



# Driving intrapreneurial behavior through high-performance work systems

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Accepted: 26 February 2023 / Published online: 11 March 2023  
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## Abstract

Companies are increasingly adopting practices aimed at fostering intrapreneurial initiatives to ensure their survival, seize opportunities, and combat threats. This paper analyzes the effect of employee perceptions of high-performance work systems on intrapreneurial behavior, with potential mediation by knowledge management processes. It also analyzes possible moderation by human resource management (HRM) strength. Hypotheses were tested using partial least squares path modeling (PLS-PM) in Smart PLS 3.3. The analysis was conducted for a sample of 1,885 knowledge-intensive employees working in three banks in Ecuador. The results show that innovative behavior can be enhanced by implementing high-performance work systems. These systems promote sound knowledge management processes. These findings are relevant because they offer guidance to help practitioners promote intrapreneurship. They highlight the importance of high-performance work systems that enhance knowledge management processes, particularly knowledge sharing. The results also show that HRM strength moderates the relationships between high-performance work systems and intrapreneurial behavior and between knowledge management and intrapreneurial behavior. However, in the second of these relationships, the effect is the opposite of what is to be expected. This finding may indicate a need to consider this variable at the group, department, or even organizational level under a multilevel analysis approach.

**Keywords** Human Resource Management · High performance Work Systems · Knowledge management processes · Intrapreneurial Behavior · Intrapreneurship

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## Introduction

Intrapreneurship has become important in both the scientific literature and business practice. It has become especially important in the 21st century due to its contribution to innovation, performance, and organizational competitiveness, as well as economic growth (Elert & Stenkula, 2020; Galván-Vela et al., 2021; Perlines et al., 2022; Yildiz et al., 2021). Firms need to foster entrepreneurial behaviors and establish effective internal entrepreneurial decision-making procedures to defend their market position in turbulent and competitive environments, such as those of developing countries (Melović et al., 2022). Entrepreneurial and intrapreneurial activity can also stimulate sustainable development in a world where it is increasingly important to align economic, social, and environmental goals (Méndez-Picazo et al., 2021).

The term intrapreneurship was introduced by Pinchot (1985) to refer to entrepreneurship by individuals within existing organizations (Glinyanova et al., 2021; Itzkovich et al., 2021). It recognized the role of individuals “who take hands-on responsibility for creating innovation of any kind, within a business” (De Jong & Wennekers, 2008: 9). Since then, the phenomenon has been studied at two levels, firm-level and individual-level, in such a way that nowadays, a distinction is usually made between corporate entrepreneurship and intrapreneurial behavior (IPB), the former being a top-bottom process and the latter a bottom-up process (Antoncic & Hisrich, 2001; DeJong et al., 2011 and 2015). At corporate level, decisions are made, and measures are implemented to promote intrapreneurial behaviors which, in turn, sustain and drive corporate-level intrapreneurship (Canet-Giner et al., 2022; Escribá-Carda et al., 2020; Rigtering & Weitzel, 2013).

In this paper, we adopt the individual and behavioral point of view. Several authors have noted the potential of this point of view for advancing the theoretical literature on intrapreneurship (Gawke et al., 2019; Perlines et al., 2022). That is consistent with the study of human resource management practices as promoters of intrapreneurial behaviors. This issue has relevant precedents, including the works of Hayton (2005), Hayton and Kelley (2006), Schmelter et al. (2010), Tang et al. (2015), and Wang and Zang (2005). Given their special relevance, we focus on employees, referred to in the literature as knowledge workers (Drucker, 2002; Lepak & Snell, 2002) as they are considered to be core employees in an entrepreneurial and innovative company (Hayton et al., 2013).

An increasing number of individuals are realizing that they have entrepreneurial knowledge and skills. While most do not intend to start a new business, they are ideal candidates to become intrapreneurs (Medina-Molina et al., 2022), especially when intrapreneurial behaviors are promoted within the organization.

Intrapreneurial employees develop an anticipatory and innovative vision, recognize opportunities, and push innovation to add value in the workplace within their hierarchy (Blanka, 2019; Carmelo-Ordaz et al., 2012; Chouchane & St-Jean, 2022; Razavi & Aziz, 2017). IPB translates into action through the identification and exploitation of opportunities by individual workers that enable their organization to advance. These employees embrace new logics using opportunistic tactics. They make small changes that are hoped to lead to larger shifts in the broader organization (Heinze & Weber, 2016). Intrapreneurial behaviors generate initiatives that can

spiral upward and influence the performance of teams and the entire organization (Fellnhöfer et al., 2017; Giang & Dung, 2022; Kollmann et al., 2017; Maritz, 2010). The primary behavioral dimensions of IPB that are commonly cited in the specialized literature are innovativeness, proactiveness, and risk-taking (De Jong et al., 2015). However, the literature also discusses creativeness, opportunity recognition, exploitation, and networking (Neessen et al., 2019). More recently, strategic renewal behavior and new business venturing behavior have been cited too (Giang & Dung, 2022).

IPB can be enhanced through appropriate human resource practices (HRPs), especially when they are part of an integrated system or High Performance Work System (HPWS), providing employees with greater capabilities, more incentives and more autonomy to identify and exploit opportunities within the company (Dal Zotto & Gustafsson, 2008; Farrukh et al., 2021; Hayton, 2005; Madu & Urban, 2014; Tang et al., 2015; Teneau & Dufour, 2015; Waheed et al., 2018).

It is also worth noting that HRPs are vital for Knowledge Management (KM), and this knowledge essentially lies in people (Currie et al., 2003; Edvardsson, 2008; Evans, 2003). More specifically, specialist literature shows that HRPs, especially when they are part of an internally consistent HPWS, play a vital role in assisting employees' absorption, transfer, sharing and creation of knowledge within firms (Chen & Huang, 2009). They also foster knowledge acquisition, sharing, interpretation and storing (Jimenez-Jimenez & Sanz-Valle, 2013) and help in knowledge acquisition, sharing, and memorizing (Jyoti & Rani, 2017).

