

The role of engagement and knowledge-sharing in the high-performance work systems–innovative behaviour relationship

Work
systems–
innovative
behaviour

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Abstract

Purpose – This paper aims to examine two indirect mechanisms through which employees' perceptions of high-performance work systems (HPWS) foster employees' innovative behaviour (IB). Particularly, this study analyses the sequential mediating role of work engagement and knowledge-sharing in this relationship at the individual level.

Design/methodology/approach – Using researchers and professors working at a Spanish state university as an empirical sample and applying partial least squares structural equation modelling (PLS-SEM), the authors test hypotheses regarding the impact of the indirect and sequential effect of engagement and knowledge-sharing on the relationship between employees' perceptions of HPWS and IB.

Findings – Findings indicate the existence of a sequential mediating effect of work engagement and knowledge-sharing. The authors' results suggest that the existence of engagement is necessary for the influence of HPWS on IB to become effective.

Social implications – The authors' results also highlighted the importance of suitable design and implementation for HPWS so that employees feel motivated and dedicated to their work.

Originality/value – The authors' findings contribute to the understanding of the mechanisms by which HPWS enhance employees' IB, and the results are especially salient in advancing the theoretical understanding of how HPWS, engagement and knowledge-sharing are relevant variables for IB.

Keywords Human resource management, Knowledge-sharing, High-performance work systems, Work engagement, Innovative behaviour, Employees' perceptions

Paper type Research paper

1. Introduction

Universities and research institutes, as knowledge-intensive organisations, develop several key knowledge processes such as knowledge creation, knowledge dissemination and learning (Trifonova and Ronchetti, 2006). Individual lecturers and researchers are key actors in developing these processes, particularly in the case of knowledge creation and dissemination through publications (Fullwood and Rowley, 2017). In this context, learning is essential for academic excellence and innovation to occur (Tan, 2016). In turn, knowledge-sharing is necessary for learning to take place, especially in universities where individuals need to share knowledge in order to further their professional career (Patel and Ragsdell, 2011).



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Knowledge-sharing is an imperative in this type of institutions as it has an impact on collaborative research work (Tan, 2016). Fullwood *et al.* (2019) analyse the factors that facilitate the sharing of knowledge in a university context, highlighting the culture of collaboration, regular face-to-face relationships and trust. According to Chen *et al.* (2011) and Tamta and Rao (2017), an essential aspect that makes employees share their knowledge is engagement. Research has shown that engaged employees can generate higher organisational performance, job satisfaction and greater employee creativity (Harter *et al.*, 2002). In addition, the use of a human resource (HR) strategy and its deployment through HR practices plays a key role in facilitating creativity and, consequently, employees' innovative behaviour (IB), especially in the case of service firms (Laursen and Foss, 2013). Therefore, an increasing amount of research on human resource management (HRM) has focussed on exploring the effects of HRM systems on employees' IB (Alfes *et al.*, 2013b; Agarwal *et al.*, 2012; Radaelli *et al.*, 2014; Sanders *et al.*, 2010; Sanders and Lin, 2016), as well as the factors explaining this relationship (Escribá-Carda *et al.*, 2017; Sanders and Lin, 2016). We suggest, in this work, that engagement plays an important role in explaining this link.

Consequently, the study of HR practices as a driver of knowledge-related processes, in general, and knowledge-sharing, in particular (Collins and Smith, 2006; Sergeeva and Andreeva, 2016), is becoming of utmost importance in extant literature. Most of the research analysing these relationships is conducted in private-sector organisations (Fullwood and Rowley, 2017). However, there is growing recognition of the role that knowledge management can play in public-sector organisations (Brown and Brudney, 2003; Singh Shandu *et al.*, 2011), yet research on knowledge management at universities is very limited (Fullwood and Rowley, 2017; Veer-Ramjeawon and Rowley, 2020).

Universities, at large, are suffering from an increasing pressure to create innovations and generate new knowledge. However, Veer-Ramjeawon and Rowley (2020) affirm that universities not always have an explicit knowledge-management strategy. Thus, it is important to design the adequate context and strategic initiatives in order to promote knowledge processes within them (Sanchez-Barrioluengo and Benneworth, 2019). Particularly, an evolution from the mass rejection of innovation activities to the current situation where academics see innovation and entrepreneurship as part of their duties has taken place in the Spanish university context (Miranda *et al.*, 2017). This impulse towards innovation and knowledge transfer was facilitated by the 2015 Spanish University Strategy (Arias-Coello *et al.*, 2020), which established that universities had to define their mission including knowledge transfer and technology as one of the basic pillars.

From a structural perspective, Spanish universities are highly formalised and have a stable nature, where employees enjoy a high level of job stability and HR policies have not changed much in the last decade. This static nature is clearly conditioned by the Spanish legislative landscape, where Spain is a country with a unitary university structure, with a homogeneous conception of higher education institutions and where higher education laws configure the similar basic structure of universities (Sanchez-Barrioluengo, 2014). As this author summarises Sanchez-Barrioluengo, 2014, p. 1764, "although universities depend on regional government, a model of homogeneity prevails within the Spanish Higher Education system at the national level".

However, Spanish universities have also been affected by successive crises, recession and environmental changes (Pascual and Conejero, 2015). As a result, these events have generated, for example, decreases in the purchasing power of employees (whose salary has been reduced proportionally), an excessive workload (caused by the greater competitive demands of the sector and the reduction in an ageing workforce) and an increasing use of recognition policies excessively linked to individual results. For all of the above, factors such as engagement and the transfer of knowledge that allow professional and intellectual

development are a key tool for motivating and retaining talent and, consequently, acquire a fundamental interest for our study.

