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ARTICLE

Work performance: the role of sustainable human resource management and sustainability concerns

Lígia Nascimento[1,2,3]
Cátia Cruz[1]
Manuela Faia Correia[1]

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Abstract

Purpose – The aim of this study was to evaluate the impact of post-pandemic changes to human resource management policies and practices (HRMPP) on work performance (WP), as well as the role of sustainability concerns (SC) in mediating the relationship between HRMPP and WP.

Theoretical framework – The research model was based on the concept of sustainable human resource management as a new paradigm of HRM and on a three-dimensional conceptualization of WP: task performance (TP), contextual performance (CP), and counterproductive work behavior (CWB).

Design/methodology/approach – Data were obtained through a convenience survey of 190 employees who had more than two years of seniority and experience working remotely during the pandemic. Multiple linear regression and mediation analysis were employed.

Findings – WP and the TP, CP, and CWB dimensions were significantly affected by specific HRMPP variables. However, SC did not mediate the relationship between HRMPP and WP, indicating that sustainability must be more fully integrated into organizational policies.

Practical & social implications of research – This research underscores the pivotal role of HRM practices in their differential impact on specific performance dimensions, offering clear guidance on enhancing people management in post-pandemic settings.

Originality/value – As no studies focusing on the proposed model were found, this study is pioneering in considering WP as a three-dimensional construct, in

1. *Universidade Lusíada, Centro de Investigação em Organizações, Mercados e Gestão Industrial – COMEGI, Lisboa, Portugal*
2. *Instituto Superior Manuel Teixeira Gomes, Intrepid Lab, Portimão, Portugal*
3. *Universidade de Trás-os-Montes e Alto Douro – UTAD, Centro de Estudos Transdisciplinares para o Desenvolvimento – CETRAD, Porto, Portugal*

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highlighting how different HRMPP impact different dimensions of WP, and in analyzing the mediating effect of SC in the relationship between HRMPP and WP in a post-crisis and digital transformation context. It developed measurement scales for HRMPP and SC.

Keywords: Sustainable human resource management, sustainability, work performance, COVID-19 pandemic.

1 Introduction

Despite living in an era that recognizes sustainability and employee well-being as pillars of organizational success, many organizations continue to prioritize immediate financial goals. In doing so, they ignore integrated approaches that consider social and environmental objectives, which could improve individual and collective performance (Mariappanadar, 2019; Stankevičiute & Savanevičiene, 2018). The crisis triggered by the pandemic has intensified these challenges by bringing about unprecedented changes, such as technological acceleration and the adoption of new work models, like teleworking and hybrid models. These changes have forced organizations to reevaluate their strategies and practices, particularly those of human resources management (HRM). The need to adapt to an increasingly dynamic and uncertain environment has led to new methods of engaging with employees to enhance individual and organizational performance (Adiga & Bassey, 2021; Caligiuri et al., 2020).

The World Commission on Environment and Development (WCED) defined sustainable development as "[…] development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987, p. 41). Currently, it is an essential organizational goal in response to growing investor, consumer, and worker demands regarding quality of life, human rights, and environmental protection (European Commission, 2001; Jones et al., 2017). There is empirical evidence of the relationship between sustainable practices and organizational performance (e.g., Lameira et al., 2013; Palma et al., 2014).

These considerations have reinforced the emerging approach of Sustainable Human Resource Management (SHRM) (Mariappanadar, 2019; Stankevičiute & Savanevičiene, 2018). SHRM is an innovative perspective that reintroduces humanity into HRM by broadening the focus from financial results to include social and environmental dimensions. This concept is similar to Elkington's (1997) Triple Bottom Line, which contributes to sustainable development (Mariappanadar, 2019; Vanka et al., 2020). Organizations that integrate sustainability into their strategies tend to promote a healthier, more motivated, and more resilient workforce. These organizations also tend to achieve better results and adapt better to unexpected and adverse situations, such as a pandemic, while strengthening employee commitment (Gričnik et al., 2023; Mazur & Walczyna, 2020).

Some companies, especially multinationals, have adopted sustainable practices (Ehnert, 2009). However, there is still a period of change and innovation in organizational management (Kramar, 2014). SHRM has been widely studied as an approach to aligning HRM practices with sustainability objectives (Macke & Genari, 2018). However, important gaps remain in the literature. Specifically, little is known about how workers' perceptions of changes in post-pandemic HRM practices and policies affect individual performance, a vital variable for organizational results and success (Aguinis & Glavas, 2019; Campbell, 1990; Gigauri, 2020; Liang & Li, 2025). Furthermore, the interaction between this relationship and sustainability concerns remains underexplored (e.g., Stankevičiute & Savanevičiene, 2018). This study addresses these gaps by examining how employees' perceptions of changes in HRM practices and policies impact employee performance in a context of technological change and the transformation of work, which has been intensified by the recent pandemic crisis. Additionally, the study explores whether individual and organizational concerns about sustainability mediate this impact. In line with emerging trends, this is the first study, to our knowledge, to examine these relationships. Moreover, it contributes to the literature by developing novel scales to assess workers' perceptions of changes in HRM practices and policies resulting from the pandemic, as well as to measure sustainability concerns. Thus, it provides a solid basis for future research and business practice.