Knowledge Management Processes (KMP) have also been pointed to as a relevant antecedent of intrapreneurship. In this vein, Alipour et al. (2011) stated that knowledge acquisition is crucial to nurturing intrapreneurship. According to Audretsch et al. (2020), investment in knowledge within organizations enables them to accumulate human capital and reach the critical mass of ideas necessary to support entrepreneurial initiatives. Other authors have also expressed similar views (Crossan & Berdrow, 2003; Hayton, 2005; Lin, 2007; Liu & Lee, 2015). Therefore, KM can be expected to mediate in the relationship between HRPs and IPB, as pointed out by authors such as Escribá-Carda et al. (2017) and Mustafa et al. (2016).

Finally, as pointed out by several authors (Canet-Giner et al., 2020; Jia et al., 2020; Ostroff & Bowen, 2016; Sanders et al., 2008; Sanders & Yang, 2016) when analyzing the impact of HRPs on employee behavior, it is necessary to take into account not only the content of the practices themselves, but also the clarity and sharpness with which the intended messages of these practices reach the employees. The Human Resource Management Strength (HRMS) construct first introduced by Bowen and Ostroff (2004) aims to capture the extent to which employees perceive that the HRPs applied are relevant, coherent and consistent. This element is decisive because it gives a clearer perception of what needs to be done when defining an HR strategy, as well as enhancing the effects that HPWS can exert on employees' behavior. Accordingly, most authors posit that this strength enhances the relationship between the HPWS and the desired behavior, moderating this relationship (Revuelto-Taboada & Saorín-Iborra, 2021). Consequently, the present paper analyzes the existence of a moderating role of HRMS both in the direct relationship of HPWS with IPB, and in its indirect relationship through KMP.

Few studies have examined the relationship between HPWS and IPB by considering KMP. Most have only focused on knowledge sharing, thus ignoring other KMP. This study is aimed at overcoming this limitation. This paper also considers the content of HRM practices. It explores the role of the clarity with which they convey a message to achieve the desired behavior of the targeted workers. The research follows a complementary process perspective in which HRMS is an essential construct. The role of strength is still subject to debate in the academic literature. Another interesting feature of this study is the site of the fieldwork, a developing country whose economic and institutional context has little in common with that of countries where most existing research has been conducted. This feature may help generalize the findings of previous studies or highlight possible limitations derived from the influence of context. Therefore, this paper can contribute to a better understanding of a key mechanism companies use to encourage the intrapreneurial behavior of knowledge workers, which is essential to promoting intrapreneurship and innovation in the broadest sense.

In order to achieve the proposed objectives, we have organized this paper into four main sections. The first one develops the theoretical framework through three subsections: the relationship between HPWS and IPB; the analysis of the role of KMP in this relationship; and the study of the role of HRMS in the aforementioned relationships. The methodology is then presented, describing a sample of 1,885 qualified employees working in three banks in Ecuador, detailing the measurement instruments used, and the analysis process carried out using partial least square structural equation modeling (PLS-SEM). In the [results](#) section, we first validate the measurement model, with reasonably good results, and then the structural model, whose outcomes validate most of the hypotheses put forward. These results show that the effect of HPWS on IPB is relevant and significant, but that it mainly occurs indirectly through KMP. HRMS acts as a moderator of the other relationships, although in an opposite direction to what was expected in the case of the HPWS-KMP relationship. Finally, the conclusions, limitations of the study and the practical implications of the results are set out in the last section.

## Theoretical framework

### High-performance human resource practices as drivers of intrapreneurial behavior

Two theoretical frameworks formed the basis for this research: social exchange theory (SET) and the ability-motivation-opportunity (AMO) model. These frameworks support the HPWS-behavior-performance link, which is the basis of the present research model. The AMO model suggests that acting on employees' ability, motivation, and opportunity to perform specific tasks and roles is essential to ensure that employees "go the extra mile" (Appelbaum et al., 2000; Boxall, 2003; Purcell, et al., 2003). Hence, HPWS is essential in promoting the behavior that facilitates success at the organizational level, as shown by Jiang et al. (2012) and Ogbonnaya and Messersmith (2019), among others.

SET suggests that employees who perceive their organizational environment as supportive feel obliged to reciprocate with behaviors that are beneficial to the organization (Cropanzano & Mitchell, 2005; Rhoades & Eisenberger, 2002; Sungu et al., 2019). Firms' investment in employees, in particular through the adoption of HPWS, creates a supportive organizational environment and signals a desire to engage employees in mutually beneficial exchanges and establish trusting, long-lasting relationships (Chang & Chin, 2018; Kloutsiniotis & Mihail, 2018; Sun, Aryee, & Law, 2007; Mostafa et al., 2019). As SET explains, these practices increase the probability of more positive work-related outcomes and a desire to engage in further exchange cycles, inspiring employees' work attitudes and behaviors and making employees feel compelled to reciprocate. In turn, these attitudes and behaviors can have a positive effect on the organization's bottom line (Kehoe & Wright, 2013; Messersmith et al., 2011).

In this regard, many authors point out that the attitudinal and behavioral consequences of HR practices depend on how employees perceive them (Arthur & Boyles, 2007; Kehoe & Wright, 2013; Mustafa et al., 2016). Hence the importance of analyzing the subjective perceptions of individuals in relation to these practices rather than the intended practices that the firm claims to implement (Alfes et al., 2019; Khilji and Wang, 2006; Piening et al., 2014; Wang et al., 2020).

Within this framework, a growing body of research has analyzed the relationships between HR practices and individual-level intrapreneurship or IPB, as a necessary behavioral antecedent of entrepreneurial outcomes that can enhance long-term organizational performance (De Jong et al., 2015; Giang & Dung, 2022; Kraus et al., 2019; Neessen et al., 2019). Researchers who take a system approach to HRM agree that there is a positive relationship between HPWS and IPB (Canet-Giner et al., 2020, 2022; Escribá-Carda et al., 2020; Farrukh et al., 2021; Kühn et al., 2016).