Bearing in mind these ideas, our main contribution through this research lies in shedding light on the extent to which employees' engagement and knowledge-sharing act as intermediate mechanisms between HR systems and IB. In addition, we aim to expand on the existing literature showing that there is a necessary sequential effect between engagement and knowledge-sharing in order to explain the link between HRM systems and IB.

2. Theoretical framework

2.1 How HRM systems relate to IB

The study of the relationship between the application of high-performance work systems (HPWS) and IB has become a fundamental topic of interest (Escribá-Carda *et al.*, 2017; Laursen and Foss, 2013). IB is seen as a driving force for organisational effectiveness, efficacy and survival (Scott and Bruce, 1994). Employees' IB refers to the ability of individuals to generate new ideas and viewpoints, which are subsequently transformed into innovation.

HPWS are sets of practices designed to promote firm performance by developing employee skills, motivation and participation (Van De Voorde and Beijer, 2015). Despite a lack of agreement in the specialist literature about the HR practices contained in them (Boxall and Purcell, 2011), numerous important studies on the topic suggest that HPWS are a bundle of practices that normally include and refer to selection, training, career development and motivation practices, such as performance appraisal, pay for performance and job security (Escribá-Carda *et al.*, 2017).

Additionally, when analysing the effect of HPWS on IB it becomes of utmost importance to consider not only how these practices have been designed and applied by managers but also how they are perceived by employees (Alfes *et al.*, 2013a; Bowen and Ostroff, 2004; Ostroff and Bowen, 2016). The way employees perceive how HR practices are applied (e.g. the perception about the usefulness of a training program) is what really causes an actual impact on employees' actions and behaviours.

Diverse authors have analysed how HPWS can encourage knowledge creation and particular behaviours (Kehoe and Wright, 2013) as IB (Bednall *et al.*, 2014; Escribá-Carda *et al.*, 2017; Sanders *et al.*, 2010; Sanders and Lin, 2016). Previous studies establish that there are certain variables (i.e. knowledge and learning processes, motivational aspects, engagement) that act as mediators (Alfes, 2013a, b; Chen and Huang, 2009; Jyoti and Rani, 2017; Radaelli *et al.*, 2014). Thus, based on the analysis of previous studies we assume that the relationship between HPWS and IB is indirect. Therefore, our interest is to study these mediating processes in depth and establish whether there is a sequence in these mediating effects that could explain better the relationship between perceived HPWS and IB.

2.1.1 The role of engagement in the relationship between perceptions of HPWS and IB. Since the seminal work of Kahn (1990), the concept of engagement has gained in importance, leading to the development of multiple definitions, measures, conceptualisations and theories of engagement (Harter *et al.*, 2002; Macey and Schneider, 2008; Salanova and Schaufeli, 2008; Schaufeli and Bakker, 2004). Schaufeli and Bakker (2004) defined work engagement as a positive, fulfilling, work-related state of mind that is characterised by vigour, dedication and absorption. According to Alfes *et al.* (2013a), engagement refers to a positive attitude held by the employee towards the organisation and its values suggest that people become engaged with their work by investing intellectual effort and experiencing positive emotions and meaningful connections with others.

Most of the research analysing the factors that mediate the HR–performance relationship is grounded in the Social Exchange Theory (Alfes *et al.*, 2013a, b; Jiang *et al.*, 2013). According to this theory, Alfes *et al.* (2013a, p. 334) argued that HRM practices as a system and employee

engagement are closely related. HPWS create favourable work conditions and a productive workplace for fostering engagement (Cooke *et al.*, 2019; De Oliveira and da Silva, 2015; Huang *et al.*, 2018; Karadas and Karatepe, 2019). Given that employees feel that their organisation is investing in them through the positive experiences they have of HRM policy and line manager behaviour, they are more willing to reciprocate through high levels of engagement and performance (Alfes *et al.*, 2013b). In the same vein, Huang *et al.* (2018) state that when an organisation employs HPWS, there will be an expectation that employees will return this investment through higher engagement and commitment.

Specialist literature has established strong relations between engagement and individual performance (Alfes *et al.*, 2013b; Bailey *et al.*, 2017; Christian *et al.*, 2011) as well as with IB (Alfes *et al.*, 2013a). Adopting IB requires an important effort on the part of employees and they will only be willing to deploy IB if they are focussed on their work, have energy to perform and feel that their work is challenging (Agarwal *et al.*, 2012). These authors specifically point out that there is a direct and positive relationship between work engagement and IB.

Further research is needed to reveal the mechanisms through which HRM practices impact on individual behaviours like IB. In this vein, Rabiul *et al.* (2021) discuss the factors that mediate the relationship between HR practices and engagement, establishing that this relationship is indirect and takes place through two psychological states, namely, safety and availability. Also, there is some evidence to support the notion that engagement mediates the relationship between HPWS and positive outcomes (Alfes *et al.*, 2013a; Karadas and Karatepe, 2019). We suggest that engagement may be a crucial underlying mechanism in the workplace for explaining the relationship between HPWS and IB, as engagement explains a wide range of behavioural and attitudinal outcomes (e.g. Christian *et al.*, 2011; Rich *et al.*, 2010; Stirpe *et al.*, 2022).

With respect to the mediating role of engagement, previous studies explicitly state that engagement mediates the relationship between the role of the supervisor and IB (Agarwal *et al.*, 2012). These authors showed that perceived organisational support and the presence of adequate job resources (i.e. characteristics) affect IB through the mediating role of work engagement. Therefore, when employees are enthusiastic about their work, they are willing to trial or put forward new ideas.

