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Human Resource Management Contributions to Knowledge Sharing for a Sustainability-Oriented Performance: A Mixed Methods Approach

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Abstract: This research examines how internal and external Human Resource Management (HRM) contributes to Knowledge Sharing (KS) in order to reach Sustainability-Oriented Performance. This paper uses a mixed methods approach to report on the main antecedents of KS for Sustainability-Oriented Performance. There are many antecedents of KS both inside and outside organizations that are as yet unidentified. This research applies two complex statistical techniques, namely, structural equation modeling (SEM) (Study 1) and fuzzy-set Qualitative Comparative Analysis (fsQCA) (Study 2). First, SEM is used to determine the antecedents of KS for Sustainability-Oriented Performance: Affective Commitment (AC) (an internal dimension of HRM) and a collaboration-oriented Human Resource Management system (CHRMS) (an external dimension of HRM). Second, three multi-group SEMs are used to determine whether a manager's characteristics (age and gender) and firm size moderate the relationship between KS and its antecedents. Finally, an fsQCA is conducted to identify alternative configurations that lead either to KS or to its absence. The sample comprises data from an online survey of 367 certified innovative Portuguese small and medium enterprises (SMEs). The SEM results show that a collaboration-oriented HRM system always has a positive effect on KS for Sustainability-Oriented Performance. In addition, if the manager is a young man working in a small firm, their AC positively affects KS. There are alternative configurations that lead to the presence or absence of KS. There is, therefore, empirical evidence for the moderating effects of the manager's age and gender, and firm size. Our study offers improved new HRM configurations and results when compared to the sole use of traditional quantitative statistical methods. The results are consistent and conclusive.

Keywords: knowledge sharing for Sustainability-Oriented Performance; affective commitment; collaboration-oriented human resource management systems; mixed methods; structural equation modeling; fuzzy-set qualitative comparative analysis

1. Introduction

Firms from industrialized countries are experiencing constant changes (new competitors, technological changes, globalization ...) in the competitive context that lead to the strengthening of certain factors, mainly those focused on knowledge. Among the main actions is to invest in the construction of new knowledge and relationships offered by internal and external collaborators. Knowledge is a primary strategic organizational resource [1] that fosters the creation of organizational value [2]. For example,

knowledge can help to improve and implement new technologies within the organization, and it can contribute to actively improving the development and implementation of new environmental practices to obtain sustainable results. It is especially important in our current context of broader pressures for a more sustainable world, requiring new collaborative strategies and new shared resources.

Knowledge sharing is a dynamic process with employees, clients, groups, organizations and other stakeholders. Firms use internal and external tools to promote this sharing of information. Inter-organizational knowledge sharing can bring many benefits, such as new products, lower costs, better manufacturability and better quality products or sustainable performance [3], but can also lead to knowledge spillovers and leakages [4]. Therefore, the study of internal and external human resources is relevant for changing knowledge sharing.

Knowledge sharing among employees and external partners allows firms to capitalize on knowledge-based resources; thus, sharing knowledge becomes a fundamental process that firms should constantly pursue to sustain their competitiveness and sustainable growth.

However, knowledge sharing is a key factor in establishing a competitive advantage. Today, there is a confused perspective about internal and external knowledge sharing because of the failure of employees and business partners to share their extant knowledge effectively due to their failure to compromise or maintain good relationships. In short, there is fear of sharing knowledge.

Therefore, we need to understand what are the ways and mechanisms to share knowledge. In this line, empirical research on this domain remains rather scarce. In addition, there are no studies that jointly evaluate the direct backgrounds (internal or external) that influence shared knowledge, as well as the combinations or optimistic paths that lead companies to want to share knowledge. However, firms should adapt to the turbulent market conditions and reorganize their resources and size to retain their sustainable competitive advantage. Therefore, the question that emerges is how manager's age, manager's gender and firm size alter the contribution of knowledge sharing for Sustainability-Oriented Performance, among others.

In this line, there is some debate over the antecedents that inform knowledge sharing (KS) between firms, so we analyze: (i) What are the key individual and internal human resource management variables that can lead to knowledge sharing between firms? (ii) What is the key inter-organizational and external HRM variable that can lead to KS between firms? (iii) Are there other contingency variables (related to the manager or to the firm) that can improve KS? Inter-organizational KS is a complex and dynamic process that involves different organizational levels. This process needs an initial phase to obtain resources at individual level. For example, when employees have more technical abilities and identify more closely with the firm through their involvement and emotional attachment or values, that is to say affective commitment (AC), they may be able to contribute and share more knowledge. In other more advanced phases, we need to obtain resources at organizational and inter-organizational level. For example, when the firm has a collaboration-oriented HRM system (CHRMS) with external stakeholders and partners, it may be sharing new knowledge with other firms for joint Sustainability-Oriented Performance. This theoretical conceptualization therefore reflects a broader background that includes internal and external human capital leading to KS between firms. KS refers to the firm's ability to exploit information from business partners or identify internal or external market opportunities [5]. Inter-organizational KS enables firms to achieve a sustainable competitive advantage in rapidly changing environments [6].