The papers that have analyzed the relationships between the high performance work practices and intrapreneurship phenomena at an organizational level have reached the same conclusions (Messersmith & Wales, 2013; Mustafa et al., 2016; Schmelter et al., 2010; Tang et al., 2015; Zhang & Jia, 2010; Zhang et al., 2008; Yu, 2013). Nevertheless, they have ignored some links in the causal chain linking HPWS, IPB and CE, as they have not considered the individual and group processes that mediate between HPWS and CE.

The implementation and perception of HPWS enables employees to better cope with problems arising from an unstable environment. It also empowers and motivates them to identify and seize opportunities stemming from changes in this environment (Farrukh et al., 2021; Jiang et al., 2012). As HPWS promote more autonomy and the discretionary behavior of employees, there is more scope to pursue opportunities within the firm which is vital to nurturing intrapreneurship (Hayton, 2005; Schmelter et al., 2010; Zhang et al., 2008; Zhang & Jia, 2010). The above leads us to propose the following hypothesis:

*H1 There is a positive and significant relationship between HPWS and IPB.*

## The role of knowledge management in the relationship between HPWS and IPB

Knowledge creation and knowledge management basically reside in people. Therefore, issues related to HRM are vital for the effective functioning of KMP. Most of the studies that analyze the relationship between HPWS and KMP focus exclusively on knowledge-sharing processes (Camelo-Ordaz et al., 2011; Ma et al., 2017; Mustafa et al., 2016;). However, HPWS can facilitate a range of KMP such as knowledge acquisition and interpretation, in addition to knowledge sharing (Cabrera & Cabrera, 2005; Escribá-Carda et al., 2017; Malik et al., 2020; Minbaeva, 2013; Oltra, 2005).

As noted by many authors, HPWS influence employee skills, attitudes, and behaviors, which makes them instrumental in knowledge creation and development within the firm (Currie et al., 2003; Edvardsson, 2008; Evans, 2003; Jimenez-Jimenez & Sanz-Valle, 2013; López-Cabrales et al., 2011). Dal Zotto and Gustafsson (2008), Hayton (2005), and Kuratko et al. (2005) have argued that HRM should facilitate knowledge acquisition and integration to boost the emergence of entrepreneurial opportunities in the firm. Accordingly, HPWS could enhance and activate the stock of knowledge needed to discover and exploit new business opportunities, thus influencing IPB (Canet-Giner et al., 2020; Farrukh et al., 2021; Jahanshahi et al., 2018).

In terms of the KM-IPB relationship, investment in knowledge within organizations helps accumulate human capital and reach the critical mass of ideas required to support entrepreneurial initiatives (Audretsch et al., 2020). KMP and the accumulation of social capital foster entrepreneurial orientation enabling companies to better respond to new opportunities and changes in the environment (Liu & Lee, 2015; Wiklund & Shepherd, 2003). In short, it is widely recognized that organizational learning and the KMP that are essential for this continuous learning are at the heart of intrapreneurship (Crossan & Berdrow, 2003; Hayton, 2005; Lin, 2007).

These arguments seem to clearly indicate the existence of KMP mediation in the relationship between HPWS and IPB. In particular, Mustafa et al. (2016) pointed out the mediating role of knowledge sharing in fostering intrapreneurship and Escribá-Carda et al.'s (2017) results validated the role of the acquisition and interpretation of information in the relationship between HPWS and innovative behavior (an essential dimension of IPB). Finally, Escribá-Carda et al. (2020) showed the existence of knowledge-sharing mediation in the relationship between HPWS and IPB. Although these studies have focused on the analysis of the mediating role of knowledge sharing, there is evidence that the other KMP are also enhanced by HPWS. Therefore, they could also have an effect on IPB. Hence, the following hypotheses are proposed:

*H2 There is a positive and significant relationship between HPWS and KMP.*

*H3 There is a positive and significant relationship between KMP and IPB.*

*H4 KMP mediate the relationship between HPWS and IPB.*

## The moderating role of HRM strength in the relationships between HPWS, KMP and IPB

The HR practices that make up HPWS can be interpreted as communication elements that attempt to “orient” the behaviors of employees and groups toward the standards that best serve the company’s interests. They indicate what type of employees the company needs and actively seeks; what skills and competencies are relevant when selecting, retaining, promoting, compensating and dismissing certain employees; what type of individual and group behaviors and results the company expects from its employees; and how these behaviors and results are evaluated and associated with certain “consequences”.

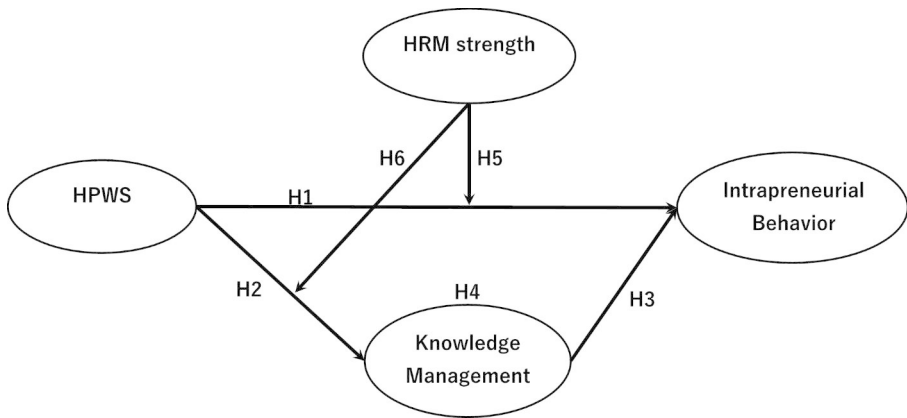
This communication requires a process or set of mechanisms to deliver the message avoiding ambiguities and achieving the right behaviors (Ostroff & Bowen, 2016). Based on this process perspective, Bowen and Ostroff (2004) introduced the construct of Human Resource Management System Strength (HRMS). This HRMS construct has its foundation in Kelley’s (1967) Causal Attribution Theory and the work by Mischel (1973), which states that when individuals have a similar perception about a circumstance, a “strong” situation emerges, generating uniform expectations about appropriate responses and behaviors.