Salanova and Schaufeli (2008) also found that work engagement fully mediates the impact of job resources on proactive behaviour. The concept of proactive behaviour is implicitly and indirectly related to IB as they (Salanova and Schaufeli, 2008) defined this concept in terms of personal initiative and seeking new challenges. Consequently, work engagement becomes a mediating variable between job design and IB. Using the Social Exchange Theory as a framework, Garg and Sharma (2015) provided empirical evidence of the mediating role of employee engagement in the relationship between HPWS and job performance.

Alfes *et al.* (2013a) studied the role of work engagement as a primary link between HRM practices as individual behaviours. More specifically, Alfes *et al.* (2013b) reached the conclusion that employee engagement becomes necessary if perceived HRM practices are to facilitate employees' IB. Likewise, engaged employees will feel more determined to carry out their work more efficiently, and consequently, they will have time to look for new and improved ways of doing things. Similarly, Huang *et al.* (2018) recognised that the implemented HPWS practices affect the workplace atmosphere and, in so doing, individual moods and attitudes at work undergo change, ultimately generating increased satisfaction with the subsequent effect on employee engagement and behaviours. In turn, Stirpe *et al.* (2022) also showed the mediating role of engagement between HR practices satisfaction and extra-role performance.

Based on the aforementioned arguments, we highlight the mediating role of work engagement in the relationship between employees' perceptions of HPWS and IB. When

employees have a clear perception about established HPWS, they will feel more passionate about what they do, about their work and about the relations they create and nurture with their colleagues and the organisation. This emotional state of employee happiness and vigour may boost their interest in compensating the firm with new (or evolved) behaviour that is more oriented towards contributing with new ideas and viewpoints, as individuals feel that they are in possession of the tools and methods required to effectively do this. Therefore, taking this logic as a starting point we can assume that work engagement mediates the relationship between HPWS and IB and, consequently, we propose our first hypothesis.

H1. Work engagement mediates the relationship between employees' perceptions of HPWS and IB

2.1.2 The role of knowledge-sharing in the relationship between employee perceptions of HPWS and IB. As a knowledge process, knowledge-sharing has been conceptualised in many different ways (Chen and Huang, 2009, p. 108; Yi, 2009, p. 68). According to Van den Hooff and de Ridder (2004, p. 118), it has to do with “the process of mutually exchanging knowledge and jointly creating new knowledge”. As suggested above, this knowledge exchange and creation may be stimulated by HR practices. In this sense and using the Ability, Motivation and Opportunity (AMO) framework, Radaelli *et al.* (2014) state that motivation is a clear antecedent of knowledge-sharing. Employees need to perceive the benefits of sharing knowledge in order to be willing to do it. In addition, they need to acquire or possess the necessary abilities to carry out this process. Likewise, the organisation has to provide them with the context and mechanisms to facilitate knowledge-sharing (e.g. through HPWS). In this sense, Almadana *et al.* (2022) point out that HR practices have the creation of a favourable environment for knowledge-sharing as one of their main objectives. Similarly, Kuvaas *et al.* (2012) found that training intensity increases knowledge-sharing. More specifically, knowledge-sharing requires individuals willing to share new knowledge and experiences. In addition, training actions oriented towards changing values and attitudes in individuals facilitate this knowledge process. In turn, Carmeli *et al.* (2013) argued that knowledge-sharing may stimulate individuals to think more critically and creatively, so they can ultimately generate new knowledge. Therefore, considering that IB requires searching for new ideas, creative thinking, proactivity and risk-taking (Bednall *et al.*, 2014), knowledge-sharing may become an essential process for IB to occur.

Despite the logical arguments set out above, there is scarce empirical evidence to support the idea that knowledge-sharing affects IB (Kamasak and Bulutlar, 2010). In a preliminary attempt to address this issue, Sousa *et al.* (2012) argued that the essence of IB takes place at individual level, as this is where the emotional process of creation occurs. As the process of sharing knowledge implies the development, combination and transformation of knowledge into new practices, the process of innovation begins in individuals who compare new knowledge and new ways of thinking with existing streams of thought (Radaelli *et al.*, 2014, p. 401). As a result, individuals involved in knowledge exchange will try to adopt new strategies and take advantage of new opportunities (i.e. become more innovative). More recently, the work of Anser *et al.* (2022) also sustains this argument and points out that knowledge-sharing affects positively the IB of employees in small businesses.

With respect to the mediating role of knowledge-sharing, there is scarce literature at organisational level that shows the potential mediating effect of knowledge-sharing in the relationship between managerial practices and innovation performance (e.g. Chen and Huang, 2009). Chen and Huang (2009, p. 112) established the positive mediation of knowledge-management capacities between strategic HR practices and innovation performance, considering knowledge-sharing as one of the three components of knowledge management. In addition, recent theorisation in the literature on strategic HRM emphasises that it is precisely the impact that knowledge exerts on individuals that influences the relationship of

HR practices on knowledge-based performance and IB (Bowen and Ostroff, 2004; Minbaeva *et al.*, 2012; Ahmed *et al.*, 2018; Saleem *et al.*, 2023). Hence, the individual level acquires special significance in this new literature stream (e.g. by considering different contexts from the traditional Western economies, like the work of Saleem *et al.* (2023)) and the mediating role of knowledge-sharing becomes particularly relevant. Bhatti *et al.* (2021), using the AMO framework to analyse HR practices, establish (at an individual level) that knowledge-sharing mediates the relationship between HPWS and innovation. Their results showed that the mediation hypotheses regarding ability and motivation practices are met. Also, Anser *et al.* (2021) establish at an individual level the mediating role of knowledge-sharing between knowledge-management infrastructure capabilities (KMICs) and IB. KMICs are defined as “organizational mechanisms for promoting learning activities within an organization” (Anser *et al.*, 2021, p. 462), and this supportive environment is measured through different HR practices as pay for performance, participation, autonomy and continuous training. Similarly, Nguyen and McGuirk (2022) find that commitment mediates the relationship between job control (autonomy), supervisor and co-workers’ support (considered as HR practices) and IB. The research we present here is in line with these approaches.

