

# THE INTERACTION EFFECT OF THE WORK ENVIRONMENT ON THE RELATIONSHIP BETWEEN QUALITY OF HEALTH SERVICES AND USER SATISFACTION OF THE TERTIARY LEVEL OF HEALTHCARE

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**ABSTRACT** Creating a positive work environment is important for any organization, especially for healthcare organizations. The aim of this study is to investigate the role of the work environment as a moderator between the quality of healthcare services and user satisfaction. A survey was conducted among a sample of 1,022 users of healthcare services, 82 managers and 464 employees of clinical centers in Bosnia and Herzegovina. The tests show that the work environment plays a significant moderating role in the relationship between the quality of healthcare services and user satisfaction. The results highlight the importance of considering workplace factors to improve employee performance in tertiary healthcare institutions. The study indicates that a working environment fostering respect for both workers and managers, reducing stress, and offering greater opportunities for advancement contributes to better service quality and higher user satisfaction with both medical and non-medical services.

**KEYWORDS:** *work environment, internal marketing, quality of healthcare services, user satisfaction, structural equation modeling, moderating influence*

## INTRODUCTION

All organizations, including those in the healthcare sector, strive to create a good work environment. Considering the impact of the work environment on user satisfaction can be defined as part of internal marketing. This is confirmed by the fact that internal marketing has the task of creating an internal environment that stimulates and motivates employees, who then transfer their satisfaction to the users. Bansal et al. (2001) emphasize that maintaining a corporate culture is a key to satisfied users.

The work environment is equally crucial for both medical and non-medical staff in all healthcare organizations. There is a positive link between work environment characterized by adequate facilities, effective leadership, and opportunities for growth can significantly enhance staffs' commitment to their organizations and overall their performance (Esharefasa & Adeyeye, 2025).

Investing in the work environment has wide-ranging effects, from improving the quality of healthcare services and increasing staff satisfaction to

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retaining a skilled workforce. These improvements, in turn, benefit both management and the overall quality management system. In public healthcare institutions, a pleasant and supportive work environment is shaped both by internal organizational policies and by state-level public health policies. A supportive work environment is shaped partly by internal organizational policies, which are the responsibility of institutional management, and partly by state-level public health policies, which require managers and medical teams to adapt or to lobby for improvements through appropriate channels. Establishing a positive work environment in healthcare institutions is crucial for the regular functioning and contribution of both medical and non-medical staff, particularly during crises such as the COVID-19 pandemic, when excessive workloads, insufficient protective resources, and limited peer support can severely harm staff mental well-being (Ardebili, et al., 2021).

Given the complexity of this issue, efforts to improve the work environment should be grounded in a detailed analysis of its key dimensions, considering both content and underlying principles. Such an analysis must reflect the perspectives of employees (nurses, technicians, physicians, and non-medical staff) as well as those of management (managers, department heads, clinic heads, and directors). Only through the collective involvement of all members of the healthcare team is it possible to identify objective indicators and develop recommendations for improving the work environment and, consequently, the quality of healthcare services.

In accordance with the previously mentioned scientifically grounded methods, we tested the following hypothesis: *The work environment moderates the relationship between the quality of healthcare services and user satisfaction.*

## CONCEPTUAL FRAMEWORK OF WORK ENVIRONMENT

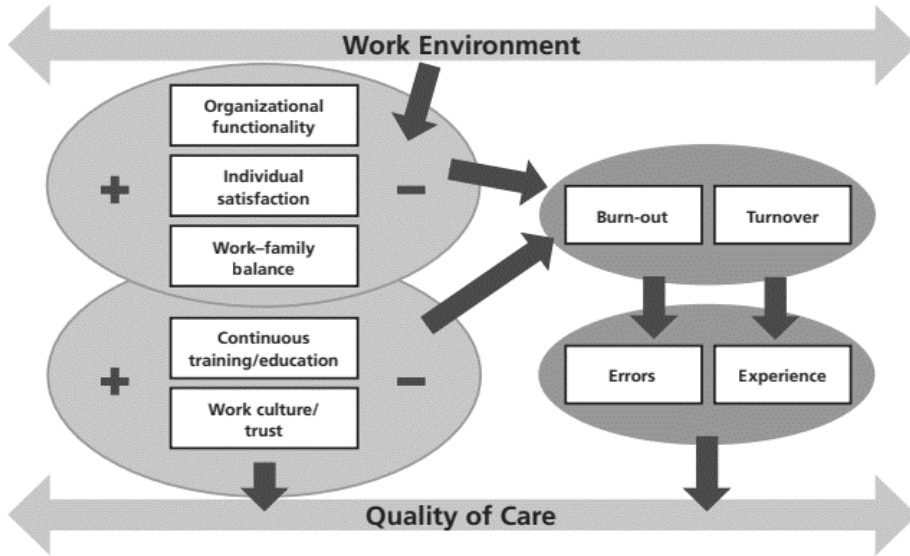
The work environment is a broad concept that has been interpreted differently by various authors. Damschroder (2009) defines it as the internal setup of an organization within which employees interact with the organization. This definition implies the context of work tasks with clearly defined job tasks, clarity of roles within the organization, and the level of workload for each employee. Other authors, like Lee (2018), expand this definition to include the social dimension of the workplace, characterized by interactions among employees and teams. The social context can be defined as the shared perception of expected rewards, recognition, and organizational support. This entails building

positive interpersonal relationships, ensuring fair and effective conflict resolution, and fostering respect and collaboration (Osatuke, et al., 2009). Van den Berg et al. (2017) highlight the physical dimension of the work environment, which encompasses workplace safety, general working conditions, the immediate setting in which employees operate, and the physical and mental health of the workforce. In this regard, it is important to monitor and analyze employee complaints, particularly those related to burnout and sick leave.