If employees perceive that the practices applied are relevant, coherent and consistent, that is, if they are “strong”, their behavior will be more aligned with the desired standard, and more oriented toward achieving the defined objectives. Greater strength also helps employees to correctly interpret messages, and they are compelled to adopt the behaviors desired by their managers. Therefore, the higher the perceived strength, the stronger the relationship between HPWS and the desired behaviors (Bowen & Ostroff, 2004; Nishii & Wright, 2007). Consequently, HRMS might be expected to moderate the relationship between HPWS and the desired behavior, in our case, intrapreneurial behavior.

However, an exhaustive review of the literature shows that although most of the research assigns this moderating role to HRMS, there are also studies that consider it to be a mediating variable or one with direct effects on the behavioral variable (Revuelto-Taboada & Saorín-Iborra, 2021). This indicates the need for further analysis of these relationships.

On the other hand, although originally the concept of strength was introduced as a contextual, collective, unit-level and organizational property, a large part of the studies that have proliferated during the last decade contemplate strength as an individual perception (e.g., Bednall et al., 2014; Cafferkey et al., 2019; Katou et al., 2014; Sanders & Yang, 2016; Waheed et al., 2018).

Authors such as Ehrnrooth and Björkman (2012) and Farndale and Sanders (2017) considered this perspective to be appropriate (an opinion we share), insofar as perceptions and understanding of situations are idiosyncratic, and the HRM process has signaling effects at individual level. Indeed, Kelley’s (1967) Attribution Theory, which is an essential cornerstone of Bowen and Ostroff’s (2004) proposal, is a theory formulated at individual level, meaning that individual-level effects provide the foundations for higher-level effects.



**Fig. 1** *Proposed model*

**Table 1** Demographic characteristics

| Characteristics    |                              | Frequency | %    |
|--------------------|------------------------------|-----------|------|
| Gender             | Men                          | 823       | 43.7 |
|                    | Women                        | 1,062     | 56.3 |
| Age                | 18–30                        | 1,035     | 54.9 |
|                    | 31–45                        | 726       | 38.5 |
|                    | 46 or over                   | 124       | 6.6  |
| Level of education | University Degree or higher  | 1,354     | 71.8 |
|                    | High School Diploma or lower | 531       | 28.2 |

In short, the above arguments lead us to propose the existence of HRMS's moderating role both, in the direct relationship of HPWS with IPB, and in its indirect relationship through KMP.

*H5 HRMS moderates the relationship between HPWS and IPB. The higher the HRMS, the stronger the relationship between HPWS and IPB.*

*H6 HRMS moderates the relationship between HPWS and KMP. The higher the HRMS, the stronger the relationship between HPWS and KMP.*

All the assumptions made in the previous subsections are summarized in the theoretical model shown in Fig. 1.

## Methodology

### Sample and data collection

The data were collected between late 2018 and early 2019 through convenience sampling. The target population was knowledge-intensive employees from three banks in Ecuador. The financial sector was chosen because innovation and constant renewal



have become crucial within the industry. The importance of these aspects has been especially acute since the 2008 crisis, which led to criticism of this sector because of poor management. The fact that employees are the most important factor affecting customer experience was also decisive. Only three banks agreed to participate. They indicated which employees could be defined as knowledge workers, in collaboration with the research team.

The questionnaire was pre-tested to ensure proper understanding of the items and an assessment of the scales' ability to capture the desired information. The information obtained was used to refine the instrument. The final version of the survey was prepared using the QuestionPro software and distributed by e-mail in coordination with each bank's Human Resource Manager.

Data were collected from 1,885 employees working in different bank departments (marketing, projects, planning, finance, human resources, innovation, information technology, audit and planning), which represented more than 50% of these firms' total workforce. These areas are characterized by having qualified employees whose tasks involve knowledge management. The sample was reasonably balanced in terms of gender (43.7% male; 56.3% female), and 71.8% of the respondents had university degrees or higher qualifications.

## Measurement scales

The 15-item scale developed by Jensen et al. (2013) and validated by Escribá-Carda et al. (2020) in the Spanish context was used to measure perceived HPWS. Gould-Williams and Davies (2005) originally proposed the seven items relating to training and development, selection, teamwork, status, job security, information-sharing and participation. The remaining eight items, relating to development, motivation, communication and empowerment, were developed by Truss (1999). Some examples of items included: "I am provided with sufficient opportunities for training and development" and "Management involve people when they make decisions that affect them."

Knowledge management processes, as generators of organizational learning, were measured with 12 items on the scale developed by Flores et al. (2012) (four items in each of the sub-processes considered). These items were adapted so employees could answer them. As an example: "We have processes to acquire relevant information from outside our company" (information acquisition); "Lessons learned by one group are actively shared by others" (information distribution); "I do not hesitate to question things I do not understand." (information interpretation).

Employees completed a 16-item HRMS scale following Delmotte et al. (2012) and validated by Bednall et al. (2014) to assess HRMS. The scale used six items to assess distinctiveness (e.g., "The HR department undertakes exactly the actions that meet our needs"), six items for HRM consistency (e.g., "HR practices in this organization achieve their intended goals"), and four items for HRM consensus (e.g., "The HR department in our organization takes decisions impartially").

The dependent variable, intrapreneurial behavior, was measured using a 12-item scale similar to that used by De Jong et al. (2011, 2015), and was adapted for first-person responses. The scale consisted of six items for innovative behavior, which were those of the Scott and Bruce (1994) scale, three items for risk-taking (Parker &

**Table 2** Mean, standard deviation, and correlations between variables

|                 | Mean   | SD    | HPWS    | STRENGTH | IPB     | KMP     |
|-----------------|--------|-------|---------|----------|---------|---------|
| <b>HPWS</b>     | 5.516  | 1.283 | 1       | 0.833**  | 0.641** | 0.806** |
| <b>STRENGTH</b> | 5.5371 | 1.332 | 0.833** | 1        | 0.627** | 0.789** |
| <b>IPB</b>      | 5.912  | 0.966 | 0.641** | 0.627**  | 1       | 0.818** |
| <b>KMP</b>      | 5.927  | 0.998 | 0.813** | 0.789**  | 0.818** | 1       |

Note: \*\*  $p < .01$

Collins, 2010) and another three for proactivity (Zhao et al., 2005). Items included “I promote and advocate ideas to others” (innovative behavior), “I act first and then ask for approval, even if I know it might upset other people” (risk-taking), and “I am known as a successful issue marketer” (proactivity).