2 Literature review

2.1 Sustainable human resource management

Organizations are under pressure from society, public institutions, and their stakeholders to act sustainably and take responsibility for their impact on communities

and the environment (Esteves et al., 2023). This trend has been accompanied by the evolution of HRM (Correia & Esteves, 2017; Esteves et al., 2023).

HRM emerged with the main objective of promoting the well-being of workers. However, over time, HRM has moved away from this foundation and limited itself to serving the economic and financial interests of organizations (Stankevičiute & Savanevičiene, 2018).

Strategic human resource management (StHRM), defined as "[…] the pattern of planned human resource deployments and activities intended to enable an organization to achieve its goals" (Wright & McMahan, 1992, p. 5), emphasizes the value of employees and considers talent a critical success factor (Kramar, 2014; Stankevičiute & Savanevičiene, 2018). However, it has several limitations. For example, it focuses exclusively on financial results and neglects the interests of other stakeholders (Bondarouk & Brewster, 2016; Guest, 2017; Stankevičiute & Savanevičiene, 2018).

Sustainable human resource management (SHRM) is considered the new paradigm of HRM (Macke & Genari, 2018; Mazur & Walczyna, 2020; Stankevičiute & Savanevičiene, 2013) and an extension of StHRM (Díaz-Carrion et al., 2020; Ehnert, 2009; Kramar, 2014; Mariappanadar, 2019; Vanka et al., 2020). It broadens the scope of HRM beyond an organization's economic and financial interests, placing greater emphasis on respecting workers and their well-being and quality of life inside and outside of work. It also emphasizes greater environmental awareness and concern for issues outside of the organization. SHRM uses a long-term, multi-stakeholder approach (Díaz-Carrion et al., 2020; Vanka et al., 2020).

Ehnert et al. (2016, p. 90) define SHRM as follows: "[…] the adoption of HRM strategies and practices that enable the achievement of financial, social, and ecological goals with an impact inside and outside the organization over a long-term time horizon, while controlling for unintended side effects and negative feedback".

According to Mariappanadar (2019), the primary objectives of SHRM are as follows:

1. Promoting employee well-being and ensuring safe, healthy, and motivating working conditions, as well as balancing professional and personal life;

2. Implementing social responsibility practices that benefit the community and society in general by promoting equal opportunities, diversity, and inclusion;

3. Adopting policies and practices that minimize the company's environmental impact and promote ecological sustainability;

4. Investing in the training and continuous development of employees to promote lifelong learning and employability;

5. Providing job security and fair working conditions to reduce turnover and increase employee satisfaction and loyalty;

6. Improving the company's performance and competitiveness through a committed, motivated, and well-managed workforce;

7. Developing a positive employer brand to attract and retain qualified talent.

These goals aim to create a sustainable work environment that benefits workers, the organization, and society as a whole by integrating economic, social, and environmental factors (United Nations, 2020).

2.2 The digital transformation and its impact on work and human resource management

The pandemic presented organizations with two major, simultaneous challenges: the changes brought about by the virus and the legal and social demands relating to sustainability. Organizations had to adapt quickly to this new reality, finding solutions in technological transformation and the digitalization of processes and work. Throughout the crisis, HRM took on a leadership role, responding to emerging problems and looking for solutions to navigate the situation as best as possible (Gigauri, 2020). This translated into an opportunity to improve and establish SHRM as the solution to various situations and emerging problems.

This crisis has accelerated the adoption of technology and introduced new ways of working. Most of these new methods are based on digital processes, automation, artificial intelligence, augmented reality, and robotics. This has accelerated the development of Industry 4.0 (Sneader & Singhal, 2021; World Economic Forum, 2021). Technological transformation has allowed organizations to continue their activities and operations,

protect workers' jobs, and maintain their businesses. Companies that would have taken years to implement digital transformation agendas had to accelerate their efforts and undergo radical changes to respond to the barriers imposed by the pandemic (Narayandas et al., 2020).

One of the major challenges for SHRM arising from the pandemic is adapting workers to new conditions, such as teleworking, and to new policies and procedures aimed at limiting human contact and protecting workers (Carnevale & Hatak, 2020). In addition to managing the transition to teleworking and its associated tensions, SHRM needed to establish practices to help employees balance personal and professional life and mitigate the negative effects of this new work environment (Gigauri, 2020).

Adopting SHRM as a management strategy brings benefits not only to the organization, but also to its internal and external stakeholders (e.g., employees, customers, and suppliers), the environment, and society (e.g., Stankevičiute & Savanevičiene, 2018; Vanka et al., 2020). In their study of the relationship between employees' perceptions of sustainable HR practices and performance, Scholten et al. (2022) derived a sequential mediation model. According to this model, social responsibility improves work performance by contributing to a supportive and trusting work environment, which promotes meaning and engagement at work. SHRM can play a key role here because studies indicate that HR practices directly impact the organization's image by conveying to job seekers what the organization offers in terms of quality, working conditions, pay and benefits fairness, and appreciation and respect for employees and the social and environmental landscape (Jones & Willness, 2013).

2.3 Organizational performance

In HRM, organizational psychology, and organizational behavior research, organizational performance is the main dependent variable (Campbell & Wiernik, 2015; Ramos-Villagrasa et al., 2019). We often try to understand how to improve employee performance and organizational results. However, the literature on organizational performance is complex and lacks consensus, particularly regarding its definition, which varies (Ghalem et al., 2016; Koopmans et al., 2011; Liang & Li, 2025). This may be due to the multidimensionality of the concept (Campbell & Wiernik, 2015; Ghalem et al., 2016), depending on the context and theoretical field.

