interpretation [25].
In conclusion, this study emphasizes a structured quantitative approach while exploring the linkage that exists between the VHRM practices and the organizational culture, the scope of the study being the IT industry in Bangladesh, with all reliability and validity being ensured with every aspect of the design and analysis.

5 FINDINGS & ANALYSIS

5.1 Measurement Model Assessment

In PLS-SEM analysis, the first step involves evaluating the measurement model. This process integrates composite reliability, indicator reliability, reflectively measured components, convergent validity, and discriminant validity into the study's methodological approach [13]. Assessing indicator reliability is essential to constructing a reliable measurement model, as relevant constructs highlight indicator dependability, which in turn is used to assess indicator variance. Ideally, outer loadings for indicators should exceed 0.70, but in social science research, outer loadings below 0.70 are often encountered, despite the optimal 0.7 threshold [25]. Instead of simply discarding indicators with low loadings, we assess whether removing them would enhance composite reliability, content validity, and convergent validity.
Indicators with outer loadings between 0.40 and 0.70 are evaluated for potential removal only if their exclusion improves composite reliability or Average Variance Extracted (AVE) beyond the recommended threshold [2]. As shown in the measurement model (Table 1), all items have outer loadings above 0.700, supporting the reliability of the model's constructs.
In our study, all constructs demonstrated outer loadings above the 0.70 threshold, indicating strong indicator reliability for each measured item. For example, outer loadings for Tech-based Remote Work (TRW) were 0.908 and 0.896, for E-Recruitment (ER) were 0.892 and 0.883, for Organizational Culture (OC) were 0.852 and 0.863, for Virtual Team Management (VM) were 0.887 and 0.866, and for E-Learning and Development (ELD) were 0.858 and 0.904.
Composite reliability values further confirm reliability, with all constructs exceeding the 0.70 threshold: TRW at 0.897, ER at 0.881, OC at 0.848, VM at 0.869, and ELD at 0.874. The Average Variance Extracted (AVE) values also indicate satisfactory convergent validity, with each construct's AVE surpassing the minimum threshold of 0.50. Specifically, the AVE for TRW is 0.813, ER is 0.788, OC is 0.735, VM is 0.768, and ELD is 0.7760 (Figure 2).
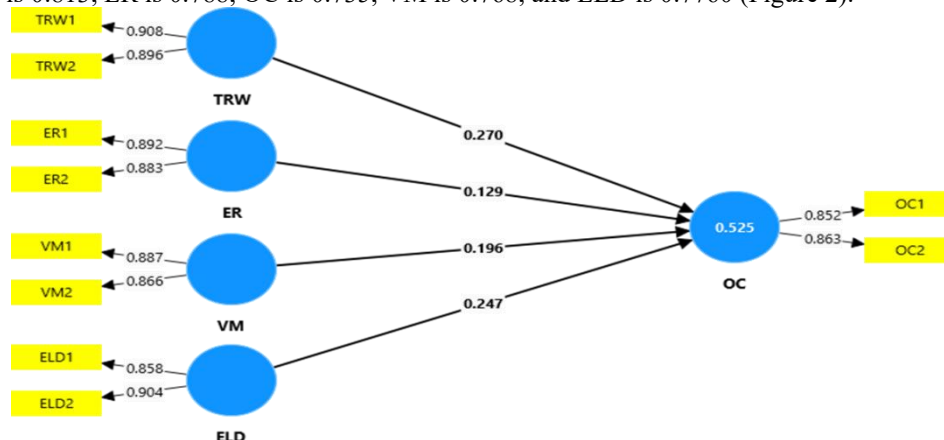

Figure 2 Measurement model (Outer loading, Correlations and Cronbach's alpha)

To evaluate reliability further, we examined Cronbach's Alpha, rho_a, and composite reliability. Both Cronbach's Alpha and rho A exceeded the recommended 0.700 threshold, indicating strong internal consistency [9]. The rho_a values, all above 0.7, fell between Cronbach's Alpha and composite reliability, further confirming reliability [26]. Each

construct also met the criteria for convergent validity, as indicated by AVE values greater than 0.500, in line with Fornell and Larcker's guidelines (1981) [27].