Finally, two control variables were also included: gender, measured as a dichotomous variable (female 0; male 1), and age, a categorical variable where 1 = 18–30; 2 = 31–45 and 3 = 46 or over.

## Data analysis

Statistical analyses were developed using Partial Least Squares Structural Equation Models (PLS-SEM) using Smart PLS 3.3 (Ringle et al., 2015). This method can estimate complex models with multiple variables. It is oriented to exploring new relationships between variables from models supported by strong theoretical bases, and enables the exploration of mediation and moderation effects (Henseler et al., 2015). When using PLS-SEM, one must first analyze the measurement model, which evaluates the relationships between the indicators and their constructs (validity and reliability), and then the structural model, which assesses the relationships between the constructs addressed and the predictive capacity of the model.

For the measurement model, reliability was estimated through Cronbach’s Alpha, rho\_A and composite reliability (CR) coefficients, convergent validity through external loadings and average variance extracted (AVE) and finally, discriminant validity using the Fornell and Larcker (1981) criterion. For the assessment of the structural model, the explained variance, effect size, predictive effect and the magnitude and statistical significance of the coefficients for each of the paths proposed in the research conceptual model were analyzed.

## Results

### Descriptive analysis

As shown, the correlations between HPWS, KMP, HRMS, and IPB were positive and significant ( $p < 0.01$ ). In addition, the mean values of the key variables in the study were above five (see Table 2), indicating that the employees chosen for the sample were suitable to study the proposed relationships, i.e., KMP, HRMS, HPWS, and IPB were relevant characteristics of their daily activities.

## Measurement model assessment

The study used Cronbach's Alpha, Rho\_A and Composite Reliability (CR) to test the reliability of the constructs. The four variables analyzed showed good levels of reliability and all the coefficients used reached values above the threshold of 0.7 (Nunnally & Bernstein, 1994), implying that the constructs are reliable according to the criteria established in the specialized literature.

Regarding the observed indicators, the criteria used were firstly the external loadings, in which values above 0.707 were considered acceptable. This ensured that the latent variable would explain at least 50% of the indicator variance. However, Social Science researchers usually keep indicators with lower values. In general, indicators with values between 0.4 and 0.7 should only be removed when this improves CR and AVE values (Hair, Hult, Ringle, & Sarstedt, 2014). During the analysis process, one item was eliminated from the HPWS scale (MI1 "There is a clear difference in status between managers and employees in this department"), one item from the KMP scale (ADINFO02 "We constantly compare ourselves with our competitors), and two items from the IPB scale (RISK2 "As an employee, when large interests are at stake, I go for the big win even when things could go seriously wrong" and RISK3 "I act first and then ask for approval, even if I know it might upset other people"), as reflected in Table 3.

Convergent validity assesses whether the different items of a construct measure the same thing, so they should be highly correlated. This evaluation criterion was developed at the level of both constructs and observed indicators. The analysis of variance extracted (AVE) was used as an estimator for the constructs, in which values above 0.50 meant that we could consider that the construct shared more than half of its variance with its indicators and had an adequate level of validity (Fornell & Larcker, 1981). The final values, all significantly above 0.5, are also shown in Table 3.

Discriminant validity seeks to determine the extent to which a construct differs from the other constructs included in the model. The most widely accepted criterion is that the square root of the AVE should be greater than the correlation between the constructs (Fornell & Larcker, 1981). The results are shown in Table 4 and enable us to affirm that this criterion is met.

## Structural model assessment

The results for the structural model are shown in Table 5. A positive and statistically significant direct relationship was found ( $\beta=0.368$ ,  $t=9.956$ ,  $p=.000$ ) for the effect of HPWS on IPB. The effect size was measured according to Cohen's (2013) criteria in which ( $f^2 > 0.02$  is weak;  $f^2 > 0.15$  is medium, and  $f^2 > 0.35$  is high). In this case, although these results provide some empirical support for hypothesis 1, the effect of HPWS on IPB is very weak ( $f^2$  0.008).

Regarding hypothesis 2, the relationship between HPWS and KMP is positive and statistically significant ( $\beta=0.498$ ,  $t=13.199$ ,  $p=.000$ ) and the effect size is medium ( $f^2$  0.146). The results provide empirical support for this hypothesis. Hypothesis 3 was also strongly supported, because the relationship between KMP and IPB is positive and statistically significant ( $\beta=0.906$ ,  $t=33.056$ ,  $p=.001$ ), and the effect size is

