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Presenting a Social Capital Model Based on Human Resource Management Efficiency in the Health System

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ABSTRACT

Efficient human resource management (HRM), defined as the ability to achieve organizational goals with optimal use of resources, and social capital, encompassing networks, trust, and collaborative relationships, are two critical factors for the success of health systems. This study aims to develop a conceptual model illustrating how social capital influences HRM efficiency in the health system. From an objective perspective, the study is classified as applied research, as its findings can provide practical solutions for improving performance indicators and addressing HR challenges in healthcare organizations. Methodologically, the study employed a mixed-methods approach with a descriptive-survey design to comprehensively examine the relationship between social capital and HRM efficiency at Babol University of Medical Sciences. The research was conducted in two phases. In the qualitative phase, data were collected through semi-structured interviews with 10 managers and faculty members with at least seven years of relevant experience. Key concepts were extracted via content analysis and transformed into standardized questionnaire items. In the quantitative phase, the finalized questionnaire adapted from the Nahpit and Ghoshal model and validated by experts was distributed among the entire target population of 350 managers across different university departments. A sample of 183 participants was selected using simple random sampling, and reliability was confirmed with a Cronbach's alpha of 0.919. Data were analyzed using SPSS 26 and AMOS 24 software. The results indicated that the proposed conceptual model demonstrated a good fit and that social capital has a significant positive effect on enhancing HRM efficiency in the health system. The findings highlight the importance of fostering trust, collaboration, and knowledge-sharing networks to optimize human resource performance in healthcare organizations

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1. Introduction

Social capital is one of the key concepts in explaining the positive and negative aspects of social life that has attracted widespread attention in recent decades. The importance and effectiveness of social capital in analyzing social phenomena has led to social capital receiving special attention as one of the central concepts in social sciences in the late twentieth and early twenty-first centuries (Gaviola et al., 2024). By entering the fields of social sciences and economics, this concept has opened a new window for analyzing and finding the causes of social and economic issues. Theorists such as Bourdieu, Putnam, and Coleman have provided numerous definitions of social capital, which will be discussed in detail below (Luthans et al., 2024). In a study on the causes of the emergence of social capital, Currie et al. (2022) concluded that the fundamental difference between social capital and other forms of capital is that social capital exists in the relationships between individuals and the individual's connection to society, while other types of capital focus on assets or individuals. Social capital is the sum of the actual and potential benefits that arise from the network of relationships of a social unit. This concept includes the networks and the resources that flow within them (Del-Castillo-Feito et al., 2022). The key point in this definition is the network of relationships, which is considered a valuable resource for the individual or organization and demonstrates the ability of actors to secure resources through membership in social structures. Tanner et al. (2022) also define social capital as the ability of actors to maintain benefits through potential members in social networks. Koopman (2023) examined the importance of social capital from two perspectives: individual benefits that actors directly obtain, such as career advancement, and collective benefits, considering social capital as a characteristic of a social unit rather than an individual. On the other hand, the use of social capital does not simply mean having relationships; relationships increase the likelihood of creating social capital, but only when these relationships facilitate access to resources do they become social capital. Therefore, the existence of relationships is necessary but not sufficient (Ozgun

et al., 2022). An important issue is the function of social capital. As one of the social factors, social capital has multiple effects, and the health system a multifaceted concept including services, policymaking, financing, and education requires a correct understanding of social capital. A correct understanding of the health system can help improve the quality of services and promote community health. Although in recent years the health system has achieved significant progress in health indicators using the primary health care strategy, achieving justice in health and equal access to services remains a major concern for policymakers (Carson et al., 2022). The Ministry of Health, Treatment, and Medical Education, in accordance with upstream documents and the 20-year vision plan, has initiated general health policies focusing on financial protection, equitable access, and improved service quality since 2014. Health, as one of the most important human resources, plays a pivotal role in the sustainable economic, social, cultural, and political development of societies and significantly impacts the quality of life of individuals (Mirfardi et al., 2025). The importance of examining the relationship between social capital and human resource management efficiency at Babol University of Medical Sciences is significant for several reasons. In addition to its educational and research roles, the university serves as one of the primary providers of healthcare services in the region, and the performance quality of its staff directly impacts community health outcomes. Moreover, effective human resource management, which involves the optimal utilization of employees' skills, motivation, and expertise, is a key factor in enhancing organizational performance and increasing job satisfaction. Social capital comprising communication networks, trust, and collaboration among staff can facilitate stronger team coordination, knowledge sharing, and improved decision-making processes, thereby enhancing human resource management efficiency. Considering Babol University of Medical Sciences' pivotal role in simultaneously delivering educational and healthcare services, along with the resource constraints within the health system, identifying and strengthening dimensions of social capital can directly contribute to increased productivity, improved service quality, and the achievement of sustainable

health development goals. Despite numerous studies on social capital, there is a research gap in the Iranian health system regarding its role in improving human resource management efficiency. Most domestic studies have focused on general social or cultural contexts, while research analyzing social capital structures at the organizational level, particularly in medical universities, is very limited. This is significant because Iranian medical universities not only serve educational and research functions but are also primary providers of health services nationwide. Therefore, the central research problem of this study is to analyze and model the relationship between social capital and human resource management efficiency in the health system of Babol University of Medical Sciences. Understanding the dimensions and components of social capital can identify areas for strengthening trust, promoting positive interactions, and enhancing solidarity among employees, which can lead to improved team cooperation, increased job satisfaction, and higher productivity in delivering health services. Ultimately, addressing this problem provides practical solutions for improving organizational performance and the quality of health services.

This paper is organized as follows: Section 2 reviews the relevant literature on social capital and human resource management in health systems. Section 3 describes the research methodology, including the qualitative and quantitative phases, data collection, and analytical methods. Section 4 presents the results of exploratory and confirmatory factor analyses, as well as structural equation modeling. Section 5 discusses the findings in light of previous studies, highlighting practical implications for improving human resource management efficiency. Finally, Section 6 concludes the study and offers recommendations for policymakers and future research.