According to Daft (2008), organizational performance is defined as a company's ability to implement efficient and effective practices and procedures to achieve its objectives. Pfeffer (1998) argues that organizational performance is the result of HRM practices and the output of employees. Motowidlo and Keel (2013) distinguish between behavior (what the person actually does), performance (the expected organizational value of behavior), and results (conditions altered by people that contribute to or hinder the organization's effectiveness). Campbell (1990) defines organizational performance as the set of worker behaviors and actions relevant to achieving organizational objectives, regardless of the results obtained. Campbell and Wiernik (2015) warn that performance is often confused with its determinants and results. They emphasize that performance is the set of individual actions specified in behavioral terms that positively or negatively affect the organization's objectives. In other words, good performance is an important contributor, but it does not equate to productivity or efficiency. The achievement of objectives depends on contextual issues, available resources, and market changes, among other factors.

Borman and Motowidlo (1993, 1997) conceptualized performance as having two dimensions: task performance and contextual performance. Building on this conceptual basis, Koopmans et al. (2011) identified two additional dimensions: adaptive performance and counterproductive work behaviors. They argued that these four dimensions would enable the assessment of individual performance, regardless of function or sector. Later, adaptive performance was integrated into contextual performance, and the construct was presented as three-dimensional: task performance, contextual performance, and counterproductive work behaviors (Koopmans et al., 2012). They defined task performance as "[…] the proficiency with which individuals perform central job tasks", contextual performance as "[…] behaviors that support the organizational, social, and psychological environment in which the technical core must function", and counterproductive work behaviors as "behavior that harms the well-being of the organization" (Koopmans et al., 2011, p. 858, 861, 862).

Considerable attention in the literature has been given to the determinants of performance. These determinants include cognitive abilities, personality traits, physical characteristics, motivational factors, management and leadership type, training and career plans, internal communication, reward structure, and benefits (Appelbaum et al., 2000; Campbell & Wiernik, 2015; Schleicher et al., 2018). This investigative focus is not surprising since improving operational performance significantly impacts the financial performance and success of organizations (Schleicher et al., 2018).

The incorporation of sustainability and sustainable development concerns into organizations (Elkington, 1997) has led to another factor influencing organizational performance. A study using 16 years of data concluded that organizations that incorporated the three pillars of sustainability – economic, environmental, and social – into their strategy obtained better operational and financial results (Eccles et al., 2014). Caligiuri et al. (2020) argue that the transformations brought about by the pandemic mean that organizational performance must be rethought and redefined, highlighting corporate sustainability as one of its most important variables.

2.4 Research model and hypotheses

Research indicates that HRM practices integrating employee well-being and appreciation increase satisfaction, motivation, and commitment. In turn, this tends to result in higher overall performance (e.g., Appelbaum et al., 2000; Guest, 2017; Wright & McMahan, 1992). During the pandemic, HRM led the way in adopting new practices and policies to protect and motivate employees. These include the use of technologies to optimize work processes and ultimately improve individual performance (e.g., Adiga & Bassey, 2021; Gigauri, 2020). Hopefully, these initiatives will lead to greater efficiency and effectiveness in completing tasks, encourage behaviors that support the organizational, social, and psychological work environment, and reduce counterproductive behaviors. Based on these assumptions and the perceived changes in HRM policies and practices in response to the pandemic crisis, the following hypotheses are formulated:

H1: HRM practices and policies have a significant and positive effect on work performance.

H1a: HRM practices and policies have a significant and positive effect on task performance.

H1b: HRM practices and policies have a significant and positive effect on contextual performance.

H1c: HRM practices and policies have a significant and positive effect on counterproductive work behaviors.

The literature review showed that organizations that incorporate sustainability and sustainable development into their strategies and operational practices achieve better results. One reason for this is the improved commitment and sense of belonging among internal stakeholders. Sharing non-financial information and corporate sustainability initiatives, often incorporated into HRM practices, motivates employees and involves them in a collective purpose. This has an impact on individual performance and organizational results. Thus, as hypothesized, it is expected that employees' perceptions of corporate concerns about sustainability will mediate the relationship between HRM actions and performance:

H2: Concerns about sustainability significantly mediate the relationship between HRM practices and policies and work performance.

Figure 1 shows the empirical model and its hypotheses.

3 Methodology

3.1 Sample

The sample was obtained through convenience sampling. Eligible individuals were over 18 years of age and had worked in their respective organizations for more than two years. They had also been teleworking, either partially or fully, during the lockdown period.