Thus, we argue that perceived HPWS affect IB through knowledge-sharing, as the perception of HPWS creates the conditions to encourage individuals to share knowledge and subsequently, to display IB. As a result, we put forward the following hypothesis:

H2. Individual knowledge-sharing mediates the relationship between perceived HPWS and IB

2.2 The sequential mediating role of engagement and knowledge-sharing between employees’ perceptions of HPWS and IB

The main contribution of this paper resides in the consideration of a sequential mediating effect of work engagement and knowledge-sharing between employees’ perceptions of HPWS and IB. Scarce literature has analysed the link between work engagement and knowledge-sharing (i.e. Chen *et al.*, 2011; Gupta, 2011; Jacobson *et al.*, 2004). In this respect, Jacobson *et al.* (2004) conducted a theoretical analysis of the organisational factors influencing researcher engagement in knowledge transfer activities at universities. They considered that some HR practices such as promotion, together with a long-term strategy that concentrates on developing a knowledge transfer infrastructure (e.g. resource availability and training opportunities), are the cornerstone for making knowledge transfer engagement into an organisational priority.

Engagement contributes to create and reinforce a collaborative atmosphere based on trust, thus helping to attain the long-term goals of the organisation (e.g. innovation, change, knowledge-sharing) (Song *et al.*, 2012).

Some works have obtained empirical evidence to support the positive relationship between work engagement and knowledge-sharing behaviour (Chen *et al.*, 2011; Gupta, 2011; Tamta and Rao, 2017). In this sense, Yadav *et al.* (2019) reveal that transformational leadership, through engagement, moves employees (freelancers) to a knowledge-sharing behaviour, considering engagement as an antecedent of knowledge-sharing. Additionally, Fullwood and Rowley (2021), through a qualitative work, determine that culture, the creation of a positive environment, socialisation and engagement, contribute, in the ambit of non-profit and voluntary workers, to knowledge-sharing in a formal and, sometimes, tacit way. The work of Fait *et al.* (2023), however, poses that the creation of a knowledge-sharing facilitating environment generates employee engagement. In this particular work, knowledge-sharing is an antecedent of engagement, unlike what occurs in our proposed model.

According to Chen *et al.* (2011), three basic reasons explain the relationship between engagement and knowledge-sharing (Chen *et al.*, 2011, p. 1015): (a) only when employees are

dedicated to their work will they accumulate enough professional knowledge to share with their colleagues; (b) for employees to share their task-related knowledge, they need to care about what they do and believe that it is worth making an extra effort; and (c) when employees are engaged in their work and are enthusiastic about it they will be more willing to share their task-relevant knowledge to further improve their performance. Some other works (Ford *et al.*, 2015) use Engagement theory to put forward a positive relationship between employee engagement and knowledge-sharing. An engaged employee tends to be fully absorbed by and enthusiastic about their job and, as a result, will develop positive actions such as knowledge-sharing. Nevertheless, they add a new approach, that is, the Adaptive Costs Theory (Cohen, 1978, 1980), to analyse the possible negative effects of engagement on knowledge-sharing behaviours. The authors state that “as individuals become more engaged in their job, they allocate more of their attention to specific job tasks. Due to this allocation of attention to in-role task performance, there would be a cost to knowledge sharing performance” (Ford *et al.*, 2015, p. 484), giving less priority to that new task (i.e. knowledge-sharing) that is excessively demanding for the employee.

Therefore, in order to ultimately affect IB, firstly HPWS need to generate work engagement (Alfes *et al.*, 2013b; Huang *et al.*, 2018) and in so doing produce a willingness in employees to share knowledge (Chen *et al.*, 2011). Taking these ideas as a starting point we establish our third theoretical relationship.

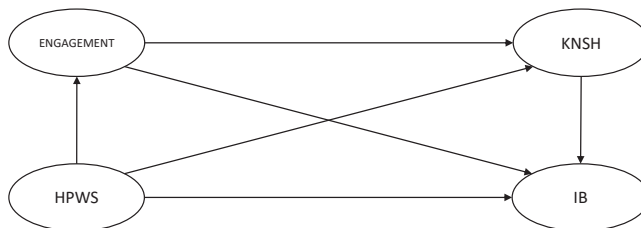
H3. Work engagement and knowledge-sharing sequentially mediate the relationship between perceived HPWS and IB

Figure 1 illustrates the theoretical framework and relationships proposed by this study.