2. Literature Review

2.1. Social Capital

One of the earliest and most influential thinkers on social capital was Pierre Bourdieu, who described it as the resources available to individuals and

groups through their social networks. Later, James Coleman emphasized its role in facilitating coordination and cooperation for mutual benefit. Robert Putnam popularized the concept further in his studies of civic engagement, highlighting the decline of social capital in modern societies due to changes in lifestyles, work patterns, and technology. While different definitions exist, a common thread is that social capital is essentially about connections and the value derived from them (). In fact, social capital, as a collective asset, strengthens the capacity for collective action and helps improve social and organizational functions by facilitating cooperation, knowledge transfer, and trust-building in networks (Bourdieu, 2022). Social capital is a concept that has gained increasing attention across disciplines such as sociology, economics, political science, and management studies. At its core, social capital refers to the networks, norms, trust, and relationships among individuals and groups that facilitate cooperation and collective action. Unlike physical or financial capital, social capital is intangible; it is embedded in the fabric of human interactions and the structures of society. However, just like other forms of capital, it can create significant value, whether in the form of personal advancement, organizational performance, or broader societal development (Li et al., 2025). A widely recognized theoretical foundation for analyzing social capital at the organizational level is the framework proposed by Nahapiet and Ghoshal (1998), who conceptualized social capital as a multidimensional construct consisting of structural, cognitive, and relational dimensions. The structural dimension refers to the overall pattern of connections among actors, the cognitive dimension reflects shared representations, interpretations, and systems of meaning, and the relational dimension encompasses trust, norms, and obligations embedded in relationships (Nahapiet & Ghoshal, 1998). This framework explains how social capital facilitates knowledge exchange, coordination, and value creation within organizations. Due to its strong explanatory power in organizational contexts, this multidimensional perspective provides the primary theoretical basis for examining how social capital contributes to

human resource management efficiency in the health system. Social capital can be divided into three main types: bonding, bridging, and linking. Bonding social capital refers to the close connections among individuals within a group, such as families, close friends, or tightly knit communities. It fosters strong loyalty and solidarity but may also lead to exclusion of outsiders. Bridging social capital connects people across diverse social groups, encouraging inclusivity, tolerance, and innovation. Linking social capital refers to relationships between individuals or groups and institutions of power, such as government agencies, corporations, or other authorities. Each type plays a different but complementary role in strengthening communities and organizations (Nochebuena-Evans et al., 2025). The importance of social capital can be observed at multiple levels. At the individual level, people with rich networks often have access to better job opportunities, support in times of need, and enhanced well-being. For instance, an individual with strong ties in a professional network is more likely to hear about job openings or receive mentorship. At the organizational level, social capital contributes to trust among employees, effective teamwork, and knowledge sharing. Companies with high levels of internal trust often experience higher productivity, creativity, and resilience in times of crisis. At the societal level, communities with strong social capital tend to have lower crime rates, higher levels of civic participation, and more effective governance (Kofford et al., 2025).

Trust is often considered the foundation of social capital. Without trust, networks and relationships may exist superficially but will fail to generate cooperation or collective action. Norms and shared values further reinforce trust by creating expectations for behavior and accountability. For example, when individuals in a community share norms of reciprocity helping others with the expectation that support will be returned they build a culture of mutual reliance that strengthens the entire community. This dynamic is critical not only in traditional societies but also in modern organizations that rely heavily on collaboration and knowledge exchange (Jiang et al., 2025). Despite its many benefits, social capital is not without challenges. Excessive bonding

social capital can lead to insularity, nepotism, or even corruption. When groups prioritize loyalty to their members over fairness or openness, they may exclude others or resist beneficial change. Moreover, digital technologies, while expanding networks, have altered the quality of social relationships (Nochebuena-Evans et al., 2025). Online interactions may increase the quantity of connections but not necessarily their depth, leading to debates about whether digital platforms strengthen or weaken social capital (Fiorillo and Ofria, 2025). In contemporary societies and organizations, efforts to build social capital require intentional strategies. Governments can promote civic engagement through community programs, participatory governance, and transparent institutions. Organizations can strengthen social capital by fostering inclusive cultures, supporting teamwork, and encouraging open communication. Educational institutions can play a vital role by teaching collaboration, empathy, and citizenship from an early age. In an increasingly globalized and interconnected world, bridging and linking social capital become particularly important, as individuals and groups must learn to cooperate across cultural, social, and institutional boundaries (Jiang et al., 2025). In conclusion, social capital is a powerful but often underappreciated form of wealth. It exists not in material assets but in relationships, networks, and trust. Its value is seen in individual success, organizational effectiveness, and societal resilience. At a time when many communities face fragmentation, polarization, and declining trust, the cultivation of social capital may be one of the most pressing needs for sustainable development and human well-being. By recognizing its importance and investing in its growth, societies and organizations can unlock the collective potential of their members and create stronger, more connected, and more prosperous communities.

2.2. Efficiency in Human Resource Management

Human Resource Management (HRM) has long been recognized as a cornerstone of organizational success. At its essence, HRM refers to the strategic approach organizations adopt to manage their workforce effectively,

aligning employee goals with organizational objectives. Efficiency in HRM goes beyond administrative tasks such as payroll, recruitment, or compliance. It focuses on maximizing employee performance, satisfaction, and development while ensuring optimal use of resources. In an era defined by globalization, technological advancement, and fierce competition, the efficiency of HRM practices has become more critical than ever (Virmani et al., 2025). The efficiency of HRM can be understood in terms of achieving desired outcomes—such as higher productivity, employee retention, or innovation—with minimal wasted effort, time, and cost. Traditionally, HR departments were often viewed as administrative or supportive functions. Today, however, efficient HRM requires HR professionals to act as strategic partners who contribute directly to business outcomes. This shift highlights the need to integrate HR practices with overall corporate strategy (Cooke et al., 2025). One of the most important aspects of HRM efficiency is recruitment and selection. Efficient HRM ensures that organizations attract the right talent, assess candidates fairly, and select employees who align with the company's values and objectives. Poor hiring decisions not only waste financial resources but also affect team performance and organizational culture. By using technology, data analytics, and structured recruitment processes, HR departments can streamline hiring, reduce biases, and improve employee fit (Sanchez-Garcia et al., 2025). Training and development also play a crucial role in HRM efficiency. Organizations that invest in continuous learning and skill development create more adaptable and innovative workforces. Efficient HRM designs training programs that meet both organizational needs and individual career goals, thereby increasing engagement and loyalty. Importantly, training must be evaluated not only by participation rates but also by its impact on performance and business outcomes. In this way, HR professionals ensure that learning investments generate real value (Ahmad et al., 2025). Performance management is another area where efficiency is critical. Traditional annual performance reviews are often criticized for being time-consuming, demotivating, or disconnected from actual work. Efficient HRM shifts toward continuous feedback, goal alignment, and