**Table 3** Internal consistency reliability and convergent validity

| Constructs and Indicators             | Outer Loading | Alfa Cronbach | rho-A | CR    | AVE   |
|---------------------------------------|---------------|---------------|-------|-------|-------|
| <b>High Performance Work System</b>   |               | 0.953         | 0.954 | 0.958 | 0.711 |
| C1                                    | 0.774         |               |       |       |       |
| C2                                    | 0.831         |               |       |       |       |
| C3                                    | 0.807         |               |       |       |       |
| DC1                                   | 0.814         |               |       |       |       |
| DC2                                   | 0.835         |               |       |       |       |
| ER1                                   | 0.840         |               |       |       |       |
| ER2                                   | 0.800         |               |       |       |       |
| F1                                    | 0.800         |               |       |       |       |
| F2                                    | 0.782         |               |       |       |       |
| MI2                                   | 0.779         |               |       |       |       |
| R1                                    | 0.733         |               |       |       |       |
| REC1                                  | 0.798         |               |       |       |       |
| ST1                                   | 0.641         |               |       |       |       |
| TE1                                   | 0.783         |               |       |       |       |
| <b>Knowledge Management Processes</b> |               | 0.934         | 0.938 | 0.944 | 0.704 |
| AI1                                   | 0.799         |               |       |       |       |
| AI3                                   | 0.705         |               |       |       |       |
| AI4                                   | 0.852         |               |       |       |       |
| DI1                                   | 0.791         |               |       |       |       |
| DI2                                   | 0.803         |               |       |       |       |
| DI3                                   | 0.777         |               |       |       |       |
| DI4                                   | 0.806         |               |       |       |       |
| II1                                   | 0.787         |               |       |       |       |
| II2                                   | 0.791         |               |       |       |       |
| II3                                   | 0.674         |               |       |       |       |
| II4                                   | 0.759         |               |       |       |       |
| <b>HRM Strength</b>                   |               | 0.976         | 0.978 | 0.979 | 0.741 |
| DIST1                                 | 0.800         |               |       |       |       |
| DIST2                                 | 0.856         |               |       |       |       |
| DIST3                                 | 0.853         |               |       |       |       |
| DIST4                                 | 0.838         |               |       |       |       |
| DIST5                                 | 0.898         |               |       |       |       |
| DIST6                                 | 0.859         |               |       |       |       |
| CON SIS1                              | 0.916         |               |       |       |       |
| CON SIS2                              | 0.901         |               |       |       |       |
| CON SIS3                              | 0.878         |               |       |       |       |
| CON SIS4                              | 0.904         |               |       |       |       |
| CON SIS5                              | 0.912         |               |       |       |       |
| CON SIS6                              | 0.909         |               |       |       |       |
| CON SEN1                              | 0.871         |               |       |       |       |
| CON SEN2                              | 0.803         |               |       |       |       |
| CON SEN3                              | 0.800         |               |       |       |       |
| CON SEN4                              | 0.749         |               |       |       |       |

high ( $f^2$  0.729). Then it can be concluded that KMP partially mediates the relationship between HPWS and IPB. The results also show that, after the inclusion of the

**Table 3** (continued)

| Constructs and Indicators       | Outer Loading | Alfa Cronbach | rho-A | CR    | AVE   |
|---------------------------------|---------------|---------------|-------|-------|-------|
| <b>Intrapreneurial Behavior</b> |               | 0.938         | 0.942 | 0.948 | 0.678 |
| Inn1                            | 0.821         |               |       |       |       |
| Inn2                            | 0.878         |               |       |       |       |
| Inn3                            | 0.867         |               |       |       |       |
| Inn4                            | 0.831         |               |       |       |       |
| Inn5                            | 0.811         |               |       |       |       |
| Inn6                            | 0.841         |               |       |       |       |
| RISK1                           | 0.617         |               |       |       |       |
| Proac1                          | 0.820         |               |       |       |       |
| Proac2                          | 0.746         |               |       |       |       |
| Proac3                          | 0.785         |               |       |       |       |

**Note:** \*\*  $p < .005$ ; VIF=variance inflation factor; rho\_A=reliability coefficient; CR=composite reliability; AVE=average variance extracted

**Table 4** Evaluation of discriminant validity through the Fornell-Larcker criterion

| Construct   | HPWS  | IPB   | HRMS  | KMP   |
|-------------|-------|-------|-------|-------|
| <b>HPWS</b> | 0.843 |       |       |       |
| <b>IPB</b>  | 0.641 | 0.823 |       |       |
| <b>HRMS</b> | 0.833 | 0.627 | 0.861 |       |
| <b>KMP</b>  | 0.806 | 0.818 | 0.789 | 0.839 |

**N.B.:** Square root of AVE on diagonal; correlations between constructs are shown below the diagonal

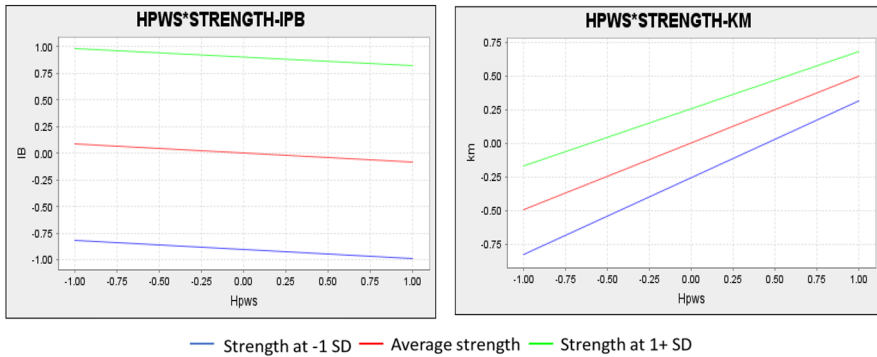
**Table 5** Structural model estimates

| Hypotheses                                       | path coeff. | t-value | p-value | CI     |        | $f^2$ | $R^2$ | $Q^2$<br>predict |
|--------------------------------------------------|-------------|---------|---------|--------|--------|-------|-------|------------------|
|                                                  |             |         |         | 2.5%   | 97.5%  |       |       |                  |
| H1 (HPWS $\rightarrow$ IPB)                      | 0.368       | 9.956   | 0.000   | 0.297  | 0.439  | 0.008 | 0.704 | 0.45             |
| H2 (HPWS $\rightarrow$ KMP)                      | 0.498       | 13.199  | 0.000   | 0.421  | 0.569  | 0.146 | 0.666 | 0.395            |
| H3 (KMP $\rightarrow$ IPB)                       | 0.906       | 33.056  | 0.000   | 0.853  | 0.960  | 0.729 |       |                  |
| H4<br>(HPWS $\rightarrow$ KMP $\rightarrow$ IPB) | -0.084      | 2.894   | 0.003   | -0.143 | -0.033 | 0.038 |       |                  |
| H5 (HPWS * HRMS<br>$\rightarrow$ IPB)            | 0.001       | 0.111   | 0.911   | -0.018 | 0.025  | 0     |       |                  |
| H6 (HPWS * HRMS<br>$\rightarrow$ KMP)            | -0.072      | 3.532   | 0.000   | -0.110 | -0.129 | 0.024 |       |                  |

**N.B.:** CI=Confidence Interval at 95% derived from bootstrapping for 5,000 samples;  $f^2$ =effect size;  $R^2$ =variance explained;  $Q^2$  *predict*=predictive effect.