The concept of the work environment can also be understood in terms of organizational culture. In this sense, it includes organizational values, norms, and shared beliefs. Schein (2004) points out that organizational culture can be the key to success, but also the key to failure for organizations which don't adapt to environmental conditions. Over the long term, leadership should therefore promote values such as risk-taking, creativity, attention to detail, critical reflection on past practices, and readiness to embrace new business challenges. Evidence shows that organizations whose cultures cultivate these values achieve significantly higher performance (Šagovac, 2021; Mečev & Grubišić, 2020; Raguž et al., 2017; Foldspang et al., 2014). Research on organizational culture, however, often focuses on isolated aspects rather than the system as a whole and the dynamic interaction among its components.

Specifically in the case of healthcare facilities, primary research (Pronovost & Sexton, 2005) is concerned with safety culture, such as patient safety and learning from adverse events, while neglecting other elements of organizational culture, such as working conditions and methods for non-medical staff, technicians, logistical issues, and so on. Most studies in healthcare focus primarily on the impact of the work environment on nurses' work, indicating that poor communication and higher workload lead to more errors in the treatment of users and even more deaths (Stojaković, 2023; MacPhee et al., 2017; Aycan et al., 2015; Coventry et al., 2015).

Summarizing the previous, the work environment should be understood as a system of support, development and positive communication, which in theory should result in better service and greater user satisfaction, which is the domain of internal marketing according to Abu ElSamen & Alshurideh (2012). Huang (2020) believes that the primary goal of the organization is to build quality relationships with employees by creating a better working environment that meets the needs of users. Much research has focused on establishing a link between the work environment and service quality (Bell et al., 2004) as well as service user satisfaction (Homburg & Stock, 2005; Weller, et al., 2019). In the case of healthcare services, work conditions have been



**FIGURE 1** Links between the work environment and quality of care

SOURCE: Wiskow, C., Albrecht, T., de Pietro, C., (2010). How to create an attractive and supportive work environment for health professionals, WHO Regional Office for Europe and European Observatory on Health Systems and Policies, p. 3.

linked to employees' perceptions of their ability to care for patients (Newman et al., 2001; Scotti et al., 2007).

In healthcare facilities, the conditions that employees are exposed to in their workplaces are of great importance due to the specific nature of the work, the length of working hours and the need for flexible work schedules (Gačević, 2021). Using the Delphi method, Maassen et al. (2021) wanted to investigate what constitutes a positive work environment in healthcare facilities. The study revealed that no fewer than 36 elements of a positive work environment were perceived by both medical and non-medical staff. Among the most important elements, the authors highlight: (1) autonomy, (2) opportunities for career advancement, (3) job challenges, (4) employee respect, (5) motivation programs, (6) overall job satisfaction, (7) leadership, (8) open communication, (9) physical environment and (10) social aspects of the environment.

Creating a positive and affirming work environment influences the quality of healthcare services provided. Although this relationship is intuitive, its assessment requires measurable concepts and indicators. The following figure shows a conceptual model that explains the relationship between the work environment and the quality of healthcare and applies to both medical and non-medical staff in healthcare facilities.

The previous model is only a rough representation of the emerging relationship, while the practice shows a much more dynamic relationship and a high-

er degree of interdependence between the individual elements shown here. The model assumes direct and indirect effects of the work environment on the quality of healthcare services. The direct impact is manifested through the symbiotic interaction of five variables: (1) Organizational functions (internal communication system); (2) Individual satisfaction (management support and respect and healthcare service user satisfaction); (3) Work-life balance (childcare facilities and reduced on-call time); (4) Continuous education and training (opportunities for professional development and qualification); (5) Organizational culture and trust (increased efficiency through trust building and good leadership). Since the relationship in the model presented can be both positive and negative, employees should be included in the consideration of possible management actions so that they feel that they have a say in the future of the organization and themselves (Russo, et al. 2012). This concept is confirmed by the study by Sharif et al. (2021), which used SEM analysis to demonstrate that a favorable organizational environment reduces feelings of exhaustion and the desire to leave the healthcare facility among medical staff. Structural equation modeling (SEM) is a multivariate statistical framework used to examine latent unobserved variables as well as observed variables, combining path and factor analysis techniques in a predictive

model (Zakrzewska-Bielawska, et al., 2022).

Through the combined action of errors in work and experience, they directly affect the quality of healthcare services. The results of the survey of medical staff do not differ significantly from the same surveys of employees in profit-oriented companies. Bulog and Bakotić (2024) also come to similar conclusions, finding a positive influence of job satisfaction on employee behavior using the example of Croatian companies. Therefore, the theoretical and research-related origins of the moderating influence of the environment are equally applicable in all (non)profit organizations.

The work environment as a moderating construct between the quality of healthcare services and user satisfaction in tertiary healthcare is a multidimensional phenomenon. It depends on the (international and national) legal regulations that deal directly or indirectly with healthcare issues. In the case of Bosnia and Herzegovina, we see that it is quite a complex system, but when it comes to tertiary healthcare, these differences become less apparent.

