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Junior Doctor Retention Strategies: Integrating Knowledge Management with Supportive Leadership and Organizational Climate

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Abstract
This study aims to evaluate interventions and strategies used to retain junior doctors, with a specific focus on the roles of organizational climate, supportive leadership, and work engagement influenced by effective knowledge management practices. We examine how knowledge management—the systematic process of creating, sharing, using, and managing the knowledge and information of an organization—contributes to creating a favorable organizational climate and supportive leadership strategies. Engaging in a quantitative study with a sample of 950 junior doctors across four Central European countries, we explore the impact of an integrated approach that combines traditional performance-oriented climate models (rational goals model) with knowledge management practices tailored to the unique demands of healthcare settings influenced by current healthcare reforms and bureaucratic systems. Our findings suggest that not only do supportive leadership and a positive organizational climate enhance work engagement among junior doctors, but robust knowledge management practices also play a crucial role in improving retention rates by facilitating continuous learning and effective information sharing. To the best of our knowledge, our research is the first to draw on the synergy between rational goals, organizational climate, supportive leadership, and knowledge management practices to explain the antecedents of junior doctor work engagement and retention. This approach offers new insights into the dynamics of employee retention and underscores fundamental factors influencing junior doctors' retention, paving the way for a more resilient and thriving healthcare workforce amidst the ongoing turbulence in global healthcare.

Keywords Junior doctors · Supportive leadership · Work engagement · Retention · Healthcare sector

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Introduction

The global healthcare workforce continues to expand with a new generation of millennials. Also known as Generation Y, millennials represent a significant generational cohort in the workforce with distinctive qualities and values that differ from previous generations. For example, many millennials prioritize personal development, growth, continuous learning, and professional development (Ng et al., 2010), which aligns with the principles of effective knowledge management that emphasizes the systematic creation, sharing knowledge to foster individual and organizational advancement (Nonaka et al., 2006). This group seek opportunities for rapid capability enhancement and advancement, along with a clear path for career progression that is complemented by transparent communication and active sharing of information and knowledge from leadership. Many millennials look for work that aligns with their values and a sense of purpose. They want to feel that their work positively impacts society or contributes to a greater cause (Karon et al., 2015). They also thrive in a collaborative environment and value teamwork and inclusivity. They appreciate constructive feedback from their supervisor and acknowledgement of their contributions (Baker & Hastings, 2018). They are optimistic with great expectations, yet, can be cautious and pragmatic (Ayoobzadeh et al., 2024).

Millennials, like employees from other generations, seek work engagement, yet their workplace preferences and expectations may diverge from those of preceding cohorts (Deal et al., 2010). Work engagement denotes a state of positive fulfillment and energy derived from deep involvement and investment in job responsibilities, characterized by high levels of enthusiasm, dedication, and absorption (Schaufeli, 2013). Engaged employees exhibit heightened focus, motivation, and commitment, thus underscoring the significance of work engagement for both individuals and organizations. Indeed, fostering work engagement is imperative for retaining talent and prolonging employee tenure (Kundu & Lata, 2017), with high levels of engagement correlating with increased patient satisfaction in healthcare settings. Consequently, nurturing work engagement not only enhances individual well-being but also drives organizational success by cultivating a conducive work environment, bolstering productivity, and facilitating the achievement of business objectives. In a recent study of Finnish healthcare professionals, Lepistö et al. (2018) highlighted the pivotal role of work engagement for young professionals, amplifying their dedication and absorption as they enter the workforce.

Sharing knowledge is particularly critical for millennials; junior doctors are no exception (Evans et al., 2023). Millennials are competent with technology, making them ideal recipients of digital knowledge management systems that provide quick access to information and learning tools, crucial for their engagement and productivity (Prusak & Davenport, 2013). Moreover, millennials, in general, often enter the workforce with ambitions for rapid career progression; knowledge management systems facilitate this by enabling quick skill acquisition and capability development, which are essential for advancing in their careers (Nonaka &

Takeuchi, 2007). In addition, young doctors often operate in team-based environments where effective collaboration and information sharing are critical attributes fostered by a robust knowledge management framework (Evans & Moodley, 2024). Furthermore, the autonomy and flexibility millennials value are well supported by knowledge management practices that allow them to access necessary resources independently, enabling efficient problem-solving and decision-making in a dynamic environment. Thus, integrating effective knowledge management into hospital structures is important for attracting, retaining, and motivating young doctors in today's dynamic medical environments (Evans et al., 2023).

At the same time, it is widely recognized that the effective management and retention of healthcare workers is a crucial imperative for hospital management and governments (Leggat et al., 2010). While this issue varies by region, country, and specific healthcare sectors, it is influenced by several common factors. The high demand for healthcare professionals, including doctors, nurses, and allied health workers, often outpaces the supply, creating fierce competition for skilled talent. Stressful work environments, long hours, emotional strain, and exposure to critical or traumatic situations contribute to burnout and turnover as employees seek better work–life balance or less stressful roles. In addition, in healthcare, skills shortages in specialized areas, dissatisfaction with compensation and benefits, limited career advancement opportunities, and the potential for global mobility all play a role in retention challenges (Verma et al., 2016).

Thus, high turnover in healthcare is very undesirable; however, for junior doctors, it can be catastrophic for several compelling reasons (Oh & Kim, 2019). First, it disrupts the continuity of patient care, as frequent staff changes can lead to gaps in knowledge about patients' medical histories and treatment plans (Verma et al., 2016). This situation could compromise patient safety and increase the risk of medical errors (Møller et al., 2022). In addition, high turnover requires hospitals to invest significant effort and cost in recruiting, onboarding, and training new junior doctors, impacting the efficiency of healthcare delivery and incurring financial costs (Verma et al., 2016). Team dynamics within hospital departments can suffer due to continual turnover, affecting effective collaboration among healthcare professionals.

Moreover, teaching hospitals may need help to provide high-quality medical education when junior doctors have limited opportunities for hands-on experience. Lastly, high turnover is known to impact staff morale, potentially leading to burnout negatively and reduced job satisfaction while also affecting a hospital's reputation among patients and healthcare professionals. Thus, the poor retention of crucial healthcare workers represents a severe risk to hospitals, yet solving this problem remains poorly understood.