Table 1 Factors Loadings, Reliability, and Convergent Validity

Construct	Item	Loading	Alpha	rho_a	CR	AVE
ELD	ELD1	0.858	0.714	0.73	0.874	0.776
	ELD2	0.904				
ER	ER1	0.892	0.73	0.731	0.881	0.788
	ER2	0.883				
OC	OC1	0.852	0.64	0.641	0.848	0.735
	OC2	0.863				
TRW	TRW1	0.908	0.771	0.772	0.897	0.813
	TRW2	0.896				
VM	VM1	0.887	0.699	0.702	0.869	0.768
	VM2	0.866				

For discriminant validity, we used the Fornell-Larcker criterion, comparing the square root of each construct's AVE with latent variable correlations, and the heterotrait-monotrait (HTMT) correlation ratio [28]. Both methods yielded values below the conservative cutoff of 0.85, confirming discriminant validity, as shown in Tables 2 and 3. These results validate that each construction is distinct, meeting all necessary criteria for a robust measurement model.

Table 2 Fornell-Larcker Criterion

Construct	ELD	ER	OC	TRW	VM
ELD	0.881				
ER	0.645	0.887			
OC	0.627	0.611	0.858		
TRW	0.582	0.682	0.621	0.902	
VM	0.714	0.705	0.628	0.609	0.876

Table 3 HTMT

Construct	ELD	ER	OC	TRW	VM
ELD					
ER	0.897				
OC	0.922	0.892			
TRW	0.779	0.907	0.883		
VM	1.011	0.985	0.936	0.827	

The HTMT table assesses the discriminant validity between five constructs: E-learning and Development (ELD), E-recruitment (ER), Organizational Culture (OC), Tech-based Remote Work (TRW), and Virtual Management (VM). Discriminant validity ensures that each construct is distinct from the others. In this table, several values, especially between ELD and VM (1.011), ER and VM (0.985), and ELD and OC (0.922), exceed the commonly accepted thresholds of 0.85 or 0.90, indicating potential overlap. This suggests that some constructs, particularly those related to Virtual HRM practices, might be measuring similar concepts and may not be entirely distinct. Further investigation could help clarify whether these constructs capture unique dimensions or overlap conceptually.

5.2 Structural Model

The structural model contains the pathways outlined in the research framework. This model is assessed through measures like R2, Q2, and the significance of path coefficients [16]. The R2 value, which ranges from 0 to 1, indicates the explanatory power of the model [11]. For Organizational Culture (OC), the R2 value is 0.525, suggesting that the model explains 52.5% of the variance in OC. This level of $R2R^2R2$ demonstrates a moderate predictive capability within the context of the research (Figure 3).
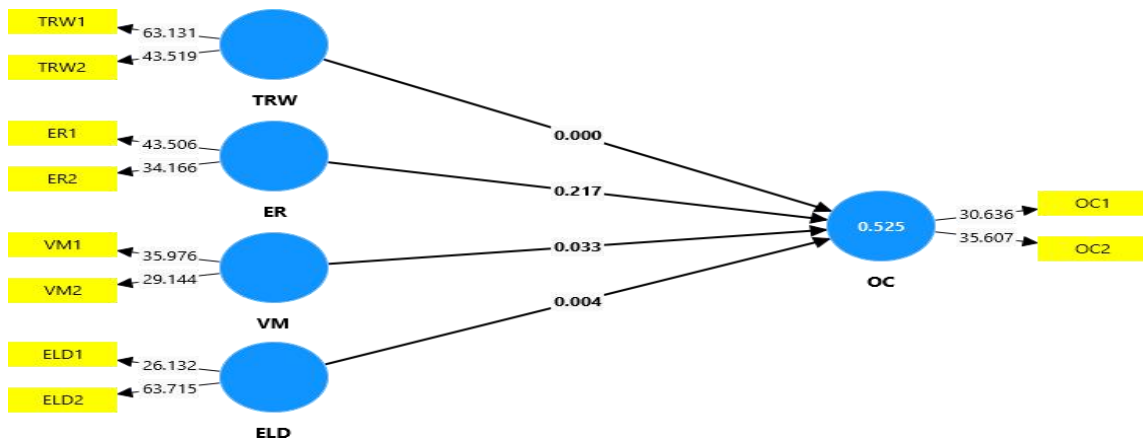
Figure 3 Bootstrap Model