A total of 190 responses were collected (Supplementary Data 1 – Database and Supplementary Data 2 – Codebook). The sample was 58.4% female and 41.6% male with an average age of 39.7 years (range 22-65 years). Most respondents had a bachelor's degree (46.8%), a master's degree (22.6%), or secondary education (22.6%). The professional categories of senior technician (35.8%)

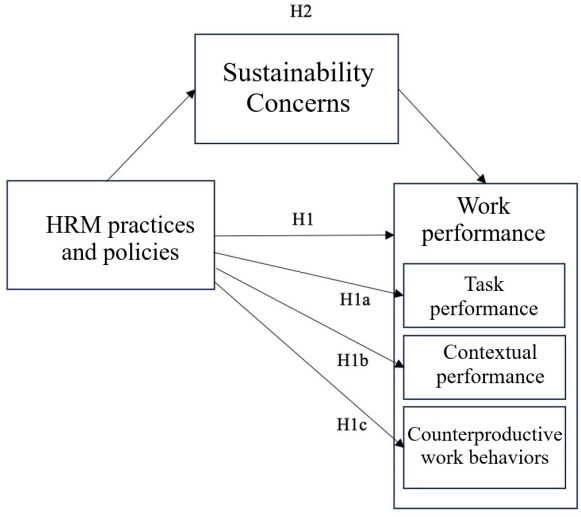

Figure 1. Research model and hypotheses.

and technician (25.3%) were the most prevalent. Most participants worked in the service sector (42.6%) and had an average of 11.9 years of service (between two and 44 years). Most participants had never teleworked before the pandemic (84.2%), but 72.1% considered the experience positive (40.5%) or very positive (31.6%).

3.2 Measuring instruments and procedures

The authors of this article built the Sustainability Concerns and Human Resource Management Policies and Practices scales from scratch, except for two items from Warr et al. (1979) that were used in the latter scale. To measure work performance, we used the English version of the Individual Work Performance Questionnaire (IWPQ) (Koopmans et al., 2016). This scale was translated and adapted into Portuguese because, at the time of this research, there was no validated version for the Portuguese population (Supplementary Data 3 – Appendix A_Scales).

3.2.1 *Human Resource Management Policies and Practices Scale (HRMPPS)*

This scale assesses policies and practices in response to the pandemic and consists of 17 items answered on a 5-point Likert scale (1 = decreased a lot, 5 = increased a lot). The items are grouped into five factors: 1) Well-being (four items, e.g., "Concern for the needs and interests of employees..."); 2) Working conditions (eight items, e.g., "Flexible working hours..."); 3) Inclusion and diversity (one item: "Equality and diversity in work policies and practices..."); 4) Internal communication (two items, e.g., "The provision of information to employees on relevant company events..."); and 5) Customer management (two items, e.g., "Concern for customer satisfaction...").

3.2.2 *Sustainability Concerns Scale (SCS)*

This scale assesses perceptions of sustainability and how the effects of the pandemic have impacted these perceptions. The scale consists of six items, three of which assess employees' concerns about sustainability (e.g., "With the pandemic, my concern about environmental sustainability..."), and three of which measure employees' perceptions of their companies' sustainability concerns (e.g., "With the pandemic, my company's concern about economic sustainability..."). Responses are given on a 5-point Likert scale (1 = decreased a lot, 5 = increased a lot).

3.2.3 *Individual Work Performance Questionnaire (IWPQ)*

This questionnaire measures individual performance at work. It contains 18 items that assess three dimensions: task performance (five items; e.g., "In the last year, I planned my work optimally "), contextual performance (eight items; e.g., "In the last year, I took on extra responsibilities"), and counterproductive work behaviors (five items; e.g., "In the last year, I complained about unimportant issues at work"). Participants answer on a five-point Likert scale (0 = rarely, 4 = always), with the scores inverted for the counterproductive behaviors dimension so that a low value indicates low performance and a high value indicates high performance. Koopmans et al. (2016) reported the following Cronbach's alpha values: task performance = 0.79, contextual performance = 0.83, and counterproductive work behaviors = 0.89.

The measurement instruments were pre-tested with four individuals of different ages, levels of seniority, and areas of expertise to gauge the average response time, clarity of the questions, ease of answering, and overall opinion from the participants' perspective. The questionnaire was shared via email and social networks (LinkedIn, Facebook, and Instagram) with individuals who met the requirements. They were also asked to forward the questionnaire to other eligible individuals (snowball technique). All ethical standards required for this type of study were followed, and participation was voluntary with informed consent (Supplementary Data 4 – Appendix B_Questionnaire).

3.3 Data analysis techniques

The data were analyzed using IBM SPSS Statistics version 27. The following steps were taken:

- Verification of the psychometric properties of the scales via exploratory factor analysis (EFA) using the principal components method with varimax rotation. Factor extraction followed the Kaiser criterion (eigenvalues > 1), and fit was verified by the Kaiser-Meyer-Olkin (KMO) and Bartlett's sphericity tests;
- Evaluation of the internal consistency of the scales using the Cronbach's α coefficient;
- Correlation analysis to explore bivariate associations between variables;
- Multiple linear regression to test the hypotheses and verification of the statistical assumptions essential to the robustness of the models;

- Simple mediation analysis using the PROCESS 4.0 macro in SPSS according to the Baron and Kenny (1986) model. This analysis used 5,000 bootstrap samples to estimate the confidence interval of the indirect effect and was applied to the independent variable (HRM practices and policies), the mediating variable (sustainability concerns), and the dependent variable (work performance).