employee development. By leveraging digital tools, managers can provide real-time feedback, track progress, and support employees in reaching their potential. Such systems reduce bureaucracy while enhancing transparency and accountability. Employee engagement and retention represent additional dimensions of HRM efficiency. High turnover rates are costly, both financially and operationally. Efficient HRM proactively addresses employee needs by fostering inclusive cultures, promoting work-life balance, and recognizing contributions. When employees feel valued and supported, they are more likely to remain loyal and contribute positively. In addition, HR departments that prioritize engagement tend to see higher productivity and creativity across the organization (Virmani et al., 2025). Technology has become a central driver of HRM efficiency. Human Resource Information Systems (HRIS), artificial intelligence, and data analytics enable HR departments to automate routine tasks, reduce errors, and generate insights for better decision-making. For example, predictive analytics can help forecast turnover risks or identify high-potential employees. Similarly, digital platforms streamline recruitment, onboarding, and training processes, freeing HR professionals to focus on strategic initiatives. The efficient use of technology ensures that HR functions are not only faster and cheaper but also smarter and more impactful (Ahmad et al., 2025). However, efficiency in HRM must not be confused with cost-cutting alone. Overemphasis on reducing expenses can undermine employee morale, well-being, and long-term organizational health. True efficiency balances productivity with fairness, employee satisfaction, and sustainability. For example, flexible work arrangements may seem costly at first but often result in higher employee retention and reduced absenteeism, leading to overall efficiency gains (Sanchez-Garcia et al., 2025). Globalization and workforce diversity add another layer of complexity. Efficient HRM must adapt to multicultural contexts, different legal systems, and varying employee expectations. This requires sensitivity to cultural differences, equitable policies, and inclusive practices. Organizations that manage diversity efficiently not only avoid conflicts but also leverage diverse perspectives for innovation and

competitiveness. The efficiency of HRM also depends heavily on leadership. HR professionals and managers must embody ethical standards, communicate effectively, and lead by example. Trust, fairness, and transparency are essential to creating environments where employees can thrive. Moreover, efficient HRM involves aligning leadership development with succession planning, ensuring that organizations have capable leaders to guide them into the future (Cooke et al., 2025). Efficiency in Human Resource Management is not about doing more with less in a purely quantitative sense. Rather, it is about maximizing value by aligning human potential with organizational goals, using resources wisely, and fostering environments where employees can thrive. Recruitment, training, performance management, engagement, and technology all contribute to this efficiency. By approaching HRM strategically and holistically, organizations can achieve not only higher productivity but also stronger employee satisfaction and long-term success. In today's dynamic world, efficient HRM is not a luxury but a necessity for any organization that aims to remain competitive and sustainable.

2.3. Health System

The health system is a complex and Dynamic refers to institutions, organizations, resources, and actors designed to promote, maintain, and restore the health of individuals and communities (Noordsy, 2024). According to the definition of the World Health Organization, "the health system includes all people, institutions, and resources that operate through organized activities to promote the health of the population, within the framework of national policies and regulations" (Yan et al., 2025). From a structural perspective, the health system consists of three main axes: the provision of health and medical services at different levels (prevention, treatment, rehabilitation); policymaking and planning; financing, human resources, and technical infrastructure (Black et al., 2024). Also, the health system plays a decisive role in sustainable development, because improving the level of public health is associated with increasing labor productivity, reducing poverty, and

improving the quality of life (Xiong et al., 2024). In Iran, the structure of the health system consists of various levels, including the Ministry of Health, universities of medical sciences, urban health centers, and Rural, hospitals, insurance institutions, and educational and research centers have been formed (Zare Askari, 2024). Sadeghifar and Nargesi (2024) introduce the Iranian health system as a multi-layered system whose components include financial and human resource providers, health service providers, educational institutions, and legislative institutions (Sadeghifar and Nargesi, 2024).

2.4. Conceptual Framework

The conceptual foundation of the present study is primarily grounded in the social capital framework developed by Nahapiet and Ghoshal (1998), who conceptualized social capital as a multidimensional construct consisting of structural, cognitive, and relational dimensions. Their model explains how network structures, shared meanings, and trust-based relationships facilitate knowledge exchange and organizational value creation. Building upon this theoretical foundation, the present study applies and extends this framework to the context of the health system by examining how these dimensions of social capital influence human resource management efficiency within a medical university setting. Thus, the proposed model operationalizes social capital not merely as a social phenomenon but as a strategic organizational resource that enhances workforce effectiveness and institutional performance.

Based on the literature review, the present study proposes a conceptual framework illustrating the relationship between social capital and human resource management efficiency within the health system. The framework consists of three main components:

1. Social Capital:
   - Dimensions: Structural, Cognitive, and Relational
   - Functions: Facilitates trust, knowledge sharing, cooperation, and collective action
2. Human Resource Management Efficiency (HRM Efficiency):

- Aspects: Recruitment and selection, training and development, performance management, employee engagement, and use of technology.
- Outcome: Maximizing employee performance, satisfaction, and organizational productivity

3. Health System Context:
   - Components: Health service provision, policymaking and planning, financing, human resources, and infrastructure.
   - Role: Provides the structural and institutional setting in which social capital and HRM practices operate

The framework hypothesizes that social capital positively influences HRM efficiency, which in turn enhances organizational performance and health service outcomes. The health system context moderates and shapes these relationships by providing institutional structures, resources, and governance mechanisms that facilitate or constrain the effectiveness of social capital and HRM practices

Fig 1. Conceptual Framework of Social Capital Influencing Human Resource Management Efficiency in the Health System

2.4. Research Background

Social capital, as an intangible yet influential asset, has received widespread attention from health researchers in recent years. Manifested through networks, norms, trust, and social interactions, social capital plays a key mediating role in facilitating collective actions and participation to achieve common goals. This collective capacity, particularly in health systems, can affect service quality, user satisfaction, organizational cohesion, and ultimately health outcomes. Several global studies have explored the role of social capital in promoting individual and public health. Okubo and Noy (2025), in a longitudinal study in Japan, showed that high levels of neighborhood social capital were significantly associated with reduced unnecessary hospitalizations among the elderly. Vahnberg and Platten (2025) reported that organizational social capital among healthcare staff is linked to lower burnout and increased clinical productivity. Similarly, Andersson and Weber (2024) emphasized that social capital at institutional and interpersonal levels can foster trust in doctor-patient interactions, reduce legal complaints, and improve adherence to medical instructions. Fujikawa et al. (2024) examined healthcare staff and found a positive relationship between workplace social capital and both job satisfaction and organizational commitment. The study specifically focused on social capital within healthcare settings, demonstrating that higher levels of social capital are associated with improvements in key performance indicators and increased employee motivation. Building on these findings, recent studies have further clarified the role of social capital in organizational and healthcare contexts. Kida et al. (2024) found that workplace social capital mediates the relationship between collaborative leadership and patient safety outcomes, highlighting its role in enhancing interprofessional collaboration and overall safety climate in hospitals. Xu et al. (2024) reported that nurses' workplace social capital positively influences workforce management, quality of care, patient safety, job satisfaction, and staff retention, indicating that social capital is critical for sustaining healthcare systems. Nikunlaakso et al. (2023) demonstrated that

higher workplace social capital mitigates job stressors and reduces psychological distress among health and social services employees, reinforcing its importance for employee well-being and performance. Together, these studies underscore the pivotal role of social capital in improving human resource effectiveness, employee motivation, and organizational outcomes in healthcare settings.