To further assess model fit, the Standardized Root Mean Square Residual (SRMR) was calculated, providing an additional indicator of model fit. Next, hypothesis testing was conducted to determine the significance of relationships between constructs. Specifically, Tech-based Remote Work (TRW) positively influences Organizational Culture (β = 0.270, t = 3.498, p < 0.001), thus supporting Hypothesis 1 (H1). Virtual Team Management (VM) also has a positive and significant impact on Organizational Culture (β = 0.196, t = 2.129, p = 0.033), supporting Hypothesis 3 (H3). Additionally, E-Learning and Development (ELD) has a positive impact on OC (β = 0.247, t = 2.848, p = 0.004), providing support for Hypothesis 4 (H4). However, E-Recruitment (ER) did not have a significant effect on OC (β = 0.129, t = 1.234, p = 0.217), indicating that Hypothesis 2 (H2) was not supported.

Table 4 R-square and R-square adjusted

Construct	R-square	R-square adjusted
OC	0.525	0.515

With an R-square value of 0.525, this Table 4 indicates that approximately 52.5% of the variance in Organizational Culture (OC) is explained by the independent variables in the model, such as E- learning and Development (ELD), E-recruitment (ER), Tech-based Remote Work (TRW), and Virtual Management (VM). The adjusted R-square value, at 0.515, slightly reduces this figure to account for the number of predictors, suggesting that around 51.5% of the variance is still explained even after adjusting for the model's complexity. These values suggest a moderate level of explanatory power, indicating that while the Virtual HRM practices included in the model significantly influence Organizational Culture, there is still a considerable portion of variance left unexplained, potentially due to other external factors.

Table 5 Hypothesis Analysis

Construct	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Hypothesis
ELD -> OC	0.247	0.25	0.087	2.848	0.004	Supported
ER -> OC	0.129	0.129	0.105	1.234	0.217	Not Supported
TRW -> OC	0.27	0.27	0.077	3.498	0	Supported
VM -> OC	0.196	0.194	0.092	2.129	0.033	Supported

Bootstrapping with 230 iterations was conducted to test the significance of the path coefficients, applying a 95% confidence interval. Paths with confidence intervals that do not include 0 were considered statistically significant, confirming the robustness of significant relationships in the model.

Table 6 Relationship Biasness

Construct	Original sample (B)	Sample means(M)	Bias	2.50%	97.50%
ELD -> OC	0.247	0.25	0.003	0.067	0.415
ER -> OC	0.129	0.129	0	-0.091	0.32
TRW -> OC	0.27	0.27	0	0.117	0.422
VM -> OC	0.196	0.194	-0.002	0.01	0.373

Table 5.6, titled "Relationship Biasness," provides an analysis of the bias in the relationships between Virtual HRM practices and organizational culture (OC) using bootstrapped path values. The table compares original sample coefficients with bootstrapped sample means, revealing that these values are nearly identical, which demonstrates stability and consistency. The bias values for each pathway are close to zero, indicating minimal bias in the estimates. Additionally, the 95% confidence intervals for each path (represented by 2.5% and 97.5% values) confirm the significance of most relationships.

The results suggest that E-learning and Development (ELD) has a moderate positive impact on OC, as does Virtual Management (VM), while Tech-based Remote Work (TRW) has the strongest positive effect. However, the influence of E-recruitment (ER) is smaller, with a confidence interval that crosses zero, indicating it may not be statistically significant. Overall, these findings highlight that ELD, TRW, and VM positively contribute to organizational culture, with low bias supporting the reliability of these relationships.

6 DISCUSSION

The results presented in the analysis of Chapter 5 examine the interdependencies and linkages between Virtual HRM (VHRM) systems and other elements of culture in an organization in the Bangladeshi IT Industry [22]. These results provide significant information on the way distinct VHRM practices connected with particular determinants of organizational culture, namely employee involvement, teamwork, and integration of communication, or job satisfaction [30]. In this Part, the consequences which are in conjunction with these findings in regard to the primary propositions and theoretical framework are discussions and contradictions as well [35].

6.1 Tech-Based Remote Work (TRW) and Organizational Culture

The noted above relationship can be considered as relatively strong as parameters of Tech-Based Remote Work (TRW) and organizational culture were proved to be positive and statistically significant, which characterizes high remote interactions between employees of IT companies (31). This finding concurs with earlier studies that using work technologies allows people to work in a flexible environment and fit their work environment to their needs while at the same time increasing their commitment to the organization [36]. The outcomes show that companies must take the same stand for providing infrastructure suitable for remote working since it improves the level of engagement of the employees [37].