4 Results

4.1 Factor analysis and internal consistency

The suitability of the data for factor analysis was confirmed by the KMO (Kaiser-Meyer-Olkin) results, which were greater than 0.7, and the Bartlett's sphericity results, which p-value was less than 0.001 (Marôco, 2021). The respective results were as follows: 0.860 and $\chi^2(136) = 1579.810$, $p<0.001$ in the HRMPPS; 0.784 and $\chi^2(15) = 432.167$, $p<0.001$ in the SCS; and 0.869 and $\chi^2(153) = 2275.851$, $p<0.001$ in the IWPQ.

The EFA carried out on the HRMPPS produced five factors, which did not coincide with those initially proposed. Together, they explained 70.5% of the total variance (Table 1). Given the common concepts, the factors were renamed as follows: 1 - Investment in employee well-being (EW), nine items; 2 - Autonomy (Au), two items; 3 - Customer management (CM), two items; 4 - Workload (WL), two items; and 5 – Job security (JS), two items.

The weights of the items in each factor varied between 0.56 and 0.91. The internal consistency, as measured by the Cronbach's α coefficient of 0.86 for the overall scale, is good (Pestana & Gageiro, 2014).

As for the SCS (Table 2), the EFA revealed that the six items with factor weights ≥ 0.62 were grouped into a single factor explaining 54.40% of the variance. This factor did not distinguish between workers' concerns and companies' concerns. A Cronbach's α coefficient of 0.83 was obtained, indicating good internal consistency (Pestana & Gageiro, 2014).

The results of the EFA for the version of the IWPQ translated and adapted by the authors of this article (see Table 3) confirmed the existence of the three factors: task performance (TP), five items, contextual performance (CP), eight items, and counterproductive work behaviors (CWB), five items. These factors were recommended by Koopmans et al. (2016) for the original scale, and they explained 66.84% of the variance in this study. The factor weights of the items ranged from 0.64 to 0.91 and Cronbach's α = 0.89, indicating good internal consistency (Pestana & Gageiro, 2014).

Table 4 shows the results of the descriptive statistics and the correlations between the variables.

4.2 Multiple linear regression

The Kolmogorov-Smirnov test revealed that the dependent variable, work performance, has a normal distribution ($p>0.05$) (Pestana & Gageiro, 2014).

We verified the following prerequisites (Marôco, 2021): the criterion n = 20 was met for each predictor variable; the correlations between the predictors (EW, Au, CM, WL and JS) varied between -0.086 and 0.481, therefore $<|0.75|$; the tolerance values varied between 0.717 and 1.000, therefore >0.1, and the variance inflation factor values ranged from 1.000 to 1.381, all <10, indicating no multicollinearity; the independence of the residuals was also observed, as the results of the Durbin-Watson test were WP (global scale) = 1.872, TP = 2.229, CP = 1.910, and CWB = 2.077, all within the interval [1.5; 2.5]. We considered a type I error probability (α) of 0.05 for all analyses.

The stepwise method was used as an unbiased statistical criterion to select the most predictive variables and complement the theoretical evidence. Table 5 shows the results of the multiple linear regression analysis performed on both the overall performance scale and its three dimensions (TP, CP, and CWB). Only the significant independent variables (EW, Au, CM, WL, and JS dimensions of HRM practices and policies) were considered for each model.

In the case of overall WP, the significant variables were JS, CM, and EW. The model that included these three independent variables was the best, with R = 0.855 and $R^2 = 0.732$. This model explained 73.2% of the variance in WP. The ANOVA test yielded a p-value of 0.000, indicating that the regression model is statistically significant. Each of the three variables, JS ($\beta = 0.696$, $t = 17.588$, $p = 0.000$), CM ($\beta = 0.345$, $t = 8.906$, $p = 0.000$), and EW ($\beta = 0.092$, $t = 2.382$, $p = 0.018$), was found to have a positive and significant predictive effect on work performance. Hypothesis H1 was verified.

We also analyzed the predictive effects of the variables that made up HRM policies and practices on each of the three dimensions of work performance (TP, CP, and CWB). Regarding TP, only the EW variable

Table 1
Factor matrix and descriptive statistics for the HRMPPS

	Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Mean	SD
1	Concern for the needs and interests of workers...	0.822					3.12	0.991
2	Communication with workers...	0.819					3.13	0.997
3	Support provided to workers...	0.778					2.95	0.865
4	Provision of information to employees on relevant company events...	0.768					3.18	0.873
5	Implementation of practices and policies that promote the well-being of workers...	0.755	0.303				3.21	0.958
6	Incentives for workers to receive vocational training...	0.754					2.91	0.824
7	Justice in the treatment of workers...	0.696					2.97	0.705
8	Equality and diversity policies and practices at work...	0.685					2.98	0.709
9	Promotion of a work-life balance...	0.564	0.491				3.01	0.979
10	Flexible working hours...		0.827				3.36	0.953
11	Freedom to choose your own work methods...	0.428	0.734				3.22	0.899
12	Enhanced customer complaint handling...			0.909			3.36	0.696
13	Concern for customer satisfaction...			0.872			3.42	0.743
14	Intensity of the work...				0.869		3.67	0.964
15	The amount of responsibility you are given...				0.815		3.46	0.746
16	Fear of unemployment...					0.835	3.14	1.004
17	Control over workers...		-0.363		0.404	0.555	2.96	0.799
	% of variance explained	31.55	11.12	10.74	10.06	7.06		

Note. Factor weights <|0.3| were excluded.