At the organizational level, studies such as Begum et al. (2025) have highlighted social capital as a source of competitive advantage. In service-oriented organizations like hospitals, mutual trust, interdepartmental cooperation, and active participation can enhance coordination, efficiency, and quality of care. Gaviola et al. (2024) also noted that in decentralized health systems, social capital empowers local communities to participate in the design and implementation of health policies. Additionally, research has demonstrated a direct link between human resource efficiency and organizational performance, which is particularly relevant in healthcare systems facing rapid technological advances, growing information volumes, and environmental changes. For instance, Ying and Jin (2024) identified social capital as a key factor in improving human resource performance (Nik Khassal and Sheki, 2023). In Iran, although numerous studies on social capital have been conducted over the past two decades, most have focused on cultural, urban, or educational contexts. Abdolzadeh et al. (2024), for example, presented a Pathological Model of Social Capital in the Education System, showing that social capital components can contribute to relational, planning, institutional, and individual interactional damages. Using structural equation modeling, they confirmed the proposed relationships, with factor loadings above 0.3 and t-statistics exceeding 1.96, and fit indices within acceptable ranges. At the organizational level, Roshani Ali Bene See et al. (2024) examined the effect of social capital on job performance and satisfaction, emphasizing the mediating role of employee empowerment. Their findings demonstrated that social capital positively and significantly influences both job performance and satisfaction through empowerment. Similarly, Khalifeh

Soltani et al. (2024) studied the mediating role of personal and social responsibility in the relationship between social capital and students' altruism, finding both direct and indirect positive effects of social capital on altruistic behaviors. These studies suggest that enhancing social capital and responsibility can encourage extra-role behaviors and altruism. Despite the growing body of literature on social capital in health systems, most studies have primarily focused on individual outcomes, public health indicators, or clinical performance, while the systematic examination of social capital's role in enhancing human resource management efficiency at the organizational level remains limited. Moreover, few studies have analyzed the structural, cognitive, and relational dimensions of social capital within an integrated conceptual framework in healthcare organizations. In the Iranian context, existing research has largely concentrated on social, educational, or cultural domains, with limited empirical evidence derived from organizational settings in medical universities. Therefore, a clear gap exists in developing a localized and empirically grounded model that explains how social capital contributes to improving human resource management efficiency in health systems.

This study proposes a comprehensive framework that simultaneously incorporates the structural, cognitive, and relational dimensions of social capital to explain human resource management efficiency in the health system. Also, Application of a mixed-methods approach: By combining qualitative and quantitative methods and employing structural equation modeling, the research provides a deeper and more robust analysis of the relationships among key variables compared to prior studies. Organizational-level focus within the health system: Unlike many previous studies emphasizing individual or social outcomes, this research specifically examines the role of social capital in managerial effectiveness and human resource performance within a healthcare organization. Provision of localized empirical evidence: The study generates context-specific findings and offers a practical framework for strengthening human resource performance through social capital development in healthcare institutions.

3. Methodology

From an objective perspective, the present study is classified as applied research, as its findings have practical potential for addressing organizational challenges and improving performance indicators within the health system. Methodologically, field data were collected from the target population using a descriptive-survey approach and standardized questionnaires. The questionnaire method was chosen due to its ability to accurately measure the various dimensions of social capital and human resource management efficiency across a large population, as well as to facilitate quantitative analysis of the relationships among variables. Employing a mixed-methods design (qualitative–quantitative) further enabled a comprehensive and multi-layered analysis of these relationships. The research was conducted in two distinct phases: qualitative and quantitative. In the qualitative phase, data were gathered through semi-structured interviews with human resource management experts at Babol University of Medical Sciences. Content analysis of the collected data led to the identification of fundamental concepts and key propositions, which were then transformed into measurable items and compiled into a standardized questionnaire. This process facilitated the operationalization of qualitative findings and their integration into the quantitative framework of the study.

In the quantitative phase, the finalized questionnaire was distributed among the target statistical population, and the collected data were analyzed using structural equation modeling (SEM). It should be clarified that the results obtained from the Structural Equation Modeling (SEM) in this study are not merely descriptive correlations. Rather, the model is based on a conceptual framework and previous theoretical research, which hypothesizes specific causal pathways such as the effect of social capital dimensions on human resource management efficiency. While SEM allows for the estimation of relationships and their strength, the interpretation of these pathways as causal is grounded in the underlying theory and conceptual framework. Therefore, the findings can be viewed both as indicating significant associations among the constructs and as supporting theoretically-informed causal relationships, providing a more comprehensive understanding of how social capital may influence HRM

efficiency within the health system context. The qualitative population consisted of 10 managers and faculty members at Babol University of Medical Sciences with at least seven years of relevant experience in human resource management, selected purposively. The quantitative population included all managers across various units of the university, totaling 350 individuals. Based on Morgan's table, a sample size of 183 was determined and selected using simple random sampling. In the qualitative phase, data were collected through semi-structured interviews with experts in social capital and human resource management. Data analysis was performed using thematic analysis, which involved carefully reading the texts, extracting initial codes from key sentences and phrases, and categorizing these codes into sub-themes and main themes. This process led to the identification of the key dimensions of social capital within the health system. The themes and concepts extracted at this stage served as the theoretical basis for developing the items of the standardized social capital questionnaire. Additionally, the pre-designed questionnaire was reviewed by experts to ensure its alignment with the conceptual framework of the study.