6.2 E-Recruitment (ER) and Organisational Culture

The analysis illustrates that E-Recruitment (ER) has no statistically significant effect on organizational culture which leads to nullification of H2. This implies that although e-recruitment is useful in the recruitment process, it does not help much in promoting acceptance and understanding of the organization [20]. The finding suggests that although processes of recruiting are now web based, organizational cultural integration and value attachment may not be addressed as required. Organizations may have to use traditional means of recruiting with a security expect tailored recruitments that fit within the core organizational values [38].

6.3 Virtual Teams Management (VM) and Organization Culture

The Virtual Team Management (VM) managed to exhibit a positive and significant influence to organizational culture which supports the Hypothesis 3 (H3). This finding emphasizes the role of technology and leadership in improving interaction and collaboration of virtual teams [39]. Using video conferences and project management applications help to foster team work and cohesiveness even when team members are miles apart [3]. IT organizations hence should adopt effective virtual team management strategy and frequent virtual team building exercises to promote inter team relationships.

6.4 E-Learning and Development (ELD) and Culture of the Organization

The evidence provided in this study about the fourth hypothesis (H4), demonstrates that E-Learning and Development (ELD) contributes positively towards organizational culture, it at the same time stresses the fact that many people dislike using it due to a lack of possibilities for self-improvement to attend such opportunities [40]. E-learning programs help employees acquire additional competencies as well as meet the needs to change within the industry, hence enhancing commitment. From this finding, it is argued that all IT companies must provide their workers with satisfying ICT tools including an all-embracing e-learning facility [32]. e-learning modules when coupled with career progression chances give the ideal situation to foster between contact hours and practice time within the industry within ne space which is advocacy for culture [41].

7 FURTHER RESEARCH DIRECTIONS

Although this study adds some level of understanding to the existing body of literature, there are a number of other factors or the present findings which future research may focus on. Some of the suggestions include:
• Assessing on the effects and benefits of VHRM practices in support of organizational culture in the context of hybrid workplaces.
• Assessing the effectiveness of the digital onboarding processes in achieving the cultural fit for employees hired through the electronic recruitment mode.
• Identifying those characteristics of leader which are perceived or associated with successful management of virtual teams.

8 CONCLUSION

This research intended to analyze the effect of Virtual Human Resource Management(VHRM) practices on the organizational culture in the IT industry of Bangladesh, where the need for technology-driven HR practices cannot be overstated. The research revolves around the four major components of VHRM which include tech-based remote work, e-recruitment, virtual team management, and e-learning and development, and examined their effects on employee engagement, effectiveness of communication, collaboration, and job satisfaction. In addition to gaining structured insights through a structured survey, quantitative analysis of data employing structural equation modeling (SEM) was used to generate data on how these VHRM practices transform workplace culture.

The results show that some VHRM, particularly tech-based remote work, virtual team management and e-learning are positive for organizational culture. Flexibility and engagement were created through remote work while improved collaboration and communication were enabled through virtual team management. Furthermore, E-learning and development were viewed as being critical for job satisfaction and employee development which are crucial for survival in the competitive and fast changing and dynamic IT sector. In combination, these practices enhance cultural features through a culture of empowerment and collaboration and continuous development of knowledge.

However, the study also identified some areas of concern with respect to the VHRM practices. As an instance, e-recruitment, although effective in promoting the efficiency of the recruitment process, had a little bearing on increasing the depth of inclusiveness and anchor within the organization's value structure. This points to a possible weakness in bridging the gap that exists between employees and the organization's culture, which suggests organizations might have to do more on orientation programs during virtual hires.

Finally, encourage organizations to invest in developing and implementing VHRM practices, as they are focused on the achievement of the cultural objective. In Bangladesh's IT firms, this entails building agile virtual infrastructure, educating managers on virtual team management, and growing e-learning platforms. Doing so enables organization to not only lure potential as well as retain talent but also build a close knit active workforce which is beneficial for the organization. Future research may build upon these results in the examination of other industries or investigate the influence of these work arrangements on the culture of the organizations, thus broadening the understanding of VHRM in 21 century corporations.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to dis.

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REFERENCES

[1] N Anjum, M A Islam. Employees' behavioral intention to adopt e-HRM system-an approach to extend technology acceptance model. International Journal of Academic Research in Accounting Finance and Management Sciences, 2020, 10(3): 544-561.