Table 2
Factor matrix and descriptive statistics for the SCS

	Items	Factor 1	Mean	SD
1	With the pandemic, my company's concern about economic sustainability...	0.667	3.53	0.754
2	With the pandemic, my company's concern about social sustainability...	0.730	3.37	0.743
3	With the pandemic, my company's concern about environmental sustainability...	0.616	3.09	0.668
4	With the pandemic, my concern about economic sustainability...	0.801	3.75	0,846
5	With the pandemic, my concern about social sustainability...	0.806	3.77	0,89
6	With the pandemic, my concern about environmental sustainability...	0.784	3.48	0,821
	% of variance explained	54.40		

Table 3
IWPQ factor matrix and descriptive statistics

	Items	Factor 1	Factor 2	Factor 3	Mean	SD
1	I worked to keep my work skills up to date	0.85			2.76	0.966
2	I worked to keep my knowledge of the job up to date	0.84			2.72	1.003
3	I took on challenging tasks when these were available	0.787			2.55	1.077
4	On my own initiative, I started new tasks when my old tasks were completed	0.76			2.48	1.130
5	I continually sought new challenges in my work	0.739			2.36	1.108
6	I came up with creative solutions for new problems	0.676	0.314		2.29	1.053
7	I took on extra responsibilities	0.654			2.51	1.092
8	I actively participated in meetings and/or consultations	0.638			2.60	1.131
9	I planned my work optimally		0.849		2.55	1.021
10	I was able to distinguish main issues from side issues		0.821		2.6	1.012
11	I was able to plan my work so that I finished it on time		0.798		2.82	1.054
12	I was able to carry out my work well with minimal time and effort		0.78		2.23	1.049
13	I kept in mind the work result I needed to achieve	0.418	0.702		3.05	0.875
14	I complained about unimportant issues at work			0.905	0.96	0.844
15	I made problems at work bigger than they were			0.825	1.12	1.127
16	I talked to colleagues about the negative aspects of my work			0.794	1.83	1.138
17	I talked to people outside the organization about the negative aspects of my work			0.772	1.61	1.233
18	I focused on the negative aspects of a situation at work instead of the positive ones			0.756	1.42	1.128
	% of variance explained	27.23	20.29	19.32		

Note. Factor weights <|0.3| were excluded.

Table 4
Means, standard deviations, and correlations

Variable	Mean	SD	SC	WP	TP	CP	CWB	HRMPP	EW	Au	CM	WL	JS
SC	3.50	.58	1										
WP	2.25	.63	.159*	1									
TP	2.53	.84	.190**	.893**	1								
CP	2.65	.84	.056	.697**	.537**	1							
CWB	1.39	.89	.064	.440**	.177*	-.020	1						
HRMPP	3.18	.48	.422**	.260**	.277**	.183*	.022	1					
EW	3.05	.68	.331**	.245**	.269**	.201**	-.006	.917**	1				
Au	3.29	.81	.288**	.122	.126	.129	-.050	.578**	.481**	1			
CM	3.39	.68	.232**	.136	.175*	.054	-.002	.497**	.339**	.177*	1		
WL	3.57	.75	.219**	.054	.135	-.126	.037	.285**	.073	.106	.223**	1	
JS	3.05	.70	.110	.085	.017	.061	.140	.185*	.001	-.086	.117	.215**	1

Note. *Correlation is significant at the 0.05 level (two-tailed); **Correlation is significant at the 0.01 level (two-tailed).

Table 5
Multiple linear regression results

Dependent variable	Independent variable	Non-standardized coefficients		Standardized coefficients	t	*p*	R^2
		B	Error	Beta			
IWPQ (WP)	(Constant)	0.566	0.120		4.708	0.000	0.732
	JS	0.441	0.025	0.696	17.588	0.000	
	CM	0.221	0.025	0.345	8.906	0.000	
	EW	0.086	0.036	0.092	2.382	0.018	
IWPQ - TP	(Constant)	-0.70	0.064		-1.100	0.273	0.932
	EW	1.034	0.020	0.965	50.729	0.000	
IWPQ - CP	(Constant)	0.405	0.167		2.424	0.016	0.744
	JS	0.721	0.031	0.859	23.336	0.000	
	WL	0.095	0.041	0.085	2.316	0.022	
IWPQ - CWB	(Constant)	0.050	0.071		0.707	0.480	0.857
	CM	0.822	0.025	0.913	32.401	0.000	
	JS	0.050	0.025	0.056	1.993	0.048	

was significant, with R = 0.965 and R^2 = 0.932, which explains 93.2% of the variance in TP. The model fit is highly significant (p = 0.000). EW emerged as a positive predictor of TP (β = 0.965, t = 50.729, p = 0.000), thus supporting H1a.

Regarding CP, the included variables were JS and WL. The model composed of both variables had an R value of 0.747 and an R^2 value of 0.744, explaining 74.4% of CP. The model fit is highly significant (p = 0.000). JS and WL were positive predictors of CP (β = 0.859, t = 23.336, p = 0.000 and β = 0.085, t = 2.316, p = 0.022, respectively), thus verifying H1b.

In the case of CWB, the significant variables were CM and EW. The model that included both variables had an R value of 0.926 and an R^2 value of 0.857, which explains 85.7% of the variance in CWB. The model fit the data very well (p = 0.000). Both CM and EW showed a positive predictive effect on CWB (CM: β = 0.913, t = 32.401, p = 0.000; JS: β = 0.056, t = 1.993, p = 0.048). Thus, H1c is also considered verified.