This study shows a full model to advance the understanding of KS. We identify two important variables at different organizational levels, which is uncommon in the literature [7]. We consider that AC and CHRMS are the two key precursors for KS development. Our model is supported by the resource-based view (RBV) of the firm and its extension theories (knowledge-based view—KBV). In addition, our model considers the possible effects of a manager's personal characteristics (age and gender) and firm size [8]. The study of inter-organizational KS through only internal human capital gives an incomplete view, so this paper shows new external ways to generate KS, for example, CHRMS. Currently, firms work in an interconnected, complex and dynamic world where the ability to exploit

the information and knowledge of trading partners is relevant to identify market opportunities and contribute among all to more sustainable growth [5].

From an internal HRM perspective, firms use new practices and procedures to lead human resources into KS [9]. Firms use an employee's AC to generate feelings of trust, attachment, comfort and commitment. This way can lead employees to provide greater collaboration, learning and engagement; in short, a greater ability to share knowledge with their colleagues [10,11]. From an external HRM perspective, firms use new practices and procedures for prompting collaboration among its HR to stimulate KS. Firms use partnerships and alliances with different stakeholders outside the firm, that is, CHRMS, to generate new agreements, information, products or new Sustainability-Oriented Performance; in short, a greater ability to share and acquire new knowledge between firms [12]. Therefore, if firms succeed in implementing stronger internal and external Human Resource Management (HRM) mechanisms at different levels of analysis (individual, organizational, and inter-organizational), they may acquire important sources for developing inter-organizational KS, which can be considered a new dynamic and changing capability obtained from two important internal and external HRM variables: AC and a CHRMS. KS can help to obtain and share new resources, information, projects, and products, or improve existing ones, or even for firms to obtain more sustainable results that contribute to the three objectives of sustainable development (economic, social and environmental growth) [6].

From the perspective of a sharing economy, KS can strengthen the competitive position of firms in complex environments, helping them to better adapt to change. In addition, collaboration between companies allows faster progress in detecting new market opportunities and developing sustainable new products. It can also prevent the use of abusive and opportunistic practices. This means that KS will also allow companies with less ethical behavior to be ousted from the market and can contribute more easily to the common good and sustainable growth [13]. Furthermore, a manager's characteristics (age and gender) and firm size can affect KS between firms. This paper presents age, gender and firm size as possible moderators of the relationships between an internal HRM variable (AC), an inter-organizational HRM variable (CHRMS), and KS [14,15].

This paper analyzes an internal and individual antecedent (AC) and an external and inter-organizational antecedent (CHRMS) that lead to inter-organizational KS [16]. Few studies consider both the internal and external HRM contributions to KS or their effects at three organizational levels. In order to uncover how companies reach KS, we need to study the KS sources and the organizational background. Thus, a study involving both the internal and external antecedents of KS may provide a picture on the strength and influence of each of those. We believe that a complete study on KS antecedents should not only estimate the direct relationships of antecedents to KS, but also reveal the configurations of antecedents that lead to KS. Therefore, this research presents a clear breakthrough in the study of KS, exposing the factors and the factor configurations influencing KS. The study of KS is of special interest to obtain new results in terms of innovation and Sustainability-Oriented Performance, among others. First, we apply structural equation modeling (SEM) to determine the joint effect of the internal and external HRM antecedents of KS (Study 1). Second, we apply multi-group SEM to determine a manager's characteristics and firm size as moderators of the proposed relationships. There are characteristics such as age, gender or size that can enhance the relationships raised. Although in some situations it may be a controversial issue, our work is committed to elucidating and discovering what are the facilitating factors of KS. Additionally, we apply a fuzzy-set Qualitative Comparative Analysis (fsQCA) to identify alternative configurations that lead to KS or its absence (Study 2). This paper contributes to the theoretical and empirical literature on KS in the following ways: the main contribution is the identification of two key HRM antecedents inside and outside the firms, and the individual and organizational/inter-organizational levels that contribute to KS. Specifically, this paper considers how the AC of employees and a CHRMS of external partners may shape the level of inter-organizational KS [17]. Second, the integrative model proposes the existence of two individual variables (manager's age and gender) that may moderate the relationships between AC, CHRMS and