In addition, the work environment at the tertiary level of healthcare depends on the methods of financing the healthcare system. It is emphasized that Bosnia and Herzegovina applies a social insurance model (Bismarck model), which means that this level of healthcare is financed by contributions from the population. On the positive side, this model ensures continuity in the collection of funds, as citizens do not have the opportunity to choose the funds in which they invest. Therefore, tertiary clinical centers do not have to deal with financial management issues. At the same time, however, this model leads to rigid healthcare systems, including in the tertiary sector, which are directly dependent on the political interests of the ruling government. Furthermore, the tertiary level of healthcare in Bosnia and Herzegovina faces additional challenges in the form of insufficient investment in equipment and personnel and the migration of healthcare staff to EU countries. Migrations also have their own theoretical basis. Once their basic needs for safety and financial security are met, most healthcare professionals (and managers) seek to satisfy their need for self-esteem and self-fulfillment through better career development, promotion opportunities and the possibility to conduct research (Dohlman et al. 2019). It is therefore not surprising that the working environment in tertiary healthcare institutions in Bosnia and Herzegovina is stagnant or only moderately developed and invested in.

The relationship between the technological and organizational development of tertiary healthcare institutions and the quality of the work environment is logical, but not yet sufficiently researched. Alkrajji et al (2016) embarked on this research with the aim of

investigating the need for investment in the technological and organizational aspects of the work environment of clinical centers in Saudi Arabia to promote standardization and better quality management. The authors identified technological factors of the work environment as the complexity and compatibility of healthcare data standards, IT infrastructure, switching costs, market uncertainties, system integration, and improving the utilization of advanced systems. Appropriate policies and procedures, information management planning, readiness for change, data analytics and accreditation were cited as organizational factors of the working environment. The focus is on national and legal regulations that can have a positive or negative impact on tertiary clinical centers and their work environment.

In the context of Bosnia and Herzegovina, this research confirms the need for a unified approach to the development of tertiary healthcare and a better system of coordination between individual clinical centers in order to ensure an equivalent level of quality healthcare for all inhabitants of this country.

## RESEARCH METHODOLOGY

In elaborating certain theoretical and methodological starting points of the observed problem and certain applied considerations, the following methods were used in the study: the hypothetical-deductive method, the method of induction and deduction, the method of analysis and synthesis and statistical methods, as well as a systematic research approach to the research. Hypothesis testing was performed through SEM analysis.

Data collection took place from July 2021 to February 2022 in the University Clinical Centers in Bosnia and Herzegovina (University Clinical Center Sarajevo; University Clinical Center of Republika Srpska Banja Luka; University Clinical Center Tuzla; University Clinical Hospital Mostar; and University Hospital Foca), which represent stratifications. A stratified sample falls into the category of random sampling and enables the degree of reliability of the conclusions about the examined parameters to be assessed. The survey was conducted on a sample of 1,022 healthcare service users, 82 managers and 464 hospital employees. The response rate was exceptionally high (70%). A panel of experts from the academic community in Bosnia and Herzegovina conducted the content validity check as part of a pilot study. They received the questionnaires by email and were able to complete them and provide written comments on the indicators of the measured constructs. Based on the comments of the expert panel, minor changes or revisions were made to some indicators.

Invitations to participate in the study were sent by registered mail to the addresses of all clinical centers and by email. The survey was conducted using a combination of field research and online survey via Google Forms. Field data collection was conducted by trained professionals who had the necessary information to clarify any ambiguities for respondents. The online questionnaires included additional information for each question and contact information in case respondents had additional questions or uncertainties. All construct statements were measured using a Likert scale ranging from 1 – “strongly disagree” to 5

– “strongly agree”.

**The work environment (W)** is a second-order construct consisting of a total of 28 statements. It is made up of two first-order constructs: the degree of management satisfaction with working conditions, measured with 14 statements, and the degree of employee satisfaction with working conditions, measured with 14 statements. The statements were created and adapted by the authors on the basis of a series of scientific research papers on the subject of the study. They are used to measure the moderating construct of work environment from the perspective of managers and employees in tertiary healthcare institutions.

**TABLE 1** Instrument for measuring the work environment

Dim.	Subdimension	Code	Indicators
<b>The work environments (WE)</b>	Level of management satisfaction with working conditions	MS1	I am satisfied with the commitment of the healthcare institution to quality management.
		MS2	I am satisfied with the direction of maintaining good interpersonal and professional relations between members of management, with staff and users of health services.
		MS3	I am satisfied with the continuous improvement of the quality of services in the health institution.
		MS4	I am satisfied with the commitment to providing quality services through continuous professional education of management members and quality management staff.
		MS5	I am satisfied with the achieved effectiveness and efficiency of the health institution’s operations.
		MS6	I am satisfied with the feedback on how the employees of the healthcare facility perform their work.
		MS7	I am satisfied with the recognition I receive for the work done.
		MS8	I am satisfied with the strategic plan of service provision, development and improvement of performance and quality.
		MS9	I am satisfied with the professional approach of the quality manager in the healthcare facility.
		MS10	I am satisfied with the strategy and plans for improving the quality of the services provided.
		MS11	I am satisfied with the human resources strategy and the defined indicators that are used to measure the performance of human resources management in the health institution.
		MS12	I am satisfied with the qualitative (observation, interview, etc.) and quantitative methods of examining employee satisfaction.
		MS13	I am satisfied with the qualitative (observation, interview, etc.) and quantitative methods of examining the satisfaction of users of health services.