KMP construct, the impact of HPWS on IPB is weak, negative, and significant at a lower level, opposite to what was expected ( $\beta = -0.084$ ,  $t=2.984$ ,  $p=.003$ ).

The product indicator approach (Chin et al., 1996) was developed to analyze the possible moderating effect of HRMS on the relationship between HPWS and IPB, HPWS and KMP proposed in hypotheses 5 and 6. This uses all the possible combinations of the observed variables in both the predictor and the moderator latent constructs to calculate the interaction effect proposed in the structural model.



**Fig. 2** Interaction of HPWS with STRENGTH on INTRA and KMP

**Table 6** Structural model estimates

| Relationship | path<br>coeff. | t-Value | p-value | CI     |       |
|--------------|----------------|---------|---------|--------|-------|
|              |                |         |         | 2.5%   | 97.5% |
| Gender → IPB | 0.041          | 3.361   | 0.001   | 0.017  | 0.064 |
| Age → IPB    | -0.014         | 1.096   | 0.273   | -0.042 | 0.010 |

**Note:** IPB=Intrapreneurial Behavior; CI=Confidence Interval at 95% derived from *bootstrapping* for 5,000 samples

In the case of the HPWS-IPB relationship, the results reveal no moderating effect of HRMS ( $\beta=0.001$ ,  $t=0.111$ ,  $p=.911$ ). Therefore, hypothesis 5 is not supported. Regarding the HPWS-KMP relationship, the results show that HRMS played a significant moderating role in this relationship. Nevertheless, contrary to expectations, the HPWS-KMP relationship was stronger when HRMS was lower ( $\beta = -0.072$ ,  $t=3.532$ ,  $p=.000$ ). Accordingly, hypothesis 6 is not supported (see Table 6; Fig. 2).

In the structural model assessment, two control variables, gender and age, were also included to analyze their possible effects on the endogenous variable of the model. As shown in Table 6, there is no significant relationship between age and IPB, although there is a weak but significant relationship between gender and IPB ( $\beta=0.041$ ,  $t=3.361$ ,  $p=.001$ ), which seems to indicate that men are more intrapreneurial than women.

Finally, the predictive effect analysis ( $Q^2$  predict) was developed for the antecedent construct in the conceptual model. According to Hair, Risher, Sarstedt and Ringle (2019) values of 0.01, 0.25 and 0.50 indicate small, medium and high predictive relevance, respectively, of the estimated path. In this case, the result states that HPWS and IPB constructs have medium predictive relevance ( $Q^2 = 0.45$ ) and ( $Q^2 = 0.395$ ).

## Discussion

This paper has addressed the study of HPWS as a precursor of employees' IPB, taking into account both its direct and indirect effects, through KMP. The possible moderating effect of HRMS has also been taken into account. For this purpose, knowledge workers' responses in three banks in Ecuador have been considered. It should be noted that Ecuador is still a developing country with a significant cultural and institutional gap between the countries where this type of research is traditionally carried out.

The hypotheses were tested using PLS-SEM structural equation modeling. The results generally confirm the findings of previous research. However, there are some notable nuances. For instance, the results suggest that intrapreneurship can be enhanced through appropriate HR practices and that KMP and HRMS play a relevant role in this relationship. This statement is justified and the results contextualized by the following comparison with findings reported in the literature.

Using quantitative methods, Zhang et al. (2008) and Zhang and Jia (2010) found a positive relationship between HR practices and corporate entrepreneurship (CE) at the firm level in the Chinese biotechnology industry. They did not report the role of IPB and validated the mediating role of perceived organizational support (POS) and organizational citizenship behavior (OCB). Farrukh et al. (2021) showed a positive relationship between HPWS and IPB, partially mediated by POS. Using multiple case studies, Schmelter et al. (2010) analyzed knowledge-intensive German firms and Kühn et al. (2016) analyzed professional service firms. They identified HR practices to foster CE at the organizational and individual levels.

Regarding the role of KMP, as noted earlier, the previous research has almost exclusively analyzed the role of knowledge sharing processes. Mustafa et al. (2016) showed that KS mediates the relationship between HR practices and firm-level CE. Escribá-Carda et al. (2017) validated the partially mediating role of KS in the relationship between HPWS and the innovation dimension of IPB for the case of Spanish researchers. Escribá-Carda et al. (2020) and Canet-Giner et al. (2022) showed that KS mediates the HPWS-IPB relationship in knowledge-intensive firms. This study examined the mediating role of all KM processes (not only KS) in the HPWS-IPB relationship. The results are in line with those of similar studies.

The results of the hypotheses on the moderating effect of strength were opposite to those expected, in general. HRMS did not moderate the HPWS-IPB relationship and moderated the HPWS-KMP relationship with an effect that was opposite to what was expected: the greater the HRMS, the weaker the relationship between HPWS and KMP. Similarly, previous research has provided varied results. For example, Bednall et al. (2014) found a positive moderating effect of HRMS on the relationship between performance appraisal quality and the innovative dimension of IPB in the education sector. For a sample of faculty members, Waheed et al. (2018) obtained similar results, although they considered psychological empowerment (PS) as a mediating variable. Sanders and Yang (2016) found similar results to Bednall et al. (2014). However, they analyzed the system of HRM practices, not a single practice, for a sample of 639 employees of 42 Dutch organizations.

In this regard, it should be recalled that this paper did not analyze strength as a collective (and shared) property of the HRM context, as proposed by Bowen and Ostroff, (2004) and Ostroff and Bowen (2016), among others, but instead assessed the individual perceptions of employees regarding strength, in line with the majority of the specialist literature (Bednall et al., 2014; Cafferkey et al., 2019; Katou et al., 2014; Waheed et al., 2018). In this case, there may be significant inter and intra-departmental variability in employee perceptions. In our case, HRMS was the variable with the highest standard deviation. This could be indicative of the need to consider this variable at group/department or even organizational level, adopting a multilevel analysis approach as recommended by some authors (Dello Russo et al., 2018; Sanders & Yang, 2016).