3. Research methodology

3.1 Procedure and sample

A survey was drawn up to measure the constructs involved in this study. All the variables were measured using multiple-item scales (seven-point Likert scales) that had been used in previous studies (Kehoe and Wright, 2013; Kuvaas *et al.*, 2012). The questionnaire was pre-tested with a sample of thirty-one individuals from the same faculty. This pre-test was developed to ensure proper understanding of the items (due to item translation) and to assess the ability of the scales to capture the desired information. The information obtained was used to refine the questionnaire understanding. The final version of the survey was sent by email to a population of approximately 2,500 employees, whose faculties or research institutes agreed to participate in the study and all of them belong to the University of Valencia, university that becomes the focus of our study because of the nature of the work developed in this institution and its relevant position in international research rankings. As we considered individuals to be our unit of analysis, we used primary data sources. The



Source(s): Figure by authors

Figure 1. Theoretical framework

questionnaire was sent to scholars and researchers working in nine faculties and ten research institutes (out of a total of eighteen faculties and twelve research institutes that this university has). The final sample comprised 304 valid questionnaires, what implies a response rate of 12%. Data was collected in 2014–2015. Control variables were also collected from respondents and subsequently double-checked using secondary sources of information. Non-response bias was checked by comparing the characteristics of the respondents to those of the original population sample. A comparison was made to establish whether the differences in demographic variables (i.e. gender and educational level) between the sample and the population were significant. No significant differences were found, which increased our confidence in the representativeness of the sample. Common-method bias was also checked using the test proposed by Kock (2015) for PLS-SEM analysis. In our study, all variance inflator factor (VIF)-level values were lower than 3.3. Therefore, we deemed our model to be free of common-method bias.

3.2 Measures

The scale measuring HPWS was based on Gaertner and Nollen (1989), Vandenberg *et al.* (1999) and Sun *et al.* (2007). This scale referred to five key HR practices: training and development (four items), pay for performance (four items), career development (three items), job security (two items) and participation in decision-making processes (four items). The scale used for measuring work engagement was the short version from the Utrecht Work Engagement Scale: a 9-item scale proposed by Schaufeli and Bakker (2004). The IB measure was obtained from the work of Scott and Bruce (1994) (6 items). Additionally, the scale measuring knowledge-sharing (8 items) was taken from the work of De Vries *et al.* (2006) and used by Kuvaas *et al.* (2012). According to these authors, this scale considers both sides of sharing, namely, providing co-workers with knowledge and obtaining knowledge from co-workers. These scales have been broadly used in the specialist literature (e.g. Kehoe and Wright, 2013).

The control variables used were educational level (Dummy_1: 1 = degree level; 0 = other higher studies; Dummy_2: 1 = PhD level; 0 = other lower studies), gender (1 = male; 0 = female), position (Dummy_3: 1 = teaching and research; 0 = technical and trainee researchers) and tenure in the organisation. The inclusion of these variables was based on previous studies, as they can have an impact on IB (Scott and Bruce, 1994). Table 1 provides a descriptive analysis and correlations of the variables.

3.3 Data analysis

SmartPLS 3.2 (Ringle *et al.*, 2015) was used to test the hypotheses proposed in our model. Bootstrapping with 5,000 subsamples is performed, then the bootstrap standard errors, confident intervals and *p*-values, are used to assess the statistical significance of individual parameters. Besides, to test mediation hypotheses H1-H3, we followed Preacher and Hayes' (2008) recommendations and the process suggested by Castro and Roldán (2013).

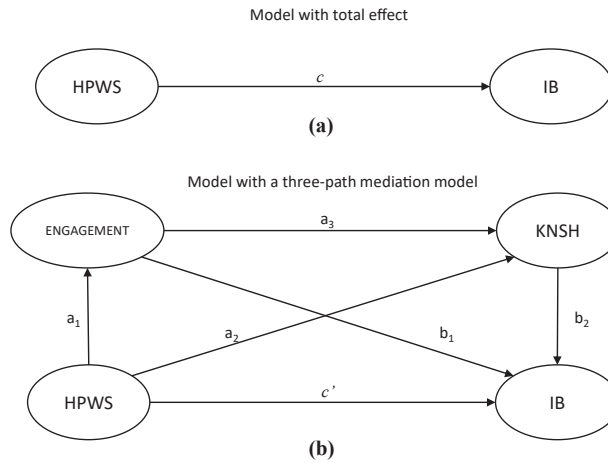
This study focussed especially on testing a three-path mediation model (Hayes, 2009; Taylor *et al.*, 2008; Castro and Roldán, 2013). Figure 2 describe the different effects proposed.

Figure 2a describes the total effect of employee perception of HPWS on IB, with *c* being the path coefficient of HPWS on IB. This total effect may be attained via a variety of direct and indirect forces (Hayes, 2009). In detail, the total effect in Figure 2b can be stated as the sum of the direct and indirect effects, the latter being estimated by the product of the path coefficients for each of the paths in the mediated chain (Alwin and Hauser, 1975). Thus, $c = c' + a_1b_1 + a_2b_2 + a_1a_3b_2$, where the latter three terms are specific indirect effects and their sum is the total indirect effect (Hayes, 2009); whilst *c'* is the direct effect of employee perceptions of HPWS on IB, controlling for both mediators (engagement and knowledge-

	Mean	SD	1	2	3	4	5	6	7	8
1. HPWS	4.43	1.08								
2. Engagement	5.36	1.07	0.29**							
3. KNSH	5.43	1.02	0.16**	0.36**						
4. IB	5.11	1.141	0.25**	0.52**	0.31**					
5. Tenure	13.81	9.91	0.25**	0.10	-0.00	0.03				
6. Gender	-	-	0.09	0.01	0.01	0.02	0.10			
7. D1_Education	-	-	-0.07	-0.14*	0.01	-0.14*	-0.31**	-0.17**		
8. D2_Education	-	-	0.09	0.12*	-0.04	0.16**	0.40**	0.17**	-0.84**	
9. D3_Position	-	-	0.1	0.11	-0.09	-0.05	0.36**	0.14*	0.36**	0.45**

Note(s): * $p < 0.05$ and ** $p < 0.01$
Source(s): Table by authors

Table 1.
Descriptive and
correlation analysis



Source(s): Figure by authors

Figure 2. Three-path mediation model

sharing) (Taylor *et al.*, 2008). In addition, this approach allows the analysis of indirect effects through both of these mediators in a series (H3 a1a3b2) (Van Jaarsveld *et al.*, 2010). Bootstrapping was used to generate standard errors and t-statistics.