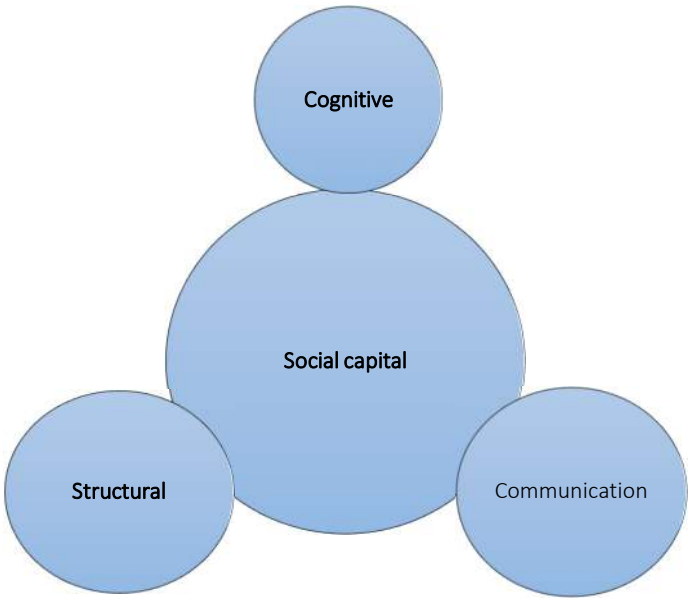

Fig 2. Conceptual model of social capital

The questionnaire review process was conducted in several stages with the participation of experts in social capital and human resource management. At each stage, the items were evaluated for clarity, relevance, and coherence, and inappropriate items were either modified or removed. These measures ensured that the standardized questionnaire became a reliable and valid tool for measuring social capital in the health system of Babol University of Medical Sciences. In the quantitative phase, data on social capital were collected using this questionnaire. After confirming its face validity with professors and field experts in management and health, reliability was assessed using Cronbach's alpha coefficient. This tool enabled scientific and accurate measurement of social capital dimensions to analyze and improve human resource efficiency. Data analysis was performed using SPSS 26 and AMOS 24. Descriptive analyses included indicators such as mean, standard deviation, and coefficient of variation, while inferential analyses employed statistical significance tests alongside structural equation modeling.

4. Findings

Investigating the dimensions of the social capital index:

In this study, social capital is conceptualized based on a three-dimensional model:

a) Structural dimension: Measures the quality of formal and informal communication networks, evaluates organizational structures that support interactions, and examines quantitative indicators of organizational relationships.
b) Cognitive dimension: Assesses the level of shared organizational understanding, the degree of alignment in goals and values, and the presence of common language and symbols.
c) Relational (communication) dimension: Examines the quality of interpersonal relationships, as well as the levels of trust and commitment. The conceptual model of social capital is presented in Figure 1.

Structural dimension: This dimension consists of two subscales: networks and relationships. The networks subscale includes four items, and the

relationships subscale also includes four items. Table 1 presents the frequency distribution of responses to the structural-dimension items, along with the mean, standard deviation, and coefficient of variation for each item.

Table 1. Distribution of structural dimension questions

Abbreviation symbol	Question	Average	Standard deviation	Coefficient of variation
qsar1	University employees combine their information, ideas, and other resources to accomplish tasks.	3.56	1.06	0.30
qsar2	University employees respect each other's feelings.	3.76	1.01	0.27
qsar3	University places great value on group and team work.	3.74	1.04	0.28
qsar4	University provides many opportunities for individuals to be part of groups.	3.79	0.98	0.26
qsar5	University employees have good relationships with each other.	2.81	1.29	0.46
qsar6	University employees usually exchange information and opinions with each other when making decisions.	3.62	1.07	0.29
qsar7	University employees willingly and voluntarily share information with each other.	3.75	0.96	0.26
qsar8	University employees discuss and discuss problems in a useful and healthy way when problems arise.	2.50	1.13	0.45

The findings in Table 1 indicate a relatively favorable level of social capital at Babol University of Medical Sciences. Most items have mean scores above 3.5 (on a five-point Likert scale), reflecting respondents' positive evaluations of social cohesion, information exchange, and group interactions within the

university environment. Specifically, items qsar2 (respect for others' feelings), qsar4 (providing opportunities for group membership), and qsar7 (voluntary information sharing) show the highest mean scores (ranging from 3.75 to 3.79) and the lowest coefficients of variation (0.26 and 0.27), indicating strong consensus among participants and a stable condition of these social capital dimensions.

These findings suggest that a culture of cooperation and mutual respect among employees is relatively institutionalized, and that the university provides an appropriate platform for collective participation. Furthermore, items qsar1 and qsar6, with satisfactory mean values and low coefficients of variation, reflect effective resource integration and information exchange in decision-making processes. This indicates that constructive interactions and the application of collective wisdom are embedded in the organizational environment.

Overall, the results demonstrate an acceptable level of social capital and show that most of the examined components are in a favorable condition according to respondents. Sustaining and strengthening policies that promote cooperation, information exchange, and mutual respect can significantly contribute to the preservation and enhancement of social capital at the organizational level.

Cognitive dimension: It is recognized as one of the key components of social capital and consists of two distinct subscales: the cooperation subscale (comprising four items) and the values subscale (comprising three items). Based on the research findings (Table 2), statistical indicators including the frequency distribution of responses, mean, standard deviation, and coefficient of variation were calculated and analyzed for each item within this dimension. These data enable a more precise assessment of the level of agreement and the dispersion of respondents' views across this dimension.

Table 2. Distribution of cognitive dimension questions

Abbreviation symbol	Question	Average	Standard deviation	Coefficient of variation
qsar9	There is a strong tendency towards collaborative solutions at the university.	3.63	1.10	0.30
qsar10	Employees of this university usually help their colleagues.	3.58	1.09	0.30
qsar11	There is a group and team spirit among the employees of this university.	3.84	0.98	0.26
qsar12	Employees of this university participate and cooperate in various matters.	3.67	1.08	0.29
qsar13	In general, the values of the employees are very similar and consistent with the goals and values of the university.	3.80	0.92	0.24
qsar14	There are common goals and values among the employees of this university.	3.62	0.93	0.26
qsar15	The employees of the university believe that the intentions and goals of the employees are good and good.	3.29	1.17	0.36

The findings presented in Table 2 indicate that the behavioral, value-based, and interactional dimensions of social capital at Babol University of Medical Sciences are at a relatively favorable level. Mean scores for most items exceed 3.5, reflecting respondents' positive perceptions of cooperation, participation, and the presence of shared values among university staff. The highest mean score is associated with item qsar11 (group and team spirit), with a value of 3.84 and the lowest coefficient of variation (0.26), indicating strong stability and high agreement among respondents. This suggests that a culture of teamwork and empathy is well institutionalized among employees, which represents a key component of social capital in knowledge-based organizations such as universities. Additionally, items qsar13 (alignment of employee values with university goals) and qsar12 (participation in organizational affairs), with relatively high mean scores (3.80 and 3.67, respectively) and low coefficients of variation (0.24 and 0.29), indicate

cultural cohesion and active cooperation among organizational members. These indicators demonstrate that employees are aligned with the university's core goals and actively participate in organizational processes. Items qsar9 (tendency toward collaborative solutions), qsar10 (helping colleagues), and qsar14 (existence of shared values), with acceptable mean scores (approximately 3.6) and low coefficients of variation (approximately 0.26–0.30), further confirm that mutual trust and willingness to cooperate have been strengthened, establishing social capital as a foundation for constructive communication. Overall, the results of this section suggest that key components of social capital including cooperation, participation, team spirit, and value alignment are at an acceptable level from the perspective of employees. Continued efforts to strengthen empathy, clarify organizational goals, and promote trust-building behaviors can significantly contribute to the sustainable development of social capital within the institution.