On the other hand, it should be noted that higher strength is related to homogeneity when implementing HRMPs aimed at different employees at different times throughout the organization. Conversely, some authors recommend different HR configurations of practices depending on, for example, the uniqueness and value of the human capital provided by the employees (Lepak & Snell, 1999, 2002). From another perspective, knowledge workers could be considered worthy of more robust investment compared to other employees, because of their greater capacity to contribute value to the organization, and the specificity of the knowledge resources they possess. This would explain why high strength reduces the effect of the HPWS applied to knowledge workers in KMP. In any case, the study of strength in its different definitions and the study of how companies manage multiple HR configurations simultaneously are certainly important areas of interest for HRM research (Lepak & Shaw, 2008; Revuelto-Taboada & Saorin-Iborra, 2021).

## Conclusion

The results imply that the total effect of HPWS on IPB is positive, although this effect essentially occurs through KMP, which mediates this relationship. Once KMP are considered, the relationship between HPWS and IPB becomes weak, less significant, and, contrary to expectations, negative. In short, the results show that IPB can be promoted using HPWS because of the effect on KMP. The results also show that proper management of KMP is essential to promote IPB. Consequently, as explained in the section on implications, HRM managers should adopt specific measures to build strong KMP and promote IPB.

Regarding the moderating role of HRMS, given the variability between employees' perceptions of HPWS and HRMS, HRMS should be considered a collective property of the HRM context, measured at the group or department level rather than the individual employee level. Differences in interpreting and implementing HPWS among middle managers can lead to significant differences in practices, as well as the interpretation of messages conveyed to employees. Less consistent or more erratic implementation may lead to different levels of strength at the group level and different interpretations of expected behaviors.



## Theoretical implications

For researchers, the present paper extends analysis of the relationships between HPWS, KMP, and IPB, providing evidence of how an internally consistent set of high-performance HR practices can boost IPB as long as they can influence the quality of KMP. KMP plays a key role in the relationships considered in this study, so the effect of each one should be analyzed individually, as well as in conjunction. The results also highlight the need for further analysis of HRMS. There are alternative conceptions of the construct: as a collective property of the context versus the individual perception of strength. However, there is still no consensus on whether it plays a moderating role, as proposed in the hypotheses in this study. The mediating role and its direct effects on behavior should be considered. This gap is indicative of the extent of the need for further research. The individual and collective perspectives should be considered when analyzing variation in the HPWS-behavior-performance link.

## Practical implications

It is also worth mentioning a series of practical implications mainly for general managers and human resource managers, but also for middle management given their responsibility as leaders and implementers. Achieving good results in terms of intrapreneurship requires the formulation and proper implementation of good HPWS, especially investment in training (Medina-Molina et al., 2022), that can improve KMP. It is essential for managers to encourage learning and knowledge-sharing processes and to develop an intrapreneurial culture in their departments.

To this end, it is advisable to implement HR and KM practices that: (a) facilitate the recruitment, selection and onboarding of employees with appropriate competency profiles; (b) improve training and development intensity, with special emphasis on specific knowledge and creative techniques; (c) encourage a certain degree of polyvalence and autonomy; (d) develop assessment and reward systems that value knowledge sharing and intra-entrepreneurial behaviors; (e) foster a teamwork culture; (f) define formal processes for knowledge exchange between individuals and groups; (g) promote risk-taking; (h) reduce the anxiety generated by innovative activities; and (i) foster exploratory learning from and through “errors”. However, these initiatives must be adapted to the specific cultural and institutional environment of developing countries such as Ecuador. In these countries issues such as power distance can undermine the effectiveness of empowering initiatives and participatory processes.

Implementing the aforementioned practices is especially important in the case of service industries such as banking because human service is what most affects customer experience. Human-related service innovations are at the core of intrapreneurship. They have a stronger effect on customer satisfaction and delight, which is essential for business success, than on technology-related service innovation (Tai et al., 2021). Conversely, at present, banks are becoming proactively engaged in sustainable activities as part of their strategy to create value and improve their public image, which was heavily damaged by the 2008 financial crisis (McDonald & Lai, 2011). To do so, banks must renew and reinvent both processes and services using a

sustainable innovation model. In such cases, it is essential to mobilize organizational talent and promote intrapreneurial behaviors.

Concerning the gender differences identified in the study, it should be noted that they often require specific actions, especially in terms of eliminating “glass ceilings” and gender biases, which limit the progress of women, reduce their ability to deploy their talent, damage their self-confidence and, consequently, their perceived entrepreneurial self-efficacy. In this area, policies are needed to guarantee equal opportunities, regardless of gender.

## Limitations and future research

The first of the main limitations of the study has previously been stated. It relates to the analysis of strength. As mentioned earlier, the results seem to suggest that this variable should be considered at the group, department, or even organizational level, adopting a multilevel analysis approach. Such an approach would enable analysis of the differences that may exist at the group, department, and organization levels.

Secondly, it is worth noting the problems that can arise from using a self-report questionnaire as the single source of information. This fact increases the likelihood that common method variance will artificially inflate the relationships between variables (Podsakoff et al., 2003). Nevertheless, several measures were taken to minimize this effect. First, qualified employees in knowledge-intensive areas and jobs with the potential to create innovative initiatives and discover new opportunities answered the survey. In addition, following Podsakoff et al. (2003), several design solutions were adopted such as ensuring anonymity, reducing item ambiguity, separating pages to measure independent and dependent variables, encouraging honest opinion with no right or wrong answers, and including verbal label scales.

Finally, the cross-sectional nature of the research conducted also poses a limitation, since it implies that associations can be made between the variables observed, though a clear cause-effect linkage cannot be established. To solve this problem, it would be necessary to carry out longitudinal studies that could analyze the effects of HPWS over time, since practices designed to boost intrapreneurship require some time to be implemented and properly interpreted.

**Funding** Open Access funding provided thanks to the CRUE-CSIC agreement with Springer Nature. Open Access funding provided thanks to the CRUE-CSIC agreement with Springer Nature.

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