Dim.	Subdimension	Code	Indicators
The work environments (WE)		MS14	I am satisfied with the support I receive from my work colleagues.
	Level of employee satisfaction with working conditions	ES1	I am satisfied with the quality of the equipment for work in the health facility.
		ES2	I am satisfied with the interpersonal relations in the healthcare facility.
		ES3	I am satisfied with the independence regarding the performance of work in a healthcare facility.
		ES4	I am satisfied with the opportunities for professional development provided by my current job in a health care facility.
		ES5	I am satisfied with the time available to perform assigned tasks in the health care facility.
		ES6	I am satisfied with the possibilities to use all my knowledge, abilities and skills in my work.
		ES7	I am satisfied that there is a regular evaluation of work by the management of the health institution.
		ES8	I am satisfied with the management support in the health facility.
		ES9	I am satisfied with the opportunities to present my ideas to the management of the healthcare facility.
		ES10	I am satisfied with receiving clear instructions about what is expected of me within the scope of work in a health care facility.
		ES11	I don't feel emotionally drained after working in a health-care facility.
		ES12	I don't feel physically exhausted after working in a health-care facility.
		ES13	I don't feel tired at the thought of going to work.
ES14	I am satisfied with the recognition I receive for the work done.		

SOURCE: Authors' construction

**Quality of healthcare services (QHS)** is a second-order construct consisting of a total of 23 statements composed of five first-order constructs. Five statements measure the tangibility construct, six statements measure the reliability construct, three statements measure the responsiveness construct, four statements measure the safety construct, and

five statements measure the empathy construct.

**User satisfaction with healthcare services (US)** is a second-order construct consisting of a total of 30 statements, made up of two first-order constructs. Fifteen statements measure the degree of user satisfaction with medical services, and fifteen statements measure the degree of user satisfaction with non-medical services.

**TABLE 2** Instrument for measuring the quality of health services and user satisfaction

<b>Dim.</b>	<b>Subdimension</b>	<b>Code</b>	<b>Indicators</b>
<b>Quality of healthcare services (QHS)</b>	Tangibility	Tangibility_1	The health institution has modern equipment.
		Tangibility_2	The exterior and interior of the healthcare facility is visually acceptable.
		Tangibility_3	The employees of the health care facility look neat.
		Tangibility_4	The accessories and devices of the healthcare facility are clean.
		Tangibility_5	The health institution has equipment and facilities in accordance with the services it provides.
	Reliability	Reliability _1	In the health facility, examinations, treatments and treatment services are quick and precise.
		Reliability _2	User review schedule is on time.
		Reliability _3	The service procedure is performed correctly on the first attempt.
		Reliability _4	Ease of contacting hospital staff.
		Reliability _5	The health institution insists on providing a health service without errors.
		Reliability _6	The employees of the health care facility have the knowledge to respond to the user's inquiry.
	Response	Response _1	Employees of the health care facility warn when the user needs help.
		Response _2	User complaints are resolved successfully and promptly.
		Response _3	Employees of the health care facility provide clear and understandable information.
	Security	Security_1	Sufficient attention is paid to the user.
		Security_2	Employees of the health facility are available when needed by the user.
		Security_3	The employees of the healthcare facility are capable of analyzing the user's illness.
		Security_4	The medical staff accurately and precisely treats the user's ailments.
	Empathy	Empathy_1	Employees show extreme patience in dealing with users.
		Empathy_2	The employees are friendly and hospitable.
Empathy_3		Users can easily file complaints.	
Empathy_4		Moral support is provided to users.	
Empathy_5		Services are provided to all users regardless of social status.	
<b>User satisfaction with healthcare services (US)</b>	Level of user satisfaction with medical services	USMS1	I am satisfied with the reception upon arrival at the health facility.
		USMS2	I am satisfied with the presentation of doctors and nurses/ technicians in the health institution.
		USMS3	I am satisfied with the clarity of the information provided about upcoming procedures and interventions by doctors and nurses/technicians.

Dim.	Subdimension	Code	Indicators	
		USMS4	I am satisfied with the length of the conversations that the doctors and nurses/technicians spent with me.	
		USMS5	I am satisfied with the professional approach of the doctors and nurses/technicians in the health facility.	
		USMS6	I am satisfied with the doctor's ability to diagnose the health problem.	
		USMS7	I am satisfied with the expediency (quickly provided services and no waiting).	
		USMS8	I am satisfied with the explanation for the delay in the ordered examination.	
		USMS9	I am satisfied with the success of the treatment.	
		USMS10	Satisfied with the treatment process.	
		USMS11	The doctors and nurses/techs did everything possible to ease my pain.	
		USMS12	Before I receive the medicine, the doctors and nurses/technicians explain what it is for and the possible side effects.	
		USMS13	The doctors and nurses/technicians have provided written information about the symptoms I have or recommendations that I must follow after I leave the healthcare facility.	
		USMS14	After leaving the health care facility, I understand my health condition and the procedures I am responsible for implementing for the benefit of my health.	
		USMS15	Every experience I had with a healthcare facility has met my expectations in terms of medical services.	
		Level of user satisfaction with non-medical services	USNM1	I am satisfied with the resolution of the complaint.
			USNM2	I am satisfied with the hospital environment.
			USNM3	I am satisfied with the accommodation services.
	USNM4		I am satisfied with the food services.	
	USNM5		I am satisfied with the prices of health services.	
	USNM6		I am satisfied with the low level of corruption in the institution where I stayed.	
	USNM7		I am satisfied with the clarity of information provided about upcoming procedures by non-medical staff.	
	USNM8		I am satisfied with the application of information technologies (e-cards, e-orders, e-prescriptions, etc.) in the institution where I stayed.	
	USNM9		I am familiar with the rights arising from compulsory health insurance, and they refer to the right to use health care and the right to certain financial benefits and assistance.	
	USNM10		I am familiar with the rights arising from extended health insurance.	
	USNM11	I am familiar with the rights arising from voluntary health insurance for myself and my family.		
	USNM12	I am satisfied with the method of financing health institutions and health services.		
	USNM13	I am satisfied with the payment of medicines, surcharges, co-payments, additional payments, etc.		
USNM14	I am satisfied with the friendliness of the staff.			
USNM15	Every experience had with a healthcare facility has met my expectations, from the aspect of non-medical services.			