Communication dimension: It is regarded as one of the principal components of social capital and comprises three fundamental subscales: the mutual understanding subscale (four items), the trust subscale (five items), and the commitment subscale (four items). Based on the data presented in Table 3, key descriptive statistics including the mean score, standard deviation, and coefficient of variation were calculated for each item within this dimension. These indicators enable the assessment of respondents' level of agreement, the examination of the dispersion of opinions, and the identification of items demonstrating the highest and lowest levels of consensus.

Table 3. Distribution of questions in the communication dimension

Abbreviation symbol	Question	Average	Standard deviation	Coefficient of variation
qsar16	The staff at this university readily accepts the differences of their colleagues.	3.86	0.82	0.21
qsar17	The staff at this university understands each other's feelings and gets along well with each other.	3.79	0.85	0.22

Abbreviation symbol	Question	Average	Standard deviation	Coefficient of variation
qsar18	The staff at this university criticize each other in a healthy and constructive way.	3.13	1.10	0.35
qsar19	The staff at this university respects each other's feelings.	3.55	0.96	0.27
qsar20	The staff at this university trust each other.	3.63	0.97	0.27
qsar21	My colleagues are honest and straightforward in their dealings with me.	3.41	0.94	0.28
qsar22	My colleagues share important information with me.	3.51	0.92	0.36
qsar23	The staff at this university always keeps each other informed.	3.42	1.11	0.26
qsar24	The staff at this university are generally trustworthy.	3.47	1.03	0.33
qsar25	The staff and the university are committed to achieving each other's goals.	3.88	0.94	0.27
qsa26	The staff at this university see themselves as members of a common family.	3.63	1.09	0.26
qsar27	In general, the staff at this university are loyal to the values of the university.	3.47	0.95	0.31
qsar28	The university and its administrators are loyal to the values of the staff.	3.72	0.96	0.25
		3.66	0.98	0.27

The findings presented in Table 3 indicate that employees' perceptions of the components of social capital at Babol University of Medical Sciences—particularly in terms of acceptance of differences, trust, mutual loyalty, and commitment to shared values—are at a relatively favorable level. The highest mean scores are observed for item qsar24 (employees are generally trustworthy), with a value of 3.88, and item qsar16 (acceptance of individual

differences), with a value of 3.86 and a very low coefficient of variation (0.21). These results suggest that the university's organizational environment is highly positive and stable with respect to social trust, diversity acceptance, and tolerance. Furthermore, items qsar17 (understanding others' feelings), qsar25 (mutual commitment to goals), and qsar27 (loyalty to university values), with mean scores ranging from 3.63 to 3.79 and low coefficients of variation (approximately 0.22 to 0.27), indicate that organizational cohesion, value alignment, and positive emotional relationships are well institutionalized among employees. Similarly, items qsar20 (mutual trust), qsar22 (sharing important information), and qsar28 (managers' loyalty to employee values), with mean scores above 3.5 and acceptable coefficients of variation, confirm that both cognitive and relational dimensions of social capital are at an appropriate level within the organization. Overall, the findings of this section demonstrate that social capital at the university is in a favorable condition, particularly in terms of trust, cohesion, respect, and empathy. Sustaining and strengthening organizational initiatives aimed at enhancing interpersonal communication, promoting shared values, and increasing transparency can further leverage this capital to improve human resource productivity and organizational effectiveness.

Exploratory factor analysis of social capital dimensions: In Table 4, the results of the exploratory factor analysis for the three dimensions of social capital indicate that the data are both adequate and suitable for analysis. The KMO index values for the structural (0.62), cognitive (0.65), and relational (0.77) dimensions all exceed the acceptable threshold of 0.6, confirming the adequacy of the sample for factor analysis. Additionally, the Bartlett's test was significant for all three dimensions ($p < 0.001$), demonstrating the presence of sufficient correlations among the variables. These results collectively confirm the appropriateness of the factor structure for the dimensions of social capital.

Table 4. Exploratory factor analysis table for the five dimensions of efficacy and the three dimensions of social capital

Dimensions	kmo statistics	Bartlett statistics	Degree of freedom	Significance level
Structural	0.62	69.54	6	0.0
Cognitive	0.65	96.78	6	0.0
Communication	0.77	186.74	6	0.0

Factor loadings of summarized variables: After conducting exploratory factor analysis, the research variables were categorized and summarized based on their factor loadings. Variables showing the weakest correlations with others in the set were identified as candidates for elimination. In this study, out of the 29 initial variables, only 12 with acceptable factor loadings remained in the model. These variables were then used for confirmatory factor analysis and structural equation modeling, while the remaining variables were excluded from further analysis. The factor loadings of the retained social capital variables in the exploratory factor analysis are presented in Table 5.

Table 5. Factor loadings of social capital variables in exploratory factor analysis

Factor loading of structural dimension variables	
Questions	**Factor loadings**
qsar2	0.571
qsar 3	0.625
qsar 6	0.752
qsar 7	0.696
Factor loading of cognitive factor variables	
qsar10	0.692
qsar11	0.821
qsar13	0.355
qsar14	0.781
Factor loading of communication factor variables	
qsar19	0.660
qsar23	0.807
qsar24	0.786
qsar25	0.821

First-order confirmatory factor analysis of the structural dimension

The standardized factor loadings of the final measurement model for the "structural" construct, within the framework of first-order confirmatory factor analysis, are presented in Figure 2. All calculated factor loadings exceed the minimum acceptable value, indicating desirable convergent validity and proper alignment of the indicators with the theoretical construct.

Table 6. Structural dimension fit indices

Fitness Indicators	χ^2/df	RMSEA	GFI	AGFI	CFI	IFI
Structural Dimension	0.34	0.0	0.99	099	1	1

The results of the structural equation analysis presented in Table 6 indicate a good fit of the research model. The normalized chi-square index (0.34) shows no significant discrepancy between the observed covariance matrix and the proposed theoretical model. The RMSEA value of 0.0 indicates an excellent fit, reflecting strong alignment between the conceptual model and the empirical data. The GFI and AGFI indices, both at 0.99, confirm the suitability of the model structure with the research data. The comparative indices, CFI and IFI, both reported at 1, demonstrate an ideal model fit. Overall, these findings indicate that the structural factor model possesses appropriate statistical validity and can accurately represent the theoretical concepts examined in this study. They further confirm the adequacy of the measurement model in reflecting the conceptual structure of the research variables.