4. Results

4.1 Measurement model

The measurement model properties were evaluated according to Hair's *et al.* (2014) recommendations for partial least squares path modelling (PLSPM). All the indicators were significantly associated with their respective constructs ($p < 0.01$) with standardised loadings equal to or greater than 0.7 (Barroso *et al.*, 2010), proving high indicator reliability. Table 2 shows values for internal consistency and discriminant validity. To assess internal consistency, composite reliability (CR) was calculated and average variance extracted (AVE) was used to check convergent validity. All constructs had CR values greater than 0.7 (Bagozzi and Yi, 1988) ranging from 0.83 to 0.94 (Guenther *et al.*, 2023). The AVE values for each construct were equal to or higher than the 0.50 threshold confirming the convergent validity of the measurement model.

Discriminant validity was assessed using two criteria. First of all, we checked that the square root of the AVE values (diagonal bold values in Table 2) was greater than all of the inter-construct correlations. Secondly, we also added a relatively new criterion that considers

	CR	AVE	1	2	3	4
1. HPWS	0.83	0.50	0.71			
2. Engagement	0.94	0.85	0.29**	0.92		
3. KNSH	0.91	0.64	0.16**	0.36**	0.8	
4. IB	0.88	0.60	0.25**	0.52**	0.31**	0.77

Table 2. Convergent validity and discriminant validity

Note(s): Diagonal values are the AVE square roots. Below the diagonal values are correlations between constructs

Source(s): Table by authors

the heterotrait-monotrait correlation ratio (HTMT) developed by [Henseler et al. \(2015\)](#) in which the HTMT values have to be lower than 0.85 ([Clark and Watson, 1995](#)). As illustrated in [Table 3](#), our HTMT values comply with this criterion. We also checked that each item had a greater load on the factor it measured than its cross loadings with the rest of the latent variables ([Henseler et al., 2009](#)).

4.2 Structural model

The structural model was estimated through PLSPM using SmartPLS 3.2. Our study used reflective constructs. Employees' perceptions of HPWS and work engagement were measured as a second-order variable. However, IB and knowledge-sharing were measured as first-order factors.

The predictive relevance of the three dependent variables in the model was assessed using Stone–Geisser's Q^2 ([Hair et al., 2014](#)), which can be measured using blindfolding procedures. As shown in [Table 4](#) below, all dependent latent variables exhibited a Q^2 higher than 0, suggesting the predictive relevance of the model ([Chin, 1998](#)). A power analysis was performed using G*Power 3 ([Faul et al., 2009](#)) to test whether our sample assured a power for the R^2 deviation from zero test that was greater than 80%. The achieved power was greater than 95%.

The R^2 value of the dependent latent variables was used to determine the amount of variance explained by the model (see [Table 4](#)). According to [Falk and Miller \(1992\)](#), this index must be higher than 0.1. As [Table 4](#) shows, all R^2 values are equal to or higher than the threshold: IB ($R^2 = 0.30$), work engagement ($R^2 = 0.10$) and knowledge-sharing ($R^2 = 0.14$).

Results show (see [Table 5](#) and [Figure 3](#)) that four out of the six direct effects described in [Figure 2b](#) are significant. Regarding testing of the hypotheses, the path coefficient of employees' perception of HPWS was not significantly linked to IB ($0.08 p > 0.05$), which indicates, as suggested in previous studies (e.g. [Escribá-Carda et al., 2017](#)), that this relationship does not take place directly.

We applied the analytical approach described by [Preacher and Hayes \(2008\)](#) and [Taylor et al. \(2008\)](#) to test our mediation hypotheses (H1-H3). The indirect effects were specified and contrasted with the mediators (engagement and knowledge-sharing) (see [Table 6](#)). We also checked the total (c) and direct (c') effects of the independent variable (i.e. employees' perceptions of HPWS) on the dependent variable (i.e. IB). As [Figure 3a](#) and [Table 6](#) show,

	1	2	3
1. HPWS			
2. Engagement	0.339		
3. KNSH	0.228	0.391	
4. IB	0.287	0.559	0.361

Source(s): Table by authors

Table 3.
HTMT values

	R^2	Q^2
Engagement	0.10	0.06
KN sharing	0.14	0.08
IB	0.30	0.16

Source(s): Table by authors

Table 4.
Structural model
evaluation

employees' perception of HPWS had a significant total effect on employee IB. When mediators were introduced (Figure 3b), HPWS no longer had a significant direct effect on IB (c'). This means that mediators have an effect on this relationship. Conversely, not all mediating effects show a significant indirect effect. The results show that engagement mediates the relationship between HPWS and IB (H1 a1b1). However, the mediating effect of knowledge-sharing was not confirmed (H2: a2b2). Finally, we found that employees' perception of HPWS was positively associated with higher employee engagement and knowledge-sharing, which relates to higher levels of IB (H3 a1a3b2).