4.3 Mediation analysis

The research model is a simple mediation analysis with three variables: an independent variable (HRMPP), a dependent variable (WP), and a mediating variable (SC). First, the effect of the independent variable on the mediating variable (path a) was calculated. A significant regression model was obtained (p = 0.0000), in which HRMPP explained 19.4% of the variance in SC (R^2 = 0.1984). HRMPP had a statistically significant positive effect on SC: b = 0.5374, SE = 0.0788, t = 6.8212, p = 0.0000, and 95% CI [0.3820, 0.6928].

Next, the effects of the independent and mediating variables on the dependent variable were analyzed. A significant model was obtained (p = 0.0057), in which HRMPP explained only 5.38% (R^2 = 0.0538) of the variance in WP under the influence of mediation. There was a positive direct effect (path c′) (b = 0.2933, SE = 0.1039, t = 2.8217, p = 0.0053, 95% CI [0.0882, 0.4983]), but SC did not have a statistically significant effect on WP (path b) as b = 0.0177, SE = 0.0861, t = 0.2055, p = 0.8374, 95% CI [–0.1522, 0.1876]).

When calculating the total effect (path c), a significant model was obtained (p = 0.0013), explaining only 5.36% of the variance in WP (R^2 = 0.0536). A significant positive effect of HRMPP on WP was also obtained (b = 0.3028, SE = 0.0928, t = 3.2622, p = 0.0013, 95% CI [0.1197, 0.4859]). To test the significance of the indirect effect of HRMPP on WP mediated by SC, the bootstrapping method with 5,000 samples was used, yielding b = 0.0095 and SE = 0.0534. The 95% confidence interval [-0.1017, 0.1126] includes zero, indicating that the mediation effect is not significant.

In short, since the effects of the mediating and dependent variables, as well as the indirect effect, were not significant, it can be concluded that SC does not mediate the relationship between HRMPP and WP. Therefore, H2 is rejected.

Table 6 summarizes the results and verifies the research hypotheses.

Table 6
Hypotheses and results

	Hypotheses	Results	Supported?
H1	HRM practices and policies have a significant and positive effect on work performance	JS← WP (β =0.696, *p=0*.000) CM← WP (β =0.345, *p=0*.000) EW← WP (β =0.092, *p=0*.018)	Yes (JS, CM and EW)
H1a	HRM practices and policies have a significant and positive effect on the task performance dimension	EW← TP (β=0.965, *p=0*.000)	Yes (EW)
H1b	HRM practices and policies have a significant and positive effect on the contextual performance dimension	JS← CP (β=0.859, *p=0*.000) WL← CP (β=0.085; *p=0*.022)	Yes (JS and WL)
H1c	HRM practices and policies have a significant and positive effect on the counterproductive work behaviors dimension	CM← CWB (β=0.913, *p=0*.000) JS← CWB (β=0.056, *p=0*.048)	Yes (CM and JS)
H2	Sustainability concerns play a mediating role in the relationship between HRM practices and policies and work performance.	(a) SC← HRMPP (b=0.5374, *p=0*.0000, CI 95% [0.3820, 0.6928]) (b) WP← SC (b=0.0177, *p=0*.8374, IC 95% [-0.1522, 0.1876]) - *ns* (c', direct effect) HRMPP← WP (b=0.2933, *p=0*.0053, CI 95% [0.0882, 0.4983]) (c, total effect) HRMPP← WP (b=0.3028, *p=0*.0013, IC 95% [0.1197, 0.4859]) (indirect effect) (b=0.0095, IC 95% [-0.1017, 0.1126]) - *ns*	No

Note. *ns* - not significant.

5 Discussion and conclusion

SHRM has grown rapidly as a new and dynamic area within HRM (Liang & Li, 2025). This growth is related to the establishment of Sustainable Development Goals (SDGs) and the pandemic crisis. This study sought to understand if the changes introduced by the recent pandemic crisis to HRM were perceived as positively impacting work performance, and the role of sustainability concerns in mediating this relationship.

The research showed that different HRM practices and policies positively influence various performance dimensions (H1). These results align with existing HRM and performance literature. For instance, Appelbaum et al. (2000) demonstrated that the integrated adoption of HRM practices significantly improves productivity and quality in the context of high-performance work systems. Díaz-Carrión et al. (2020) reinforce this perspective, stressing that well-structured human resources policies aligned with organizational objectives are associated with higher performance levels.

Specifically, our study indicates that task performance is affected by investments in workers' well-being (H1a). This finding aligns with Guest (2017), who emphasizes the importance of well-being practices in promoting motivation and performance in activities related to organizational objectives. Campbell (1990) also argues that policies promoting workers' well-being boost motivation and fulfillment of technical job functions (task performance).

According to our research, contextual performance is impacted by workload and job security (H1b). These results support the arguments of Caligiuri et al. (2020), who identified health and safety as essential elements for sustainability and adaptation in the workplace during times of uncertainty. However, workload has been associated with contradictory effects on performance. Studies such as those by Carnevale and Hatak (2020) suggest that high workloads can reduce well-being and one's ability to contribute to a positive organizational environment. Nevertheless, workload, intensified by organizational demands during the pandemic but supported by increased use of support technologies, may have been perceived as challenging, generating eustress, which is a positive, motivating stress (Hargrove et al., 2015). This could have beneficial effects on performance.