Effective management and retention of young doctors is paramount for advancing and sustaining a knowledge economy driven by innovation and excellence. Healthcare is one of the most critical sectors of the knowledge economy, and young doctors favor innovative practices and modern technologies that improve the quality of healthcare provided and the efficiency of the system. Retaining young, talented doctors allows for the continuous development of their expertise, which is crucial for implementing the latest practices and technologies.

Previous research has investigated the reasons underlying retention and engagement problems in healthcare, but few scholars have examined how retention can be improved. This study aims to evaluate interventions and strategies used to retain junior doctors. We focus on understanding the factors influencing work engagement and retention among junior doctors in four Central European countries: the Czech Republic, Hungary, Poland, and Slovakia. Collectively, these countries are known as the Visegrád Group, usually termed the V4. This group is a political and cultural alliance that cooperates closely on various economic, political, and cultural issues within the European Union. Understanding and addressing junior doctor retention is crucial in the V4 countries due to severe high turnover rates that have led to a talent drain, hindering healthcare system development.

Our research offers a new perspective on the problem of retaining young doctors, and can therefore inform policies aimed at improving the working conditions, career prospects, and job satisfaction of health workers, which will ultimately improve the quality and sustainability of healthcare in the region. We draw on Patterson et al. (2005) climate models, particularly the traditional performance-oriented climate known as the rational goals model (RG model), influenced by current healthcare reforms and bureaucratic healthcare systems. The study introduces mediating variables to explore the relationships between the RG model and work engagement and retention, reflecting contemporary organizational behavior elements and the need to adapt to the preferences of the emerging generation of doctors. In addition, through the human relations model lens, we examine knowledge sharing and supportive leadership, recognizing that traditional knowledge management processes and leadership approaches may only partially align with the perspectives and preferences of today's junior doctors.

This research aims to provide useful insights into optimizing the work environment for junior doctors, enhancing their engagement, and promoting retention in the healthcare sector. From a theoretical standpoint, this study enhances existing research by introducing mediating variables that explore the connection between the RG model and work engagement and retention. These variables address modern organizational behaviors and the preferences of new generations of physicians. This approach enhances the organizational behavior literature by acknowledging that traditional knowledge management and leadership methods may not fully align with the needs of today's younger physicians.

In conclusion, addressing the challenge of high turnover rates among junior doctors in the healthcare industry offers many benefits. By fostering work engagement and enhancing retention strategies, hospitals can improve patient care, reduce costs associated with recruitment and training, and promote efficient teamwork and staff morale. Next, we offer an overview of the extant literature to establish the context and theoretical framework. A methodology section outlines the research design, data collection methods, and data analysis. Finally, the discussion and conclusion encapsulate the central findings and their implications.

Hypothesis Development

Work Engagement

Work engagement is defined as deep and enthusiastic involvement in job tasks, a solid commitment to one's work, and a profound feeling of absorption in the work itself (Kahn, 1990). Work engagement represents a desirable state of mind where employees are highly motivated, focused, and energized by their tasks and the overall work environment (Schaufeli & Bakker, 2010). The antecedents of work engagement are complex. However, Schaufeli et al. (2006) seminal work, the Job Demands-Resources (JD-R) model, has significantly contributed to explaining the antecedents and outcomes of work engagement. The JD-R model identifies job demands and resources as critical antecedents to work engagement. The balance between these factors plays a crucial role in determining an employee's level of engagement and well-being in the workplace.

Engaged employees exhibit heightened focus, motivation, and commitment, thus underscoring the significance of work engagement for both individuals and organizations. Indeed, fostering work engagement is imperative for retaining talent and prolonging employee tenure (Kundu & Lata, 2017), with high levels of engagement correlating with increased patient satisfaction in healthcare settings. Consequently, nurturing work engagement not only enhances individual well-being but also drives organizational success by cultivating a conducive work environment, bolstering productivity, and facilitating the achievement of business objectives.

Job Demands of Junior Doctors

Junior doctors face many demanding aspects in their roles within the healthcare system. These demands include high workloads, long working hours, demanding schedules, irregular shifts, and emotional demands such as delivering difficult news to families and managing the emotional aspects of patient care. Junior doctors must navigate complex decision-making, as they are frequently required to make critical decisions regarding patient care, diagnosis, and treatment, which can be both intellectually demanding and emotionally taxing. Not surprisingly, junior doctors face enormous stress at work. The negative impact of stress and how it can impede engagement is underlined by Wiesner et al. (2005). Stress at work impacts emotional states and the extent to which employees connect with their work on an emotional level. It involves emotions and feelings about one's job, colleagues, and the organization (Kartal, 2018). Amid these demanding roles, junior doctors need job resources to facilitate work engagement (Schaufeli et al., 2009).

Job Demands Specific to the Visegrád Cluster Countries

In the Visegrád (V4) countries, public spending on healthcare as a proportion of GDP is still lower than in other European countries. In Slovakia, data from 2021

show a GDP level of 7.0%, much lower than the EU average of 9.9% (OECD, 2022). The Polish government spends only 6.5% of its GDP on public health, while Hungary and the Czech Republic spend 6.4 and 7.8%, respectively. According to OECD data, the countries of the V4 region are among the countries with a low number of doctors and nurses per 1000 inhabitants. Several hospital departments in these countries have closed as doctors have left the country to work abroad and in the private sector. Many health workers have admitted their intention to resign or emigrate abroad. According to the National Register of Healthcare Professionals of the Slovak Republic, the average age of general practitioners in Slovakia is 54 years. The pandemic and the lack of managerial capacity to cope with such a situation have made the adaptation processes of junior doctors entering the profession more complex, resulting in dissatisfaction and the intention to go abroad.

Job Resources of Junior Doctors

Supervision and mentorship from experienced senior physicians serve as invaluable resources, offering guidance, support, and opportunities for learning and skill development (Schaufeli, 2009). Healthcare institutions often provide access to training programs, workshops, and opportunities for further education, allowing junior doctors to continually enhance their skills and knowledge. Collaboration within a supportive healthcare team, including nurses, senior doctors, and allied health professionals, provides a sense of teamwork and shared responsibility, helping to moderate the challenges they face (Weller et al., 2011). In addition, receiving regular feedback (Li & Xia, 2024) especially on their clinical performance and opportunities for improvement can motivate junior doctors and help them track their progress. Work–life balance initiatives, such as flexible scheduling or access to mental health and well-being resources, further contribute to their overall resilience and job satisfaction (Soneye et al., 2023).