SOURCE: Authors' construction

**Data verification** was performed by handling missing data, identifying outliers and testing the data using the assumptions of multivariate techniques. According to Schumacker and Lomax (2010), there are several options available to researchers with regard to missing data. These are primarily the simple deletion of subjects whose values are missing, the replacement of the missing data values or the use of robust statistical procedures that take into account the presence of missing data. For this problem, it is important to investigate the extent and pattern of the missing data. The problem must be solved if the pattern is not random or if more than 10% of the data is missing.

First, questionnaires with more than 10% of the data missing were removed. Including users, managers and employees, 38 questionnaires were excluded from further analysis. The questionnaires that were completed online via the Google form did not contain any missing data, as each field was marked as mandatory and respondents were therefore unable to submit the questionnaire if they had not answered all questions. Subsequently, the missing data was replaced by the arithmetic mean, which replaces each missing value with the arithmetic mean of the entire sample. This was used for statements measured on a Likert scale from 1 - strongly disagree to 5 - strongly agree. Finally, a group mean substitution was performed, which means that the missing value for a particular group (gender group, age structure group, etc.) is replaced by the average value of the same group. The multivariate analysis was performed using the Mahalanobis Distance test, the calculation of which enables the identification of outliers through an approximate test of statistical significance (Tabachnick & Fidell, 2013). The total number of outliers for users of health services was 136, among managers it was 5, while the total number of outliers among employees was 39.

Based on the results of the Kolmogorov-Smirnov and Shapiro-Wilk tests,  $p = 0.000 < 0.05$ , we conclude that the null hypothesis is rejected, that is, that the assumption of normal distribution is not met. However, consultation of the literature revealed that deviations of the data from the normality assumption are not a problem when the Maximum Likelihood (ML) method is used for the analysis. Namely, Nwabueze et al. (2009) confirmed in their study that the ML method is robust for five different distributions.

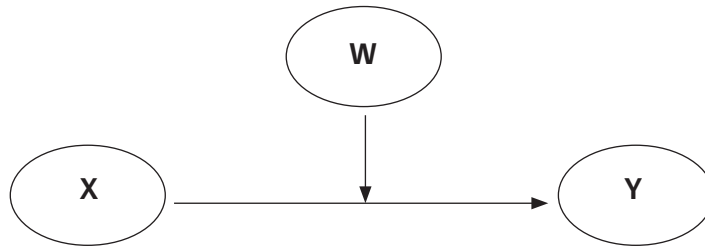
Scatter plot analysis showed that the data are linearly distributed, so that the assumption of linearity of the data is fulfilled. Possible multicollinearity was examined using the tolerance index (TOL) and the variance inflation factor (VIF). For all variables, the TOL values are greater than 0.1 and all VIF values are less than 10. It can therefore be concluded that no variable in the study causes a multicollinearity problem.

In order to test the suitability of the models presented above, a confirmatory factor analysis of the measured models (CFA) was conducted. However, the results obtained did not show a satisfactory suitability of the model. Therefore, the model was modified again. After analyzing the modification index, it was found that some statements showed too high a correlation, that is, they measured almost the same concept. By reviewing the standardized factor loadings, it was found that all values of the manifest variables were above the recommended value of 0.5, so we kept all variables of the observed models. Based on the above, the CFA analysis was repeated and, based on the results obtained, we concluded that the models had a good level of fit. Namely, the GOF indicators are above/below the recommended thresholds.

The reliability of the measurement models was assessed using inter-item and item to total correlation values, the Cronbach alpha coefficient, the Standardized Cronbach alpha coefficient, the reliability indicator (CR) and the maximum reliability indicator [MaxR(H)]. Based on the results obtained, we were able to determine that all indicators in the models consistently represent the corresponding latent construct or factor, that is, that the measurement models are reliable.

To determine the convergent validity of the factors in the models, the indicators for the standardized factor loading and the average variance extracted (AVE) were calculated and finally the values of CR and AVE. The results indicated that all factor loadings are statistically significant, at a significance level of 1%. The standardized factor loadings of all indicators are greater than 0.5, indicating they reflect the latent variable they measure. In addition, all AVE values are above the recommended threshold of 0.5, meaning that each construct in the model explains at least 50% of the variance in its indicators. AVE is a more conservative assessment of the validity of the measurement model, and it is assumed that based on the CR indicator, a conclusion can also be made about the convergent validity of the model. Since all values of  $CR > AVE$ , we concluded that the measurement models meet the conditions of convergent validity.