Our study shows that counterproductive work behavior is influenced by job security and how the company manages its customers (H1c). Appelbaum et al. (2000) support the link between workplace safety and reduced

counterproductive behavior, highlighting the importance of adopting clear and safe HRM practices to reduce organizational conflicts and deviant behavior. Our finding that the relationship between customer management and counterproductive behavior can influence the internal climate and employee behavior represents an original contribution.

This study revealed that although HRM practices and policies are significantly related to performance, this relationship is not mediated by sustainability concerns (H2). This finding aligns with Botelho (2019), who reported that, despite lengthy non-financial reports, adherence to sustainability actions by most Portuguese companies is limited. It also aligns with Karman (2020), who stated that many organizations view social and environmental practices as costs rather than strategic investments and use them only to achieve economic goals. However, this view may change as organizations and employees recognize the long-term benefits of sustainable practices (Aguinis, 2011; Jones et al., 2017), which would reinforce Mariappanadar's (2019) arguments about the role of these practices in improving employee motivation and performance. The lack of mediation can be explained by Maslow's (1943) hierarchy of needs, which states that needs are ranked and satisfied according to their priority and urgency. The rise in unemployment was an immediate consequence of the pandemic's economic effects, and technological transformation is a factor in the loss of millions of jobs worldwide (World Economic Forum, 2021). In this scenario, workers prioritize job security over sustainability concerns and actions; therefore, they tend not to neglect their performance. However, dissatisfaction with unsustainable business practices can increase the intention to leave voluntarily, creating future risks for talent retention.

The sample size is a limitation of this study. Although it was balanced in terms of age and professional category, the sample size was relatively small and consisted of workers whose jobs could be carried out in a teleworking regime. This excluded a significant portion of the Portuguese population, including workers in industries such as manufacturing and retail, whose experiences may differ greatly. Additionally, the study was conducted in Portugal, which limits the generalizability of the results to other countries.

For future research, it is suggested that the dimensions of contextual performance and counterproductive work behaviors be explored in greater depth in conjunction with specific HRM and SHRM practices. Including samples from different economic sectors, including those more dependent on face-to-face work, would also be interesting in order to understand the different dynamics surrounding HRM, sustainability, and performance. Complementing the perceptions of workers and managers with a qualitative approach based on interviews or focus groups could be useful. Finally, longitudinal research could assess the influence of changes in HRM practices and sustainability concerns on performance over time in the post-pandemic era.

This study makes important contributions to the HRM literature. First, it analyzes the results of the work performance construct from a three-dimensional perspective rather than a one-dimensional perspective, as has been common in the literature. This allows for the optimization of individual performance management from a behavioral perspective. Second, it demonstrates that various HRM practices impact different performance dimensions. Third, the study addresses the lack of research analyzing the effect of sustainability as a mediating variable on the relationship between HRM practices, policies, and organizational performance. Additionally, it develops specific measures to assess perceived changes in post-pandemic HRM policies, practices, and sustainability concerns. Finally, it opens up new opportunities for future research into the presented dynamics.

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SUPPLEMENTARY MATERIAL

Supplementary Data 1 – Database
Supplementary Data 2 – Codebook
Supplementary Data 3 – Appendix A_Scales
Supplementary Data 4 – Appendix B_Questionnaire
Supplementary material to this article can be found online at https://doi.org/10.7910/DVN/PCBI78

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The authors declare that artificial intelligence (AI) platforms were utilized in various stages of this research to enhance accuracy, efficiency, and overall quality. The specific contributions of AI to this work include:
(X) Enhancing Readability and Proofreading with ChatGPT.
The authors declare that after using this tool/service, they reviewed and edited the content as needed and take full responsibility for the content of the publication.

Authors:
1. Lígia Nascimento, PhD in Management, COMEGI/Universidade Lusíada, Lisboa, Portugal; Intrepid Lab/ISMAT, Portimão, Portugal and CETRAD/UTAD, Porto, Portugal.
E-mail: ligia.nascimento@lis.ulusiada.pt; ligia.nascimento@ismat.pt
2. Cátia Cruz, Master's degree in Human Resource Management and Organizational Analysis, former scholarship holder at COMEGI Research Centre, Universidade Lusíada, Lisboa, Portugal.
E-mail: catiacruz1995@gmail.com
3. Manuela Faia Correia, PhD in Industrial and Business Studies, COMEGI/Universidade Lusíada, Lisboa, Portugal.
E-mail: mcorreia@lis.ulusiada.pt

Authors' contributions:
1st author: Theoretical foundation/Literature review; Statistical analysis; Data analysis and interpretation; Critical review of the manuscript; Writing of the manuscript.
2nd author: Definition of the research problem; Development of hypotheses or research questions (empirical work); Development of theoretical propositions (theoretical essays); Theoretical foundation/Literature review; Definition of methodological procedures; Data collection; Statistical analysis; Data analysis and interpretation; Critical review of the manuscript; Writing of the manuscript.
3rd author: Theoretical foundation/Literature review; Critical review of the manuscript; Writing of the manuscript.