Notwithstanding, the performance management review could be a comprehensive resource that will allow junior doctors to focus on their tasks more effectively (Gross et al., 2019; Møller et al., 2022). A practical review includes feedback, development, and a sense of purpose (DeNisi & Murphy, 2017; Li & Xia, 2024; Maley & Kramar, 2014). Moreover, an effective review process found to be acceptable by the employee can increase employee engagement and retention (Neher & Maley, 2020). Acceptability of the performance management process, in turn, is associated with justice and if the process is perceived as fair, it is more likely to be acceptable. In addition, the acceptability of the process impacts employee motivation and commitment (Kramar, 2021). According to this logic, employee engagement, motivation, and commitment are outcomes of an effective performance management process (van den Berghe & Verweire, 2004).

Accordingly, examining the dynamics of work engagement among junior doctors, it is evident that the availability of essential job resources not only bolsters their engagement but also shapes the overall organizational climate within which they operate. Conversely, lacking job resources within a climate can impede engagement and negatively affect employee motivation and job satisfaction. Ultimately,

job resources and work engagement are intricately linked to the healthcare environment—the "organizational climate."

Organizational Climate

According to Schneider et al. (2013), organizational climate refers to the shared perceptions and experiences of members within an organization regarding its work environment. It encompasses the collective understanding of organizational practices, values, norms, and expectations that shape the work atmosphere. Schneider's perspective on organizational climate emphasizes the role of employees' perceptions and interpretations in shaping their overall experience within the organization. These perceptions can influence factors such as commitment (Ostroff & Bowen, 2016), engagement (Rožman et al., 2019), well-being, and behavior, making organizational climate a critical element for understanding and managing organizational dynamics and outcomes (Berberoglu, 2018). Since Bowen and Ostroff's (2004) seminal work on organizational climate and HR climate, scholars have consistently argued that organizational-level and individual-level climate perceptions are associated with job satisfaction (Bowen & Ostroff, 2004; Schulte, et al., 2006).

Organizational climate is recognized as a key factor in promoting employee retention (Berberoglu, 2018; Hussainy, 2022). Studies have concluded that job satisfaction, job performance, organizational commitment, and work motivation are significantly correlated with the organizational climate (Khan & Sharma, 2020). The growing interest in research in organizational climate is attributed to the mindset of the current generation of employees, who change jobs at the slightest inconvenience (Hussainy, 2022).

Patterson et al. (2005) analyze different models of organizational climate and suggest that the traditional performance-oriented climate, which Patterson calls the rational goals model, dominates in the healthcare context. Such a climate reflects recent reforms aimed at global challenges and limited financial resources in healthcare. Hence, the rational goal model extends the traditional performance management system by emphasizing outcome-driven, performance-based, and quality-focused principles. It encourages organizations to align their goals, evaluate performance based on results, and prioritize efficiency and quality. While it adds rigor to performance management, it also recognizes the significance of employee engagement in achieving these goals. As a result, we hypothesize that a performance-oriented climate positively influences junior doctors' employee engagement.

H1: A performance-oriented climate with rational goals (RG) positively correlates with junior doctors' employee engagement.

The Human Relations Model

The human relations model (HR model) takes a slightly different perspective, emphasizing employee well-being and autonomy, the importance of learning and personal growth, and employee empowerment through participation in decision-making

(Patterson et al., 2005). This generation is attracted to organizations with a mission and purpose that offer the chance to fulfill a personal vision and emphasize individual growth and development of their strengths. Therefore, the human resource model has significant potential to support millennial doctors' engagement.

However, alongside employee well-being, and learning, the HR model emphasizes knowledge sharing through autonomy, empowerment, and communication. The concept of knowledge is defined as a combination of values, information, and expertise for assessing and encompassing new experiences and information (Davenport & Prusak, 1998).

Knowledge management plays a significant role in enhancing the mediating effect of organizational climate on work engagement among young doctors (Evans et al., 2023). It is a fundamental driver of performance (Bousa & Venkitachalam, 2013; Dabic et al., 2019) and a vital resource for organizational sustainability (Martins et al., 2019; Weina & Yanling, 2022).

Knowledge management alone can be appropriately supported by a knowledge-sharing climate that is part of the organizational climate (Ni et al., 2017). As the organizational climate is significantly related to employee's perceptions of the work atmosphere, environment, and practices (Obeng et al., 2021), it can influence and support the process and experience of learning in an organization (Kim & Park, 2020). For example, employees actively share knowledge when the organizational climate emphasizes the value of knowledge and promotes knowledge sharing and accessibility (Peralta & Saldanha, 2014). Organizational climate can also create conditions for collaborative knowledge sharing by fostering networking and collaboration and encouraging the discussion of ideas (Le & Lei, 2017). At the same time, research has confirmed that leadership strategies directly influence organizational climate, knowledge sharing, and organizational learning (Kim & Park, 2020). Thus, leadership has a direct impact on fostering learning and development in an organization (Salas-Vallina et al., 2017).

Knowledge management systems facilitate the flow of information and expertise that are essential for empowering employees and fostering an organizational climate conducive to engagement (Onyango et al., 2022; Rožman et al., 2019). By systematically capturing, sharing, and implementing knowledge across the organization, knowledge management supports a performance-oriented climate that aligns with millennials' expectations for continuous learning and personal growth (Hershatter & Epstein, 2010). This alignment could enhance help the potential of the HR model to effectively engage millennial doctors by ensuring that they are not only informed and involved in decision-making processes but also continuously learning and growing in an environment that values their contributions and individual strengths. Thus, it is reasonable to assume that incorporating knowledge management practices can strengthen the linkage between a favorable HR-oriented climate and enhanced work engagement among young doctors.