First-order confirmatory factor analysis of the cognitive dimension

The standardized factor loadings of the final measurement model for the cognitive dimension, within the framework of first-order confirmatory factor analysis, are presented in Figure 3. All calculated factor loadings exceed the minimum acceptable value, indicating desirable convergent validity and

proper alignment of the indicators with the theoretical construct. The model fit indices for the cognitive dimension are presented in Table 7.

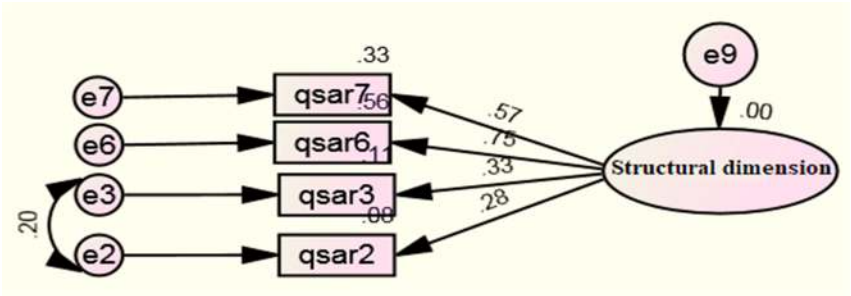

Fig 3. Standardized factor loading of the final measurement model of the structural dimension

Table 7. Cognitive dimension fit indices

Fitness Indicators	χ^2/df	RMSEA	**GFI**	**AGFI**	**CFI**	**IFI**
Cognitive dimension	0.42	0.0	0.99	099	1	1

The results of the structural equation analysis presented in Table 8 indicate an excellent fit of the research's conceptual model. The normalized chi-square index, with a value below the critical threshold of 3, demonstrates a good correspondence between the observed covariance matrix and the theoretical model. The RMSEA value of 0.0, which is below the 0.05 threshold, indicates very high accuracy in predicting the observed data. The GFI and AGFI indices, exceeding the recommended value of 0.95, confirm the model's strong ability to explain data variance. The comparative indices, CFI and IFI, both at 1.00 the highest possible level demonstrate an ideal model fit. The high accuracy of all fit indices establishes this model as a valid and reliable framework for future studies in this field.

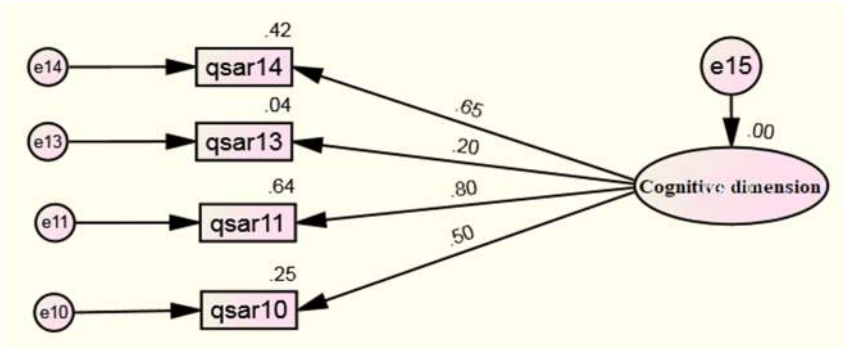

Fig 4. Standardized factor loading of the final measurement model of the cognitive dimension

First-order confirmatory factor analysis of the communication dimension

The standardized factor loadings of the final measurement model for the communication dimension, within the framework of first-order confirmatory factor analysis, are presented in Figure 4. All calculated factor loadings exceed the minimum acceptable value, indicating desirable convergent validity and appropriate alignment of the indicators with the theoretical construct. The model fit indices for the communication dimension are also presented in Table 8.

Table 8. Communication dimension fit indices

Fitness Indicators	χ^2/df	RMSEA	GFI	AGFI	CFI	IFI
Communication dimension	0.03	0.0	1	0.99	1	1

The results of the structural equation analysis presented in Table 8 indicate an excellent fit of the research's conceptual model. The normalized chi-square index, with a value below the critical threshold of 3, demonstrates a good correspondence between the observed covariance matrix and the theoretical model. The RMSEA value of 0.0, which is below the 0.05 threshold, indicates very high accuracy in predicting the observed data. The GFI and AGFI indices, exceeding the recommended value of 0.95, confirm the model's

strong ability to explain data variance. The comparative indices, CFI and IFI, both at 1.00 the highest possible level demonstrate an ideal fit. The overall excellence of these fit indices establishes this model as a valid and reliable framework for future studies in this field.

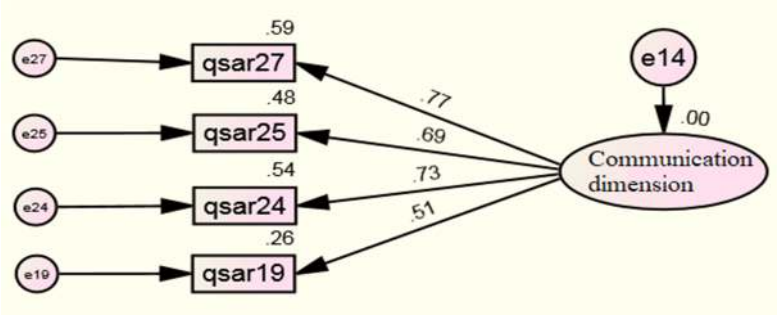

Fig 5. Standardized factor loading of the final measurement model of the communication dimension

Social Capital Model Review: Within the framework of second-order confirmatory factor analysis, the standardized factor loadings of the final measurement model for the social capital index are presented in Figure 5. The findings indicate that all calculated factor loadings, at a significance level of 0.05, exceed the minimum acceptable threshold of 0.3, confirming desirable convergent validity and the significant alignment of the measurement indicators with the theoretical construct under study. These results demonstrate the structural correspondence of the indicators with the conceptual dimensions of the social capital model and their significant alignment with the theoretical framework. Accordingly, the indicators used in each of the three dimensions of social capital (structural, cognitive, and relational) exhibit appropriate structural correspondence with the research's conceptual model and provide sufficient shared variance to explain the main construct. In summary, the conceptual model of social capital, based on these dimensions, was evaluated through second-order confirmatory factor analysis, and the results confirm both the validity and structural soundness of the model.