5. Discussion and implications

Our study has focussed on the mediating role that engagement and knowledge-sharing play in the relationship between employees' perceptions of HPWS and IB. We also focussed on the existence of a sequential mediation of engagement and knowledge-sharing in this relationship. With respect to the single mediating role of engagement, the specialist literature (Alfes et al., 2013b; Argawal et al., 2012; Huang et al., 2018; Salanova and Schaufeli, 2008; Stirpe et al., 2022) recognises that work engagement mediates the relationship between HRM practices and employees' attitudes and behaviours such as IB (Alfes et al., 2013a).

Effects on endogenous variables	Direct effect	T-value
HPWS→Engagement	0.31***	5.49
Engagement→KNSH	0.35***	5.05
KNSH→IB	0.15**	2.38
HPWS→KNSH	0.08 n/s	1.13
Engagement → IB	0.45***	8.29
HPWS→IB	0.08 n/s	1.59
D_2_Education → IB	0.23**	2.6
D3_Position → IB	-0.16***	3.11

Table 5. Effects on endogenous variables
Note(s): * $p < 0.05$; ** $p < 0.01$ and *** $p < 0.00$. Note: Only D_2 and D_3 showed a significant effect on IB
Source(s): Table by authors

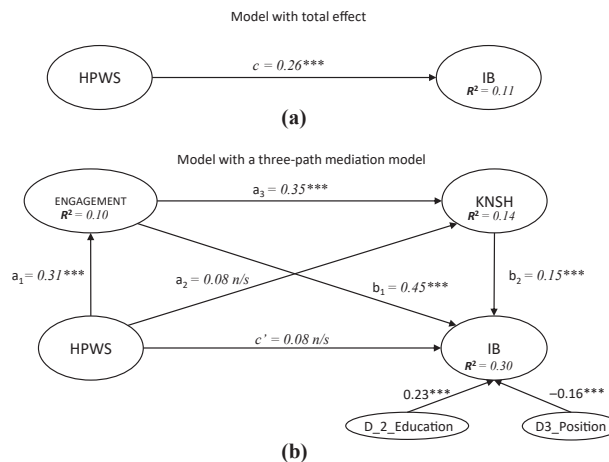


Figure 3. Structural model: results of the three-path mediation model

Source(s): Figure by authors

Total effect of HPWS on IB		Direct effect of HPWS on IB			Indirect effect of HPWS on IB		
<i>Coefficient</i>	<i>t-value</i>	<i>Coefficient</i>	<i>t-value</i>		<i>Point estimate</i>	<i>t-value</i>	
0.25***	4.54	Direct effect:c'	0.08 n/s	1.59	Total	0.17***	4.79
					H1: a ₁ b ₁ (via Engagement)	0.14***	4.44
					H2: a ₂ b ₂ (via KNSH)	0.01 n/s	0.94
					H3: a ₁ a ₃ b ₂ (via Eng + KNSH)	0.02 *	1.74

Note(s): * $p < 0.05$; ** $p < 0.01$ and *** $p < 0.001$

Source(s): Table by authors

Table 6. Summary of the mediating effect tests

Our results clearly run along the same lines (see Figure 3b and Table 5) suggesting that, in the university context, the existence of engagement is necessary for the influence of HPWS on IB to become effective. Only when researchers positively perceive the application of practices such as intensive training (e.g. continuous training programmes, international research stays and exchanges, consultancy projects, etc.), participation in decision-making and collaboration, job security and career development, will they become engaged with their work and intrinsically motivated, as the specialist literature (Fullwood and Rowley, 2017; Fullwood *et al.*, 2019) has suggested. Consequently, these engaged individuals will be more likely to introduce new ideas and approaches in their daily work. It is important to highlight that recent regulations and laws affecting the Spanish public higher education sector as well as the economic recession (dramatically reducing funding for research) may have created indifference and a lack of enthusiasm and dedication in civil servants towards their work. However, in relative terms, working conditions are better compared to many other Spanish economic sectors, which implies that HRM practices as a system (e.g. job security, autonomy and participation in decision-making) can still become a powerful enabler of engagement and, consequently, of IB.

In general, there is insufficient empirical evidence to support the idea that individual knowledge-sharing behaviour can affect IB (see: Kamasak and Bulutlar, 2010) although recently more works have tried to shed light on this phenomenon (Anser *et al.*, 2022). Consequently, our research provides new empirical evidence about the role that knowledge-sharing plays in encouraging IB. In addition, previous studies have suggested that knowledge governance mechanisms, like HRM practices, enhance knowledge mechanisms such as knowledge-sharing (Jansen *et al.*, 2006). The literature also states that knowledge-sharing plays a mediating role between HPWS and IB (Chen and Huang, 2009; Bhatti *et al.*, 2021). However, our results do not support these relationships (see Tables 4 and 5). The results obtained in this research show that there is a positive and significant link between knowledge-sharing and IB; but contrary to previous studies (e.g. Radaelli *et al.*, 2014), the relationship between HPWS and knowledge-sharing is not significant giving no support to the mediating effect of knowledge-sharing in the relationship between HPWS and IB. Partially in line with our results, the work of Bhatti *et al.* (2021) didn't support the mediation for opportunity practices (in the AMO framework) either.

There are some reasons which could explain this result. First of all, the type of HRM practices adopted in Spanish public universities to foster research and specially to pay for performance are more oriented towards compensating individual behaviours and not collective ones. Thus, in many cases, individuals tend to adopt opportunistic and competitive

behaviour, setting aside the sharing of knowledge and cooperation. Consequently, our results can be explained by considering previous research focussed on academia which affirms that the increasingly competitive pressure to generate publications, compete for positions and obtain funding has been shown to lead secrecy and knowledge hiding (Walsh and Hong, 2003; Hernaus *et al.*, 2019). Secondly, there is a lack of culture as well as specific training for Spanish public university-based researchers on knowledge-sharing. Thirdly, these individuals have to comply with an excessive amount of bureaucracy when performing their research work which, ultimately, and taking into account the adaptive cost theory, could disengage them from knowledge-sharing (Ford *et al.*, 2015; Issac *et al.*, 2021). In this sense, the Spanish governmental entities responsible for designing compensation mechanisms for universities and research centres should modify these measures to compensate collective work to a greater extent.