In this light, we propose that multiple variables may influence the human resource model and work engagement, and the relationship may not always be direct. Thus, we posit that organizational climate mediates the relationship between the human relations model and work engagement.

H2: An organizational climate that prioritizes human relations mediates the relationship between performance-oriented climate (RG) and young doctors' work engagement (WE).

While an organizational climate that balances human relations and rational goals is undeniably crucial for fostering work engagement, it is essential to recognize that more than these factors alone may be required. To complete the equation for achieving optimal work engagement, we must also consider the essential role of supportive leadership.

Supportive Leadership

Supportive leadership is a leadership style where leaders are friendly, approachable, and actively concerned with the well-being and needs of their followers (Dayanti et al., 2022). Along these lines, Shin et al. (2015) highlight the importance of this style in creating an environment that facilitates supportive interactions within the organization. Similarly, Chih et al. (2018) note that supportive leaders are distinguished by their genuine care and respect for their followers, encouraging ongoing interaction. Moreover, this leadership approach positively impacts the performance of subordinates (Kim et al., 2021).

The theory of supportive leadership is often associated with transformational leadership and servant leadership theories, and it is defined as the supervisor's support in facilitating the achievement of goals by guiding subordinates to be effective and learn to perform their tasks (Banai & Reisel, 2007). Supportive leadership studies suggest that such supervisory behaviors create self-efficacy in subordinates, which positively influences performance (Bandura, 1986; Mitchell & Boyle, 2021). The association between leadership and organizational climate attributes measured by the rational goal model has been examined in previous research. Scholars suggest that leadership style is related to performance through goal clarity, an essential element of the rational goal and organizational climate models. Therefore, we hypothesize that supportive leadership mediates the relationship between performance-oriented climate rational goals and junior doctors' work engagement.

H3: Supportive leadership mediates the relationship between rational goals and junior doctors' employee engagement.

Attitudes toward work are shaped by a variety of employee interactions and the overall characteristics of the organization. As discussed, organizational climate, which encompasses employees' perceptions of the psychological attributes of their work environment (Khan & Sharma, 2020), includes aspects such as leadership style. Both organizational climate (Berberoglu, 2018; Khan & Sharma, 2020) and supportive leadership (Kim et al., 2021; Mitchell & Boyle, 2021) have been shown to significantly influence employees' productivity, motivation, and behavior in the workplace. Therefore, we hypothesize that two organizational climate variables emphasizing human relationships and supportive leadership jointly mediate

the relationship between performance-oriented climate and junior doctors' employee engagement.

H4: Organizational climate, with an emphasis on human relations and supportive leadership, jointly mediates the relationship between rational goals and junior doctors' employee engagement**.**

Method

Sample Characteristics

We focused on large public hospitals which employed post-graduation doctors. The questionnaire was emailed to hospitals in Slovakia, the Czech Republic, and Poland, covering the entire territory of these countries. We chose these countries due to the similarity in the healthcare systems, transformation, and high emigration of doctors from this region due to their common historical development and similar economic and social conditions. In the post-war period, centrally administered health care systems were introduced, providing free health care to all citizens. After the fall of socialism, these systems were transformed, but many elements of the original system remained. All V4 countries currently provide their citizens with universal access to healthcare, mainly financed by the health insurance system but increasingly by private funding, such as direct patient payments and supplementary health insurance. All V4 countries face similar problems of healthcare financing and inadequate infrastructure, as well as shortages and outflows of qualified health workers and their inadequate age structure (GLOBSEC, 2022). Since the 1990s, healthcare in the V4 countries has undergone reforms to streamline the system, improve the quality of care, and ensure financial sustainability. Reforms include changes in financing, decentralization of management, increased competition among service providers, and efforts to improve the efficiency of health facilities (Ministry of Finance of the Slovak Republic, 2023). Given the selection of countries and health facilities and the regional factor, we consider the sample to be relevant for this study. The human resource departments of these hospitals surveyed sent the electronic questionnaires to doctors. The emails contained information about the purpose of the research, instructions for completing the questionnaire, the time needed to complete the questionnaire, and notification that by sending the questionnaire, the respondents consented to data processing.

Sample and Data Collection

We used a questionnaire survey to collect data. Seidel (2017) revealed that the first 3 years of employment for millennials working in healthcare are critical. Thus, our sample included junior doctors working in hospitals for 1 to 3 years.

Data collection occurred in May 2022, with weekly reminders sent to doctors to complete the questionnaires, as the initial return rate was low. Although hospital

managers showed interest in participating in the research, obtaining data from the doctors themselves proved challenging, presumably due to their heavy workloads. A total of 1560 requests were sent (350 for Slovakia, 580 for the Czech Republic, and 630 for Poland). The return rate was 61%, indicating that the sample consisted of 950 young doctors from 3 countries: 210 from Slovakia (22%), 420 from the Czech Republic (44%), and 320 from Poland (34%). The average age of the respondents was 27.8 years. In addition, 57% of the respondents were female, and the rest were male. The doctors belonged to different clinical areas.

Measurement Tool

The first item of the questionnaire, which preceded the questions on individual variables, concerned the doctors' intention to work abroad or outside the medical profession. While 39% of respondents indicated they planned to work abroad, 41% remained undecided but considered working abroad, and 20% wished to continue working in their home country. The sample also included respondents who were not residents of the employer's country. These were mainly Slovak doctors in the Czech Republic and Ukrainian doctors in Slovakia and Poland (8%). The research took place in Slovakia, Poland, and the Czech Republic. Since the measurement tools were unavailable in the respective languages, we used back-translation before administering the tools. Bilingual experts translated the tool from English into Slovak, Czech, and Polish and then back into English, and in case of discrepancies, rewording ensured semantic consistency. Work engagement (WE) was measured using the 9-item short version of the Utrecht Work Engagement Scale (UWES), which has excellent psychometric properties (Schaufeli & Bakker, 2004). Since the three core dimensions of work engagement (vigor, engagement, and absorption) are usually highly correlated, the 9-item scale indicates work engagement (Schaufeli & Bakker, 2004). Respondents rated the frequency experienced for each of the nine items on a 5-point scale ranging from 1 ("never") to 5 ("always").