To check the discriminant validity of the measurement models QHS and US (the measurement model WE was not tested for discriminant validity as it was considered a one-dimensional construct) the Fornell-Larcker criterion, HTMT and HTMT2 were used. Based on the results presented using the Fornell-Larcker criterion, we concluded that the discriminant validity of the measurement models was impaired as the values on the diagonal are smaller than the correlation coefficient in the relevant row and column. As the discriminant validity was violated according to the Fornell-Larcker criterion, it was retested using the HTMT



**FIGURE 2** Graphic representation of moderating influence  
**SOURCE:** Authors' construction

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and HTMT2. Namely, in a simulation study conducted by Henseler et al. (2015), it was shown that the traditional criterion for determining discriminant validity is not suitable for detecting a discriminant validity problem when it actually exists. The Fornell-Larcker criterion successfully identified 139 problems in only 15% of cases. For this reason, a new measure of discriminant validity was proposed, the so-called heterotrait-monotrait ratio (HTMT). The results showed that the values of HTMT and HTMT2 are around the threshold value of 0.90, indicating that there are no problems with the discriminant validity of the models, with the measurement model QHS retaining four first-order latent constructs: tangibility, reliability, security and empathy. Namely, smaller values of HTMT and HTMT2 show that the correlations between indicators measuring different constructs are lower than the correlations between indicators measuring the same construct. This leads to the conclusion that discriminant validity has been confirmed in the models, i.e. it has been established that the constructs differ from each other and that their associated indicators measure them well.

Based on the conducted analyses, we found that all measurement models meet the assumed criteria of suitability, reliability and validity, and as such were the subject of analysis and testing of the hypothesis: *"The working environment moderates the relationship between the quality of health services and the satisfaction of users of health services"*.

## EMPIRICAL RESEARCH RESULTS

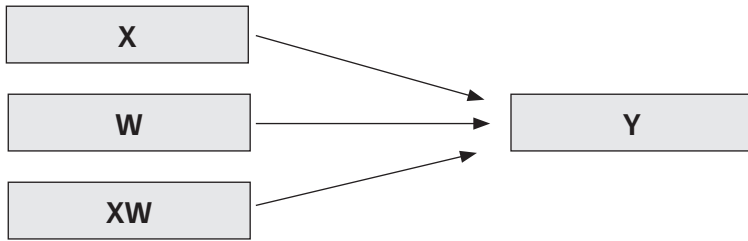
Moderation occurs when a third variable or construct changes the relationship between two related variables or constructs. In SEM models with a moderator, the relationship between the independent and dependent variable changes depending on the level of the moderating variable. In contrast to mediation, which explains why there are relationships between predictors and the dependent variable, moderation

indicates when or for whom these relationships exist (Hair et al. 2019).

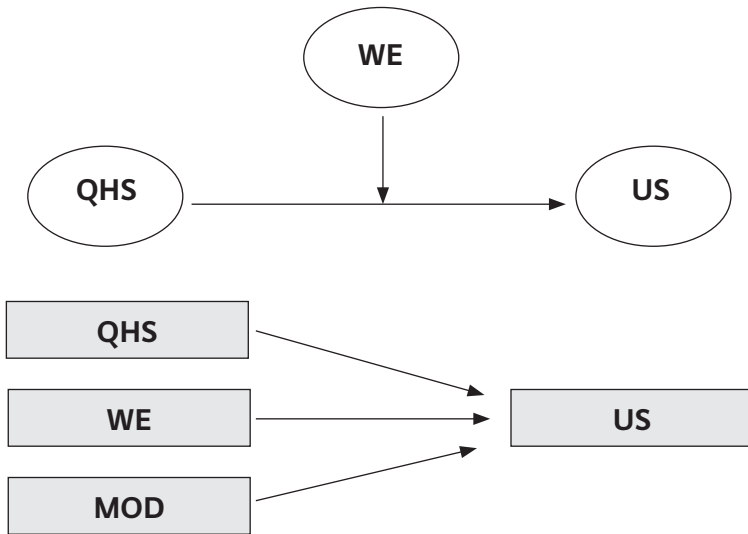
For example, testing moderation could answer the question of whether there are differences in the relationship between financial behavior and financial security between men and women or between different age groups, and so on. The following figure graphically depicts the influence of the moderator "W" on the relationship between the independent variable "X" and the dependent variable "Y". Unlike a mediator, a moderator is not part of the model. Rather, the researcher determines which relationship in the model is to be tested for possible moderation (Vuković, 2022).

Moderators are most commonly categorical variables, such as gender, although ordinal variables can also be used as moderators if they can be meaningfully categorized. It is very important to select a moderator based on theoretical assumptions; there must be a reason for the researcher to assume that the moderator influences the relationship between two variables. Moderation analysis is easiest to perform when the moderator is not significantly associated with either variable in the model. Moderation is most commonly tested by generating an interaction effect in which the values of the independent variable and the moderator are multiplied. The model with the interaction effect is shown in the following figure as a statistical model in which the independent variable "X", the moderator "W" and the interaction effect "XW" are specified in such a way that they directly influence the dependent variable "Y".

The existence of a moderation effect can be established if the coefficient representing the relationship between the interaction effect and the dependent variable is statistically significant, while the coefficient representing the relationship between the moderator and the dependent variable is not significant. In addition, a potential improvement in model fit or explained variance can be observed from the change in R<sup>2</sup> after adding the interaction effect. Once the presence of moderation in the model has been established, individual coefficients (simple slopes tests) can be tested.