With regard to the sequential mediating effect of knowledge-sharing and engagement in the relationship between HPWS and IB, previous studies have shed light on the relevant role of engagement to promote knowledge-sharing (Chen *et al.*, 2011; Gupta, 2011; Tamta and Rao, 2017). Our results are in line with these studies, as we conclude that work engagement and knowledge-sharing sequentially mediate the relationship between perceived HPWS and IB (see Table 5). This means that HPWS positively affect the degree of engagement of the researchers included in our sample. Consequently, their level of knowledge-sharing is also greater as they feel enthusiastic about their work and are more likely to share and search for new sources of knowledge which, ultimately, affects their creative processes. This means that, in order to avoid knowledge hiding, a recent and relevant topic in the current literature on knowledge (Issac *et al.*, 2021), it is important to foster knowledge-sharing behaviours amongst scholars, so these finally enhance IB.

On the other hand, although our data was collected in the years prior to the pandemic, the context was comparable to the current situation of economic crisis (loss of purchasing power of academics and researchers, increase of controls based on results), and consequently, our results are still valid, given that HR policies have not changed substantially and also given the stability of the staff at the institution (Sanchez-Barrioluengo, 2014). In this respect, our results are still relevant and can make an important contribution both theoretical and empirically. From the theoretical viewpoint, our study extends the outcomes of previous studies highlighting the relevance of work engagement as a necessary condition for knowledge-sharing as a mechanism explaining the relationship between HPWS and IB. In this sense, we recommend the joint consideration of different yet interrelated frameworks such as knowledge management and HRM, as their combined effect can better explain the antecedents of innovation at individual level.

From a practical perspective, our results may contribute to better orientate organisational HRM practices. Our results have shown no significant relationship between the HPWS perceived by researchers and knowledge-sharing. As a consequence, HRM practices should be modified by governmental entities and public universities in order to facilitate knowledge-sharing and IB. This is especially relevant if we see these processes as being essential for universities and research centres set in modern contexts. Spanish universities are relatively flat organisations that permit a high degree of participation and encourage teamwork. However, pay for performance practices are basically focussed on individual and not on collective results. Therefore, it would be wise to design pay for performance practices bearing in mind not only individual contributions but also team performance (e.g. positively assessing manuscripts and research jointly carried out by a research team and not penalising cooperative work).

Additionally, teamwork is encouraged but usually takes place within a department or knowledge area. HRM practices in Spanish universities should be more oriented towards developing lateral coordination mechanisms to facilitate interdepartmental knowledge-

sharing (e.g. creating multidisciplinary research groups, implementing graduate and postgraduate programmes in which individuals from different and diverse knowledge areas can take part, implementing information technology (IT) tools for facilitating communication and knowledge-sharing between co-workers, etc.).

6. Conclusions

In an innovative context such as universities in which our empirical study has been conducted, individuals should be engaged with their institution and, consequently, share knowledge through the different mechanisms that the institution offers them. This sequential effect of both variables should ultimately lead to greater IB. This sequential mediation considers that HPWS perceptions affect an employee's state of mind (their vigour, enthusiasm and dedication to their work) and, consequently, the employee will adopt processes (i.e. knowledge-sharing) and behaviours (i.e. IB) that are encouraged by the organisation. Consequently, if knowledge-intensive organisations want to foster IB in their employees they will need to design and properly implement a set of HR practices which increase the level of engagement of employees as a whole and, simultaneously, reduce the barriers that make it difficult for knowledge-sharing to occur. This is not only valid for the university context but also for any organisation using knowledge as its main competitive resource.

We tested our hypotheses in a knowledge-intensive context (researchers and faculty members) in which knowledge should be shared to obtain better innovation results (e.g. new ways of lecturing, new scientific results, new protocols, new applications). Our results show that for individual knowledge-sharing to take place, employees should correctly perceive HPWS and be engaged with their work. Hence, beyond the university context, our results show that organisations should make efforts to check that there is no gap between intended and perceived HR practices. Our results also revealed that work engagement is necessary for knowledge-sharing and IB to take place and highlighted the importance of suitable design and implementation for HPWS so that employees feel motivated and dedicated to their work. Thus, the main contribution of the research presented here lies in analysing the sequential mediating effect of engagement and knowledge-sharing in the relationship between perceived HPWS and IB from an individual viewpoint.

Despite the contribution of this study, our work has limitations that should be addressed in future studies. Firstly, future research should consider other additional HR practices in the system (e.g. family-friendly and wellbeing HR practices) so as to obtain a more comprehensive perspective of the set of HR actions implemented by organisations. Furthermore, the use of other sources or respondents (e.g. research teams) could also represent a new research avenue. In addition, the use of longitudinal data is needed to confirm the causality assumed in this research. Finally, the application of a qualitative methodology (e.g. case studies) taking our quantitative results as a starting point could help us to forge an in-depth analysis of how the relationship between HPWS, engagement, knowledge-sharing and IB takes place. In this respect, it would be interesting to study how internal communication policies, organisational culture and investment in collaborative IT solutions to facilitate knowledge-sharing affect this relationship.

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