Supportive leadership (SL) was measured using the Professional Practice Work Environment Inventory, a psychometric assessment tool that contains statements to assess this leadership style (Ives et al., 2017). The ten items listed in Table 1 were rated on a Likert scale from 1 to 5 (1—strongly disagree, 5—strongly agree).

The human relations model (HRM) and the rational goals model (RGM) were adopted from the competing values framework (CVF) (Patterson et al., 2005). Respondents commented on six statements about HRH and six about RGM using a 5-point Likert scale (1—strongly disagree, 5—strongly agree). The country and gender of the doctors (male = 0, female = 1) were control variables. Stefanidis and Strogilos (2021) highlight the significance of gender on the effects of organizational support on employee engagement; Vesterinen et al. (2013) used age and years of experience as blinded control variables in their studies on healthcare managers. In addition, Shader et al. (2001) also considered healthcare workers' age and years of experience as variables related to job satisfaction.

Table 1 Latent variable categories and descriptors

Supportive leadership (SL)		Work engagement (WE)	
SL1	Leaders in my unit/department encourage staff to contribute to decisions about our unit/department	WE1	At my work, I feel bursting with energy
SL2	Leaders in my unit/department value my opinion about unit/department-related issues	WE2	At my job, I feel strong and vigorous
SL3	I feel valued by the leader in my unit/department	WE3	I am enthusiastic about my job
SL4	Leadership in this unit/department is supportive of unit/department staff	WE4	My job inspires me
SL5	Unit/department leadership values my opinion about unit/department-related issues	WE5	I feel like going to work when I get up in the morning
SL6	I am encouraged by staff leaders to voice my opinion on patient issues	WE6	I feel happy when I am working intensely
SL7	The leader in my unit/department inspires staff members to participate in change		
SL8	Supportive leadership in my unit/department influences my decision-making	WE7	I am proud of the work that I do
SL9	My unit/department head is a good manager and leader	WE8	I am immersed in my work
SL10	My unit/department head supports staff even if the conflict is with a doctor	WE9	I get carried away when I am working
Rational goals model (RGM)		Human relations model (HRM)	
RGM1	Clarity of organizational goals	HRM1	Autonomy
RGM2	Efficiency and productivity at work	HRM2	Integration with other wards
RGM3	Effort toward achieving goals	HRM3	Involvement in decision-making
RGM4	Pressure to produce	HRM4	Supervisory support
RGM5	Performance feedback	HRM5	Training
RGM6	Quality	HRM6	Welfare

The questionnaire included a set of 31 indicator variables (Table 1) for the measurement model. To alleviate the common method bias, we adopted measures such as randomizing the items in the questionnaire, reversing the scales, and presenting each section in a different context, using the approach of Podsakoff et al. (2003). Furthermore, using the VIF index, whose values were less than 3.3, we found that the model was not subject to collinearity. Thus, it reduced the risk of common method bias (Kock, 2015).

Results

Data were analyzed using the Partial Least Squares Structural Equation Modeling (PLS-SEM) method through the SmartPLS 3.3 software to assess the measurement and structural models. We used tools such as the coefficient of determination (R-Square), Adjusted R-Square, and structural reliability and validity methods, i.e., to validate the reliability and validity of the model, i.e., Cronbach's alpha, Spearman's rho (rho_A), composite reliability (CR), Average Variance Extracted (AVE), discriminant validity methods such as Fornell–Lacker criterion, cross-loadings, heterotrait-to-monotrait ratio (HTMT), and collinear statistics methods such as variance inflation factors (VIF). To test the fit of the structural model, we used the standardized squared model residual (SRMR), *P*-value, and *T*-statistic methods. The hypotheses were tested at the $\alpha = 0.05$ level. The results ensured that all predicted structural model relationships would be confirmed.

Measurement Model

The measurement model evaluation (reflective and formative models) determines whether all common model requirements have been met. Consistency assessment is carried out through individual indicator reliability, construct reliability, and convergent validity tests. Our results have shown that the measurement model satisfies the reliability requirement because almost all standardized loadings are greater than 0.70 (Götz et al., 2010). At the same time, the requirements of internal construct and convergent reliability were also met (Table 2). The internal construct reliability was monitored through Cronbach's alpha, composite reliabilities (CR), and rho A, and all values were greater than 0.70 and less than 0.95. In addition, the theory suggests that rho A should lie between Cronbach's alpha and CR (Ringle, et al., 2020). Convergent validity was measured by calculating the average variance extracted (AVE), which exceeds 0.5 in our model for all constructs—indicating that the construct explains, on average, at least 50% of the variance of its items.

We finally tested our model for discriminant validity analysis—the degree to which a latent variable is empirically different from the other variables in the structural model. In addition to the traditional Fornell–Larcker criterion and cross-loadings, we assessed the model against the heterotrait–monotrait correlation (HTMT) ratio (Ringle et al., 2020), measured as the average indicator correlations between constructs. In terms of the Forner–Larcker criterion, Table 3 shows that the square

Table 2 Loadings, reliability, and validity

	Construct/indicator	Factor loading	Composite reliability (CR)	rho_A	Cronbach's alpha	Average variance extracted (AVE)
RGM	RGM1	0.904	0.955	0.950	0.942	0.780
	RGM2	0.864				
	RGM3	0.927				
	RGM4	0.738				
	RGM5	0.920				
	RGM6	0.932				
HRM	HRM1	0.907	0.956	0.945	0.944	0.784
	HRM2	0.878				
	HRM3	0.917				
	HRM4	0.865				
	HRM5	0.934				
	HRM6	0.805				
SL	SL1	0.893	0.958	0.957	0.951	0.698
	SL2	0.829				
	SL3	0.901				
	SL4	0.859				
	SL5	0.765				
	SL6	0.687				
	SL7	0.758				
	SL8	0.808				
	SL9	0.921				
	SL10	0.902				
WE	WE1	0.910	0.939	0.957	0.899	0.689
	WE2	0.923				
	WE3	0.862				
	WE4	0.583				
	WE5	0.869				
	WE6	0.884				
	WE7	0.882				
	WE8	0.877				
	WE9	0.739				