**FIGURE 3** Model with interaction effect  
SOURCE: Authors' construction



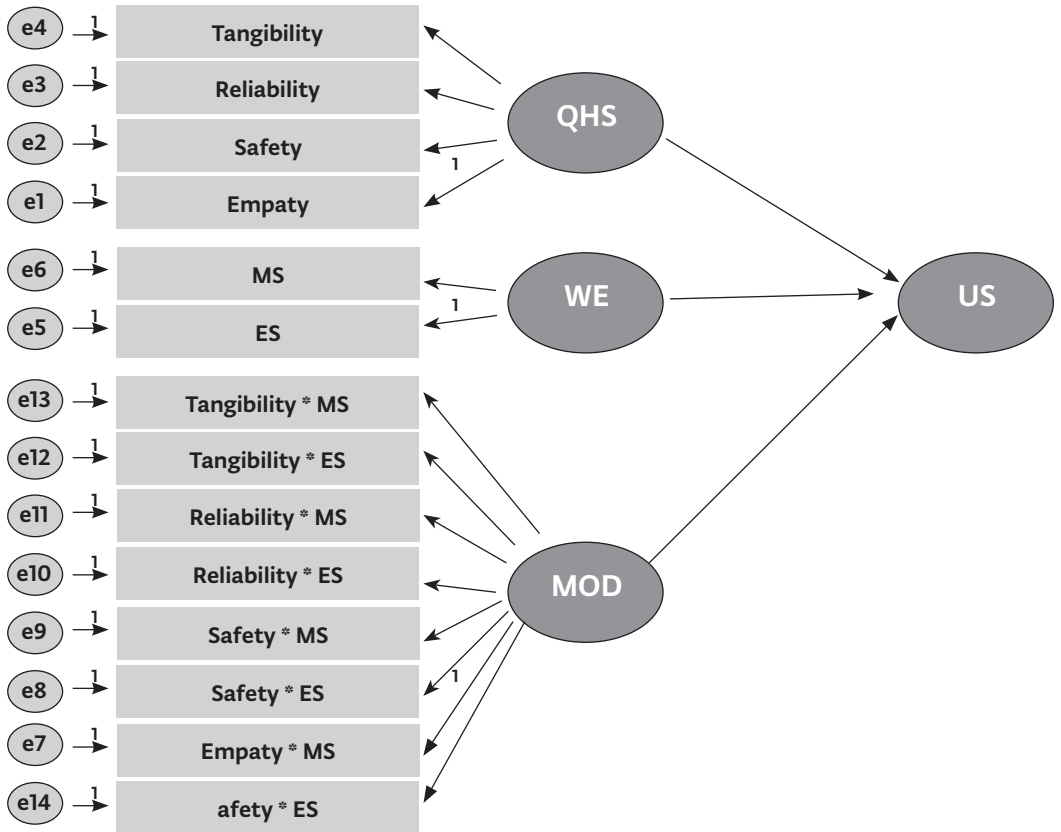
**FIGURE 4** Model 1 PROCESS (MOD = QHS · WE)  
SOURCE: Authors' construction

In this way, the significance of the impact of certain moderator values on the dependent variable can be determined.

To test hypothesis: "Work environment moderates the relationship between the quality of healthcare services and patient satisfaction," the PROCESS approach, model 1, was used. The analysis of the moderating effect aims to determine whether the magnitude or direction of the effect of the exogenous variable on the endogenous variable depends on the moderator variable. A significant influence of the moderating variable practically implies that the effect of the independent variable on the dependent variable is different for different values of the moderator (Hayes, 2013). In accordance with Model 1 and the conceptual framework, moderation analysis is performed by testing the inter-

action between the independent variable (**quality of healthcare services - QHS**) and the moderator (**work environment - WE**) in the model of the dependent variable (**user satisfaction with healthcare services - US**). This is represented by  $X \cdot W \rightarrow Y$ . The conceptual theoretical model of moderation is presented in the following figure.

To assess the interaction effect (Preacher & Hayes, 2004), the *bootstrapping* method was applied, which estimates a 90% confidence interval for the proposed effect using 5,000 resampled datasets. In the *bootstrapping* method, a sufficient condition to demonstrate the moderation effect is a statistically significant interaction effect. The results of the analysis and hypothesis testing are presented in the following tables.



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**FIGURE 5** Part of the moderating variable interaction effect model  
 SOURCE: Authors' construction

**TABLE 3** Model of moderating influence of work environment (WE) (model summary)

Hypothesis	R	R <sup>2</sup>	F	df1	df2	p
<b>QHS · WE → US</b>	0.6853	0.4696	21.5471	3.0000	73.0000	0.0000

SOURCE: Authors' calculation

**TABLE 4** Evaluation of the parameters for the moderating influence of the work environment (WE) on the relationship between the quality of health services (QHS) and the satisfaction of users of health services (US)

Hypothesis	B	SE	t	p	LLCI	ULCI
<b>QHS · WE → US</b>	-0.0138	0.0072	-1.9026	0.0610	-0.0259	-0.0017

SOURCE: Authors' calculation

Based on the parameters in the model, we can conclude that the coefficient of determination  $R^2 = 0.4696$ , which means that 46.96% of all variances have been accounted for by the model, i.e., this model explains 46.96% of the satisfaction of healthcare service

users. Additionally, the model of the moderating effect of the work environment (WE) achieves statistical significance ( $p = 0.0000 < 0.001$ ), confirming the statistical validity of the estimated model.