[2] N Noor, S Rehman, M A Shah, R Altaf. E-HRM Practices and Organizational Success in IT Sector: Mediating Role of Perceived Usefulness. 2024. DOI: 10.1111/hrm.12456.

[3] N Anjum, M S Rahaman, M I Choudhury, et al. An insight into green HRM practices for sustainable workplace in the banking sector of Bangladesh: the role of electronic HRM. Journal of Business Strategy Finance and Management, 2022, 4(1): 66.

[4] S Rahman, M Z Islam, M Hossain, et al. Organizational Factors, ICT Support, and Affective Commitment: The Case of Bangladesh-Based Service Organizations. Journal of Global Information Management (JGIM), 2022, 30(1): 1-18. DOI: 10.4018/JGIM.2022010101.

[5] S S Alam, K Z Islam. Examining adoption of electronic human resource management from the perspective of technology organization environment framework. IEEE Engineering Management Review, 2021, 49(4): 59-75.

[6] A Islam, A Naseem. Role of Industry 4.0 tools in organizational performance of the IT sector. Kybernetes, 2023.

[7] S H B Shahriar, M S Alam, S Arafat, et al. Remote work and changes in organizational HR practices during corona pandemic: a study from Bangladesh. Vision, 2022: 09722629221115234.

[8] B Barua. Impact of total quality management factors on knowledge creation in the organizations of Bangladesh. The TQM Journal, 2021, 33(6): 1516-1543.

[9] F Bhuiyan, M O Gani. Usage of Human Resource Information System and Its Application in Business: A Study on Banking Industry in Bangladesh. iBusiness, 2015, 7(3): 111-122.

[10] G M A A Quaosar. Adoption of human resource information systems in developing countries: An empirical study. International Business Research, 2018, 11(4): 133-144. DOI: 10.5539/ibr.v11n4p133.

[11] M T Ahmed. E-HRM Practices and its impact on Organizational Performance: A study on the Manufacturing industry in Bangladesh. European Journal of Business and Management, 2019, 11(6): 50-60.

[12] F Syarief, H Nindiasari, M Martanto, et al. e-HRM: Changes in Business and Labor Culture in the Digital Paradigm, 2022, 6(1).

[13] M H Mia, F Faisal. Digital Human Resource Management: Prospects & Challenges for Garments Industries in Bangladesh. European Journal of Business and Management, 2020, 12(7): 18-25. DOI: 10.7176/ejbm/12-7-03.

[14] F Shahriar, M S B Tonmoy, F Yeasmin. Revolutionizing Organizational Communication in Industry 4.0: Unlocking Opportunities and Overcoming Challenges in Bangladesh. Journal of Current Social and Political Issues, 2024, 2(1): 1-9.

[15] A Talukdar, A Ganguly. A dark side of e-HRM: mediating role of HR service delivery and HR socialization on HR effectiveness. International Journal of Manpower, 2022, 43(1): 116-147.

[16] M K Ganeshan, C Vethirajan. Electronic human resource management practices and employees' perception towards information technology industry. International Journal of Scientific & Technology Research, 2020, 9: 86-90. DOI: 10.1109/IJSTR.2020.00932.

[17] M N I. Noyal. The impact of technology adoption on HR practices in the Bangladeshi construction industry. 2023. DOI: 10.1111/bmj.12867.

[18] H Halid, S N A Halim, K Ravesangar. Human resource management practices in the digital era. In: Technological Challenges: The Human Side of the Digital Age. Cham: Springer International Publishing, 2022: 109-158. DOI: 10.1007/978-3-030-69239-4_6.

[19] M S Rahman, M S Hosain. E-HRM practices for organizational sustainability: Evidence from selected textile firms in Bangladesh. Asian Journal of Economics, Business and Accounting, 2021, 21(1): 1-16. DOI: 10.9734/ajeba/2021/v21i130371.

[20] L Wijaya, J Valerie, C K Meng, et al. Factors Influencing the Adoption of Augmented Reality on Consumers. Online Shopping Purchase Intentions, 2024.

[21] S M Ventura, F Castronovo, D Nikolić, et al. Implementation of virtual reality in construction education: a content -analysis based literature review. Journal of Information Technology in Construction, 2022, 27: 705. DOI: 10.36680/j.itcon.2022.035.