WE work engagement, *RGM* rational goals model, *HRM* human relations model, *SL* supportive leadership

root of the AVE for a construct was greater than the correlation between constructs. However, in the case of the heterotrait-to-monotrait correlation ratio, only some of the values obtained were below the threshold of 0.90 (Henseler et al., 2015). In the case of cross-loadings, based on the analysis results, we can conclude that a particular variable had a higher loading on its latent variable compared to the other latent variables in the study based on the application of cross-loadings. Therefore,

Table 3 Discriminant validity (Fornell–Lacker criteria)/HTMT ratio

	HRM	RGM	SL	WE
HRM	***0.886/–***			
RGM	0.936/0.988	***0.883/–***		
SL	0.901/0.949	0.898/0.942	***0.835/–***	
WE	0.905/0.899	0.887/0.819	0.958/0.897	***0.830/–***

Diagonal elements (values in bold italics) are the square root of variance shared between the constructs and their measures (AVE). Off-diagonal elements are the correlations among constructs. For discriminant validity, the diagonal elements should be larger than the off-diagonal elements. HTMT ratio results are listed after the slash

we concluded that discriminant validity was established. However, we do not report the cross-loadings due to the large data size.

Structural Model

If collinearity is not an issue, the next step is to examine the R^2 (R-squared) values of the endogenous parameters, as the R^2 value determines the strength of each structural path and identifies the higher quality of the model. The R^2 value should be equal to or greater than 0.1. Our results (values ranging from 0.545 to 0.681) show that all R^2 values exceed 0.1. Predictive significance was established. Q^2 values assess both predictive relevance and path relevance. A Q^2 value greater than 0 indicates the predictive relevance of the model. The results show the predictive significance of the constructs (see Table 4). In addition, the model fit was assessed using SRMR. The SRMR value was 0.068. SRMR values should be less than or equal to 0.100, indicating an acceptable model fit (Table 5).

The results demonstrated a direct effect of RGM on WE ($\beta = 0.917$, $P = 0.000$). Thus, Hypothesis 1 was confirmed. A performance-oriented climate is directly related to junior doctors' work engagement. In Hypothesis 3, SL serves as a mediator; the direct effect is $\beta = 0.149$ (i.e., lower than RGM), and the indirect effect is $\beta = 0.749$. In percentage terms, when mediated by SL, the direct effect accounts for

Table 4 Predictive relevance of the model

	SSO	SSE	Q^2 (= 1 − SSE/SSO)
HRM	5700.000	1811.769	0.682
RGM	5700.000	5700.000	
SL	9500.000	4199.205	0.558
WE	8550.000	3140.689	0.633

WE work engagement; *RGM* rational goals model; *HRM* human relations model; *SL* supportive leadership, $P < 0.05$; Q^2 construct cross-validated redundancy

Table 5 Path coefficients, total, direct, and indirect effects

	Original sample (β)	Sample mean (β)	Standard deviation	*T*-Statistics	*P*-Values	
1. Mediation of HRM between RGM and WE—H2: supported						
HRM → WE	0.621	0.621	0.030	20.470	0.000	
RGM → HRM	0.937	0.937	0.003	289.160	0.000	
RGM → WE (direct effect)	0.316	0.316	0.032	9.773	0.000	Significant
RGM → WE (total effect)	0.897	0.898	0.006	143.952	0.000	
RGM → HRM → WE (indirect effect)	0.582	0.581	0.029	20.402	0.000	Significant
2. Mediation of SL between RGM and WE—H3: supported						
SL → WE	0.834	0.834	0.018	47.642	0.000	
RGM → SL	0.898	0.898	0.006	159.899	0.000	
RGM → WE (direct effect)	0.149	0.150	0.019	7.807	0.000	Significant
RGM → WE (total effect)	0.898	0.898	0.006	151.936	0.000	
RGM → SL → WE (indirect effect)	0.749	0.749	0.016	46.447	0.000	Significant
3. Mediation of HRM and SL between RGM and WE—H4: supported						
SL → WE	0.758	0.758	0.021	35.962	0.000	
HRM → WE	0.245	0.246	0.025	9.642	0.000	
RGM → SL	0.898	0.898	0.006	152.624	0.000	
RGM → HRM	0.937	0.936	0.003	294.697	0.000	
RGM → WE (total effect)	0.898	0.898	0.006	150.731	0.000	
RGM → WE (direct effect)	−0.013	−0.013	0.024	0.543	0.587	Non-significant
RGM → HRM → WE (indirect effect)	0.230	0.230	0.024	9.646	0.000	Significant
RGM → SL → WE (indirect effect)	0.681	0.681	0.019	35.726	0.000	Significant
RGM → WE (total indirect effect)	0.911	0.911	0.022	42.287	0.000	

WE work engagement; *RGM* rational goals model; *HRM* human relations model; *SL* supportive leadership, $P < 0.05$

17% and the indirect effect accounts for 83% of the total effect. Hypothesis 4, which tests the simultaneous effect of two mediators (HRM and SL), was confirmed. Their real indirect effect is significant, with the direct effect being negative (−0.013) and not significant at the total effect size (0.898); 25% of the total indirect effect (0.911) is accounted for by transmission through the mediator HRM and 75% by transmission through SL.

Multigroup Analysis

We measured the invariance of the composite models (MICOM) before conducting a multigroup analysis (Henseler et al., 2016). As a result, full invariance was identified here, which allowed us to test the relationships of the selected groups. Tables 6 and 7 show the results of parametric tests of the multigroup analyses by segmentation variables.

We found no significant path differences between the Slovak and Czech Republic for the country variable (Table 7). This observation is substantial; the proximity of cultures and contexts provides a foundation for consistent perceptions of the variables and their relationships. However, differences emerge in comparison to Poland, where there appears to be a partial difference in the relationship between RGM and WE (but in different directions), which would require further investigation.

Discussion

Our research demonstrates that organizational climate plays a pivotal role in influencing the work engagement of junior doctors and underscores the significance of cultivating a suitable organizational climate within healthcare institutions. However, the present study also focuses on rational goals and organizational climate, emphasizing goal-setting, performance feedback, and goal achievement. It is much more practically focused than other studies, offering a new lens into the problem of junior doctor retention. Our findings reveal that a favorable organizational climate can directly stimulate the work engagement of junior doctors.