Testing the moderating effect reveals that the

work environment (WE) has a significant moderating role in the relationship between the quality of healthcare services (QHS) and the satisfaction of healthcare service users (US). In other words, the results indicate acceptance of the moderating hypothesis, implying the conclusion that: *"The work environment moderates the relationship between the quality of healthcare services and the satisfaction of healthcare service users"* ( $\beta = -0.0138$ ,  $t = -1.9026$ ,  $p = 0.0610 < 0.10$ , **90% confidence interval**). Statistical significance can be confirmed based on the LLCI (lower limit of the interval) and ULCI (upper limit of the interval). Specifically, the interval from  $-0,0259$  (LLCI) to  $-0,0017$  (ULCI) does not contain the value 0, implying a significant moderating role of the work environment (WE).

## DISCUSSION AND CONCLUSION

By creating a positive work environment, the conditions are created for a higher level of satisfaction among employees and managers of healthcare institutions. The positive feelings of appreciation that employees and managers have for their work are directly reflected in the quality of their work, i.e. the efficiency of the provision of medical and non-medical services to users. This theoretically conceptualized relationship is part of internal marketing and forms the basis for defining the role of the work environment as a moderating construct between the quality of healthcare services and user satisfaction. The moderating effect is due to the fact that users do not directly perceive the situation in the work environment of healthcare institutions. Their perception of the work environment is subtle and indirect and is reflected in the quality of healthcare services provided. Therefore, this scientific investigation represents a significant and bold scientific step forward by linking manifest and latent factors that influence the overall level of user satisfaction with healthcare services.

The results have pointed to the importance of the work environment, which plays a moderating role between the quality of healthcare services and user satisfaction with healthcare services. It has been practically demonstrated that higher satisfaction with the conditions of the work environment improves the efficiency and quality of healthcare services provided by employees and management at the tertiary level of healthcare in Bosnia and Herzegovina, which ultimately leads to higher user satisfaction.

Certain limitations must be taken into account when interpreting the results, as well as recommendations for future research arising from these limitations. The first limitation lies in the limited literature database, which may lead to the exclusion of certain publications

that could have a significant impact on the formation of the theoretical concept and its empirical testing. Therefore, it is impossible to make a direct comparison with other studies as no one has addressed the moderating influence of the work environment in the health system. However, we can analyze the effects indirectly with previous theoretical and research findings. This research confirms previous studies on the existence of a positive influence of the work environment on the productivity of employees and managers by influencing personal motivational factors such as promotion, working hours, respect for opinions (Šagovac, 2021; Foldspang et al., 2014). In addition, research confirms studies on the impact of a negative work environment on nurses' poor outcomes (Stojaković, 2023; MacPhee et al., 2017; Aycan et al., 2015; Coventry et al., 2015), but extends the effect to other nursing staff and managers.

The second limitation relates to the time frame of the empirical research. Considering the spatial limitation of the survey to Bosnia and Herzegovina, it should definitely be aimed at confirming the created structural model and conducting research at the level of other countries. It is also recommended that the survey be expanded to include questions on socio-cultural factors of the work environment, as the effects of the work environment in this study focus primarily on personal factors. As contemporary literature increasingly recognizes the social and cultural influences on managers' and employees' perceptions (Imonikhe & Lukic, 2022; Lee et al., 2019; Ghemawat, 2017), we believe that the research would be greatly enhanced by including the aforementioned factors in the assessment of the work environment. Furthermore, it is advisable to conduct identical research at other levels of the healthcare system. Finally, it is recommended that the measurement scales be tested on the same or a similar sample to test the suitability, reliability, validity and objectivity of future research.

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## INTERAKCIJSKI UČINAK RADNOG OKRUŽENJA NA ODNOS IZMEĐU KVALITETE ZDRAVSTVENIH USLUGA I ZADOVOLJSTVA KORISNIKA NA TERCIJARNOJ RAZINI ZDRAVSTVENE ZAŠTITE

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### SAŽETAK

Stvaranje pozitivnog radnog okruženja važno je za svaku organizaciju, a posebno za zdravstvene ustanove. Cilj ovog istraživanja je ispitati ulogu radnog okruženja kao moderatora između kvalitete zdravstvenih usluga i zadovoljstva korisnika. Istraživanje je provedeno na uzorku od 1022 korisnika zdravstvenih usluga, 82 menadžera i 464 zaposlenika kliničkih centara u Bosni i Hercegovini. Testovi pokazuju da radno okruženje ima značajnu moderirajuću ulogu u odnosu između kvalitete zdravstvenih usluga i zadovoljstva korisnika. Rezultati naglašavaju važnost uzimanja u obzir čimbenika radnog mjesta kako bi se unaprijedila učinkovitost zaposlenika u tercijarnim zdravstvenim ustanovama. Istraživanje pokazuje da radno okruženje koje potiče međusobno poštovanje radnika i menadžera, smanjuje stres i nudi veće mogućnosti za napredovanje doprinosi boljoj kvaliteti usluga i većem zadovoljstvu korisnika medicinskim i nemedicinskim uslugama.

**KLJUČNE RIJEČI:** *radno okruženje, interni marketing, kvaliteta zdravstvenih usluga, zadovoljstvo korisnika, modeliranje strukturnih jednadžbi, moderirajući utjecaj*