[22] A Gabriel, A D Ajriya, C Z N Fahmi,et al. The influence of augmented reality on E-commerce: A case study on fashion and beauty products. Cogent Business & Management, 2023, 10(2). DOI: 10.1080/23311975.2023.2208716

[23] M M Ali, A M Islam. Macroeconomic impacts of the global financial crisis on the Bangladesh economy. Savings and Development, 2024: 305.

[24] C Söderström, P Mikalef, N AUTHOR_ID, et al. Augmented reality (AR) marketing and consumer responses: A study of cue-utilization and habituation. Journal of Business Research, 2024, 182: 114813. DOI: 10.1016/j.jbusres.2024.114813.

[25] N Muqaddim, M S Hosain. E-HRM practices and operational efficiency: Evidence from Bangladeshi garment industry. Asian Journal of Economics, Business and Accounting, 2021, 21(4): 81-96. DOI: 10.9734/ajeba/2021/v21i430334.

[26] Sarstedt M, Hair JF, Pick M, et al. Progress in partial least squares structural equation modeling use in marketing research in the last decade. Psychology & Marketing, 2022, 39(5): 1035-64.

[27] Fornell C, Larcker DF. Evaluating structural equation models with unobservable variables and measurement error. Journal of marketing research, 1981, 18(1): 39-50.

[28] A R Khan, N Hasan, M. Rubel. Factors affecting organizations adopting human resource information systems: a study in Bangladesh. J. Bus. Manage, 2015, 17: 45-54.

[29] N Yaqoob, Z Ali, I Ahmed, et al. Narratives of School Leadership to Support the Well-Being of Teachers in Karachi Pakistan. Voyage Journal of Educational Studies, 2023, 3(4):135. DOI: 10.58622/vjes.v3i4.99

[30] Rabby, Md Anik, Rahman. Consumer Observation on Retail Digitalization: A Study on Retail Sector of Bangladesh. International Journal of Research Publication and Reviews, 2023, 04: 776-787.

[31] Rabby AH. Women Empowerment through Integrated Development Approach: A Case Study on Poverty Eradication Program (PEP). Joura, 2024, 2(2): 15-32. Available from: https://hasmed.org/index.php/Joura/article/view/106.

[32] Imtiaz Q, Anwer S, Chowdhury SR, et al. Challenges And Solutions For Ethical Ai Implementation In Hrm. Library Progress International, 2024, 44(3): 12490-504.

[33] Giuseppe Giorgianni, Muhammad Numan Ali, Ikhlef Jebbor, et al. Unveiling The Potential Of Ai: Impacts On Industries And Ethical Considerations. Kuey, 2024, 30(3): 2654-61. https://kuey.net/index.php/kuey/article/view/7484.

[34] Rabby SM, Rahamn MA. A Comprehensive Review on Expatriate Training and It's Importance. 2023.

[35] J A Abane, R Adamtey, V O Ayim. Does organizational culture influence employee productivity at the local level? A test of Denison's culture model in Ghana's local government sector. Future Business Journal, 2022, 8(1). DOI: 10.1186/s43093-022-00145-5.

[36] P Damon. The Effect of COVID-19 on Remote Work Policies. Journal of Science Policy & Governance, 2022, 21(1) . DOI: 10.38126/jspg210101.

[37] P Makowski. Remote Leadership and Work Engagement: A Critical Review and Future Directions. European Journal of Business Management and Research, 2023, 8(4): 1. DOI: 10.24018/ejbmr.2023.8.4.1835.

[38] R D Johnson, D L Stone, K M Lukaszewski. The benefits of eHRM and AI for talent acquisition. Journal of Tourism Futures, 2020, 7(1): 40. DOI: 10.1108/jtf-02-2020-0013.

[39] P Dogra, A K Kaushik, P Kalia, et al. Influence of augmented reality on shopping behavior. Management Decision, 2023, 61(7): 2073. DOI: 10.1108/md-02-2022-0136.

[40] M N S Lopez, R C M Ramos. Perceptions of hospitality management students of Nueva Ecija University of Science and Technology to different learning modalities. World Journal of Advanced Research and Reviews, 2023, 18(3): 240. DOI: 10.30574/wjarr.2023.18.3.1047.

[41] R Taskeen. A DECOLONIAL ANALYSIS OF PEACE PEDAGOGY IN EDUCATION IN INDIA AND PAKISTAN, 2023.