Table 6 PLS-SEM/multigroup analysis for managers by gender

	Path coeff. orig. (male–female)	*P*-Value
HRM → WE	−0.065	0.230
RGM → HRM	−0.008	0.271
RGM → SL	0.026*	0.031
RGM → WE	−0.047	0.411
SL → WE	0.094*	0.023

WE work engagement, *RGM* rational goals model, *HRM* human relations model, *SL* supportive leadership

*Significant difference between path coefficients

Table 7 PLS-SEM/multigroup analysis for countries

	Path coefficients-diff (CZ – PL)	*P*-Value new (CZ vs. PL)
HRM → WE	0.101*	0.037
RGM → HRM	– 0.010	0.082
RGM → SL	– 0.013	0.275
RGM → WE	– 0.207*	0.000
SL → WE	0.089*	0.050
	Path coefficients-diff (CZ – SK)	*P*-Value new (CZ vs. SK)
HRM → WE	– 0.368	
RGM → HRM	– 0.010	0.167
RGM → SL	– 0.015	0.306
RGM → WE	0.025	0.679
SL → WE	0.315	
	Path coefficients-diff (PL – SK)	*P*-Value new (PL vs. SK)
HRM → WE	– 0.469	
RGM → HRM	0.000	0.956
RGM → SL	– 0.002	0.870
RGM → WE	0.232*	0.000
SL → WE	0.227	

WE work engagement, *RGM* rational goals model, *HRM* human relations model, *SL* supportive leadership

*$P < 0.05$

However, it is important to note that an organizational climate focused on achieving goals and productivity may increase employee demands, potentially leading to dissatisfaction.

Nevertheless, integrating the rational goal model into the organizational climate creates a delicate balance. On the one hand, it offers clear organizational goals and performance feedback, which can attract the junior generation of employees. On the other hand, excessive emphasis on productivity may lead to burnout and negatively impact employee satisfaction. Thus, while goal orientation is vital, it should be accompanied by a supportive and empowering work environment where information and knowledge is shared effectively. This balance can be explained through the jobs-demand (JD-R) model, which offers insights into how specific aspects of the work environment influence employee well-being, job satisfaction, and retention.

Digital transformation, if properly managed, can enhance the ability to continuously create new knowledge at the organizational level. Thus, the concept of learning organizations and organizational learning is increasingly important in the digital age (Marchegiani 2021). Tools such as eLearning platforms, intra-enterprise networks, and many others can be used effectively in the healthcare sector. Moreover, knowledge management, supported by modern technological solutions, can be attractive to the upcoming generation of employees.

An effective performance management process can play a critical role in creating a desirable organizational climate by helping to address job demands. We

agree with Spreitzer (1995) that access to information and individual-performance-based reward systems should form part of an effective performance management process. DeNisi and Smith (2014) advocate that an effective performance management process requires bundles of HR practices to create a climate for performance that could include managing knowledges, skills, and abilities to improve firm-level or organization performance.

However, addressing the specific challenges of junior doctors requires a nuanced approach that goes beyond traditional performance assessments to encompass support, feedback, and career progression (Gross et al., 2019; Møller et al., 2022). Unlike traditional systems that focus solely on metrics and outcomes, modern approaches should emphasize formative feedback that specifically promotes learning and development and recognize the junior doctors' contributions to the healthcare team. Integrating knowledge management practices such as sharing of best practices and fostering a culture of continuous learning could enhance these efforts. Proficient knowledge management strategies will help ensure that critical information is readily available, decision-making is informed by up-to-date and complete information, and that the continuous professional development of doctors is supported, in line with the recommendations of Patterson et al. (2005). This comprehensive approach will help improve performance; it will also support junior doctors' engagement and ultimately their retention.

This type of support fosters a growth mindset, encouraging junior doctors to see challenges as opportunities for development rather than insurmountable obstacles and can help junior doctors visualize their career trajectory within the healthcare system. Leveraging technology can also enhance the performance management process. Digital tools and platforms can streamline knowledge sharing, facilitate more frequent and meaningful feedback, and offer personalized learning resources. Technology can also support peer-to-peer learning and community building, creating a more collaborative and supportive work environment (Wuersch et al., 2023). By reducing the time spent on bureaucratic tasks, junior doctors can focus more on patient care and professional development. Thus, an effective performance management system for junior doctors is a critical component in addressing the demands of their jobs and creating a positive organizational culture. By focusing on comprehensive support, career development, work–life balance, knowledge sharing, and the efficient use of technology, such an all-encompassing system can improve job satisfaction, reduce burnout rates, and ultimately retain talented junior doctors within the healthcare system. Furthermore, investing in these areas signals a commitment to the well-being and professional growth and is indispensable for work engagement (Lepistö et al., 2019), and for the delivery of high-quality patient care and the overall health of the healthcare workforce.

A positive organizational climate also provides resources like mentorship programs and opportunities for not only professional development but also psychological support. Moreover, a work-engaged organizational climate enhances job satisfaction among junior doctors. Their job satisfaction increases when they feel valued and recognized for their contributions. This satisfaction, coupled with a sense of loyalty and commitment fostered by an engaged work environment, makes them more likely to stay with the hospital.

In addition, a favorable climate offers a resource for opportunities and supportive leadership, further strengthening the retention of junior doctors. Hospitals prioritizing supportive leadership create an environment where junior doctors feel heard, valued, and empowered. This, in turn, strengthens their commitment to the hospital and reduces turnover.

Thus, a conducive organizational climate encouraging work engagement is instrumental in retaining junior hospital doctors. By addressing job demands and providing necessary resources within this framework, hospitals can create an environment where junior doctors are more likely to stay, experience less burnout, and find satisfaction in their roles—it benefits hospitals by retaining skilled professionals and ensuring continuity in patient care.