Table 9. Fit indices of the second stage confirmatory model of social capital

Fitness Indicators	χ^2/df	RMSEA	GFI	AGFI	CFI	IFI
Social capital	1.76	0.06	0.94	0.90	0.94	0.93

Based on the information in Table 9, the normalized chi-square index falls within the acceptable range of 1 to 3, indicating that the model has an acceptable fit. The RMSEA value, which lies within the acceptable range (0.05–0.08), suggests that the model has adequate predictive power. Both GFI and AGFI indices exceed the threshold of 0.90, demonstrating the model's strong ability to explain data variance. The comparative indices, CFI and IFI, with values of 0.94 and 0.93, indicate a relatively good fit compared to the baseline model. Also, the measurement model proposed in this study shows a significant agreement with the collected experimental data with respect to the key fit indices. These findings confirm that the indicators effectively capture the theoretical constructs of the research and that the model possesses the statistical stability required for generalization to the target population.

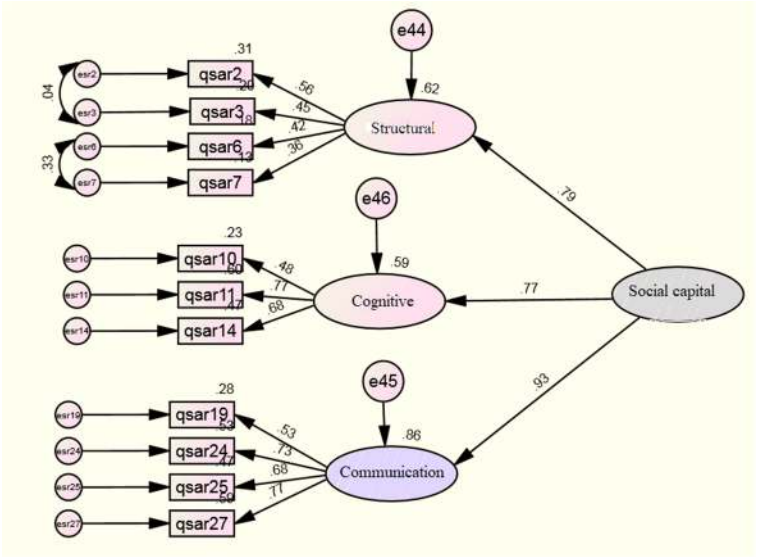

Fig 6. Standardized factor loading of the final measurement model of the Social capital

5. Discussion and Conclusions

This study investigates the relationship between social capital and human resource management efficiency in the health system, highlighting how networks, trust, and collaboration among employees can enhance organizational performance. Understanding and strengthening social capital is particularly important in healthcare settings, where effective coordination and knowledge sharing directly impact service quality. At Babol University of Medical Sciences, the findings demonstrate that well-developed structural, cognitive, and relational dimensions of social capital such as strong communication networks, shared values, and mutual trust significantly improve human resource efficiency, fostering teamwork, employee motivation, and overall organizational productivity. This emphasizes that investing in social capital is a strategic approach to achieving better healthcare outcomes and sustainable institutional performance. In the qualitative phase of the research, using semi-structured interviews and content analysis, three key dimensions of social capital were identified: structural, cognitive, and relational. The structural dimension, which emphasizes communication networks and the configuration of relationships among members, plays a crucial role in facilitating information exchange and organizational collaboration. The cognitive dimension, focusing on the alignment of values, beliefs, and shared understanding, provides the foundation for strengthening empathy and active participation in achieving organizational goals. The relational dimension, encompassing mutual trust, commitment, and acceptance of differences, fosters a positive and supportive organizational environment. These dimensions form the fundamental basis of social capital at Babol University of Medical Sciences and offer a valid framework for assessing its role in enhancing human resource performance.

According to the researcher's studies and an extensive review of domestic and international literature on human resource management and social capital, it is evident that although social capital has been widely examined in health contexts, its comprehensive role in enhancing human resource management

efficiency at the organizational level particularly within medical universities has received limited empirical attention. By focusing on Babol University of Medical Sciences, this study provides a context-specific and integrative examination of how social capital dimensions' influence human resource management efficiency through a mixed-methods design. This methodological integration and localized modeling contribute to addressing existing research gaps and extend current knowledge on organizational social capital in healthcare systems. The findings revealed that social capital exists at an acceptable and desirable level across the structural, cognitive, and relational dimensions at Babol University of Medical Sciences. Strong communication networks, shared values and perspectives, and mutual trust and acceptance of differences collectively shape the organization's social capital. The structural dimension facilitates collaboration, accelerates information exchange, and strengthens collective decision-making, consistent with findings emphasizing the role of workplace social capital in enhancing coordination and safety outcomes in healthcare organizations (Kida et al., 2024). The cognitive dimension reflects shared goals and organizational culture, supporting employee engagement and participation, which aligns with evidence indicating that social capital improves workforce management, quality of care, and staff retention in healthcare settings (Xu et al., 2024).

Furthermore, the relational dimension provides a foundation for strengthening employee motivation, commitment, and psychological well-being by fostering a supportive and trust-based work environment. This finding is consistent with studies demonstrating that workplace social capital enhances job satisfaction and organizational commitment (Fujikawa et al., 2024) and mitigates occupational stress and psychological distress among healthcare employees (Nikunlaakso et al., 2023). Together, these findings confirm that social capital functions as a strategic organizational resource that enhances human resource effectiveness, employee well-being, and overall performance in healthcare systems. Statistical analyses and structural equation modeling conducted in this study confirmed the validity of the social capital

dimensions and demonstrated significant relationships between social capital and human resource performance. The results indicate that social capital is not only a key resource for improving intra-organizational relationships but also a strong driver for enhancing productivity, job satisfaction, and organizational sustainability. In other words, social capital can be considered a strategic factor in improving human resource management efficiency in the health system. These findings are consistent with Roshani Ali Bene See et al. (2024), who reported a positive and significant effect of social capital on job performance and satisfaction, mediated by employee empowerment.

Recommendations: 1. Institutionalize Network-Based Communication Systems: Develop formal and informal platforms for knowledge exchange (interdepartmental committees, communities of practice, internal digital platforms) to accelerate information flow and collective decision-making. Strengthening the structural dimension of social capital will enhance coordination and translate collaboration into higher HRM efficiency. 2. Align Values and Goals through Participatory Leadership: Design participatory mechanisms in policy formulation and performance evaluation grounded in shared organizational values. This approach reinforces the cognitive dimension of social capital by increasing shared understanding and commitment, thereby improving effectiveness and service quality. 3. Implement Structured Trust-Building and Mutual Support Programs: Establish transparency practices, continuous feedback systems, and constructive conflict-resolution processes to sustain trust and commitment. Reinforcing the relational dimension of social capital reduces burnout, improves job satisfaction, and stabilizes workforce performance. 4. Monitor Social Capital Periodically and Link It to HRM Indicators: Create a social capital monitoring dashboard and integrate its metrics with key HRM indicators (retention, productivity, engagement). This evidence-based improvement cycle supports strategic decision-making and optimizes resource allocation across the health system.

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