Mediating Factors: Personal Climate and Supportive Leadership

Our research further highlights the crucial role of personal climate and supportive leadership as mediators in the relationship between rational goals, organizational climate, and work engagement. These mediating factors enhance goal orientation's impact on junior doctors' work engagement. Autonomy, learning opportunities, personal growth, and participation in decision-making can boost work engagement when integrated into the organizational climate. Incorporating the human resource model further strengthens this relationship. Notably, the study underscores the importance of knowledge management and supportive leadership in promoting employee engagement. A supportive, transparent, mutually respectful environment, characterized by open and trusting communication, and knowledge sharing, emerges as a critical factor for the millennial generation. Supportive leadership, in practice, involves managers demonstrating empathy, fostering open communication and knowledge sharing, and clearly articulating the purpose of their team's work. The healthier and more robust the relationship between employees and managers, the more engaged employees are and the more likely they will have positive outcomes, supporting their managers in return.

Gender Differences and Cross-Cultural Insights

Surprisingly, our study found that junior male doctors respond more positively to supportive leadership than their female colleagues. Junior male doctors' greater receptiveness to supportive leadership than their female counterparts may be influenced by societal gender norms, with men potentially more accepting of non-authoritarian leadership styles. Male doctors may perceive such leadership as validating and rewarding due to its contrast with more traditional leadership. In addition, the influence of male role models in leadership positions, familiarity with supportive leadership, workplace climate, communication styles, differing expectations regarding advocacy and support, and implicit biases and stereotypes could all contribute to this gender-based variation in response to leadership. These findings warrant further investigation, especially considering the similarity in conditions and healthcare system transformation across the Central European countries under study.

While no significant differences were found between Slovak and Czech doctors, variations in the relationships between the rational goal model and work engagement emerged when comparing these countries with Poland where differences in the relationship between the rational goal model and work engagement were evident. These findings suggest that the dimensions of culture may be a factor that interferes with the relationships we have examined. While the Czech Republic and Slovakia, due to their long-shared history and similarity of social development, show a higher homogeneity of results, in the case of Poland, the different historical and social context may be the source of the different reactions of junior doctors to the handling of rational goals. Understanding and leveraging these cultural nuances through frameworks such as Hofstede's cultural dimensions (Hofstede, 1984; Hofstede et al., 2010), Meyer's cultural mapping (Meyer, 2014), Hall's theory of high-context and low-context communication (Hall, 1976), and the GLOBE study (House et al., 2004) is essential for effective healthcare management. Investigating the cultural nuances that influence the effectiveness of organizational climate strategies can help healthcare organizations fine-tune their approaches in diverse contexts.

Limitations and Future Research

While our study provides valuable insights, it has limitations. We acknowledge the potential for common method bias and the need for data from multiple sources, such as interviews with managers and patients, to enhance objectivity. While the current study provides a robust snapshot of the factors influencing junior doctor retention, future research could benefit from longitudinal studies. Tracking changes over time would provide deeper insights into the long-term effectiveness of the proposed strategies. Our findings open avenues for future research, particularly in exploring the observed cross-cultural differences and examining the impact of relationships on other outcomes within healthcare settings. Although our study focuses on the Visegrád Group (V4) countries, the challenges and transformations in healthcare management discussed are relevant globally due to similar shifts in workforce demographics. Thus, the findings could provide valuable insights for managing healthcare settings worldwide.

Implications for Practice

In an era characterized by the challenges besieging global healthcare systems, the role of junior doctors as frontline workers is vulnerable. The 2023/2024 UK doctor strike, echoing the demands of countless junior doctors worldwide, underscores the urgency of addressing the mounting issues that threaten the very core of healthcare sustainability. Within this background, our study offers insight and optimism. Investigating the network of work engagement, organizational climate, rational goals, and supportive leadership provides an understanding of how hospitals can improve the retention of junior doctors. Our findings address junior doctors' struggles and their ambitions for better resources to address their poor working conditions. We call on healthcare leaders, policymakers, and institutions to recognize that junior doctors

are the lifeblood of hospitals. The findings of the study serve as a call for immediate action, urging hospital leaders and governments to reconsider their approaches to junior doctor retention.

Conclusion

Junior doctors frequently face demanding roles characterized by long hours, high patient loads, and exposure to unpredictable situations, leading to burnout, stress, and high turnover rates. The urgency and significance of reducing this turnover are paramount. A positive organizational climate can play a central role in mitigating these challenges by providing a supportive environment that helps junior doctors navigate their demanding responsibilities more effectively. While sharing geographical and historical ties, the Visegrád Group (V4) countries, the Czech Republic, Hungary, Poland, and Slovakia, exhibit distinct cultural characteristics that shape their organizational climates and influence strategies for retaining junior doctors.

In Poland, a high-power distance fosters a hierarchical healthcare management style that may limit junior doctors' autonomy, potentially affecting their job satisfaction and commitment. In contrast, with their lower power distance, the Czech Republic and Slovakia promote participative management, enhancing junior doctors' engagement and empowerment. Hungary balances hierarchy and consultation, creating an environment that supports structured authority and participation. In addition, the high uncertainty avoidance in Slovakia and Poland supports structured, rule-based management models, making Rational Goals Models (RGMs) particularly effective. Conversely, the moderate uncertainty avoidance in the Czech Republic and Hungary allows for more adaptive and innovative strategies in healthcare management. These cultural differences necessitate both generic and tailored retention strategies, with each country's unique context guiding the development of practical approaches to enhance junior doctors' engagement and reduce turnover.

Gender dynamics further influence the effectiveness of leadership strategies in the V4 countries. It is crucial to be aware of these dynamics and consider them in leadership strategies. Male junior doctors often respond positively to supportive leadership, which they perceive as a welcome shift from traditional hierarchical models, aligning with Eagly and Karau's (2002) role congruity theory. This theory suggests that leadership effectiveness is often judged through the lens of gendered expectations, making supportive leadership particularly affirming for male doctors' professional identities. On the other hand, female doctors may require leadership that directly addresses their specific challenges, such as balancing career advancement with family responsibilities and overcoming gender biases. Leadership strategies for female doctors should thus focus on equitable career opportunities and work–life balance, as emphasized by Carnes et al. (2008).

Tailoring leadership strategies to be gender sensitive and culturally attuned is essential for healthcare organizations in the V4 countries to effectively engage and retain junior doctors. This will ultimately reduce turnover, foster an inclusive work environment, and enhance the sustainability and effectiveness of healthcare systems across the region.

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