KS. We therefore discover that if the manager is specifically a young man working in a small firm, the relationships in the model improve significantly. Third, we discover alternative configurations that lead to KS, as well as those that lead to its absence (or reluctance). Fourth, we make an important contribution to the empirical literature by testing the model through a mixed methods approach, which produces more solvent and robust results. The application of mixed methods makes us discover new paths that lead to KS. In this sense, testing the models by both approaches leads to the same conclusions. On the one hand, we apply a quantitative method to verify the model's hypotheses on KS (H1–H5). On the other hand, we apply a qualitative method to identify alternative pathways within the proposed model that lead to KS (H6, H7). In addition, this paper uses primary information from managers of certified innovative small and medium enterprises (SMEs) in Portugal. Accordingly, this study uses a database of innovative firms because HR and KS are the two cornerstones of such firms [18].

This paper continues as follows: Section 2 shows the literature review. Here, you can see the main theoretical approaches, constructs and hypotheses. Section 3 shows the sample characteristics, the measurement assessment and the two statistical methods that are used (SEM and fsQCA). In Section 4, the analysis and results are shown. Finally, Section 5 includes a discussion and conclusion, implications for researchers and practitioners, limitations and a guide for future research.

2. Literature Review and Hypotheses

In recent years, one of the key topics tackled by sustainable development discourse concerns the interrelated relationship between knowledge, firms' technologies and sustainability. The implementation of new knowledge and information technologies has been deemed as a necessary condition for the successful application of new environmental practices. New collaboration practices or new knowledge are often the means through which organizations can actually achieve a Sustainability-Oriented Performance. Therefore, we propose the following research questions:

- Does AC lead SMEs to adopt a philosophy of KS?
- Does having a CHRMS lead SEMs to adopt a philosophy of KS?
- Can internal and external dimensions of HRM jointly contribute to the development of KS for a Sustainability-Oriented Performance?
- What are the manager's characteristics and the most adequate firm size that lead to KS?

The RBV of the firm [19] highlights a firm's internal factors as a source of sustainable competitive advantage. This approach shows that, among these internal factors, the most important ones are intangible and unobservable, such as skills, competences and organizational culture. These resources have certain characteristics—for instance, scarcity, value, imperfect imitability, irreplaceability and rent appropriation—which are of crucial importance as a source of sustainable competitive advantage [20]. When exploring such resources and capabilities, we follow an approach derived from the RBV, the KBV, and thus we give great emphasis to the contribution of knowledge. Some authors define HR as employees' knowledge, experience, skills and commitment, as well as their relationships inside and outside the firm. Intellectual resources include many aspects [21] formed by employees' knowledge, skills and experience. Other authors, such as Youndt et al. [22], indicate that they comprise people's knowledge, skills and experiences, and other resources from networks, as well as institutionalized and codified knowledge.

The literature does indeed address KS [23], but few studies involve internal and external HRM variables or consider different levels (individual, organizational, and inter-organizational). Following Jeon et al. [24], we propose two HRM practices that occur inside and outside of the firm at two different levels (individual and organizational/inter-organizational). We propose that KS cannot be explained solely on a single analysis level. Both the RBV and the KBV show that intangible internal factors such as AC are an important source of competitive advantage because AC has unique and imitable characteristics whereby one or several firms can obtain new knowledge [20]. AC is part of emotional capital [25].

From the perspective of human relationships, cooperation systems and the social exchange approach [26,27], the main objective is to analyze the networks and links inside and outside of firms. This paper examines external HR relationships. This approach shows that external inter-organizational relationships such as CHRMS are relevant and additional sources of sustainable competitive advantage because they can generate new information and new knowledge. A collaboration-oriented HRM system is based on the original theorizing of the alliance employment mode, partnership employment, and a collaborative HRM configuration [28]. CHRMS is part of relational or social capital [25].

This paper considers knowledge to be the most important and special resource for sustainable competitive advantage both intra and inter firms. Therefore, a firm or several firms can acquire, transfer, and incorporate context-specific knowledge via inter-firm cooperation [29]. At an individual level, AC serves internal HRM by generating new KS. CHRMS at organizational level serves external HRM by generating new inter-organizational KS. Accordingly, our research model considers the broadest definition of knowledge inside, outside, and between firms [30,31]. We define KS as the knowledge that a firm or several firms can acquire, transfer, and incorporate via inter-firm cooperation and networks. KS is part of intellectual capital [25]. Accordingly, we have the support of the RBV and the KBV to consider KS from an internal perspective, and we have the support of Human Relations Theory and Cooperative Systems to consider KS from an external perspective. Both theoretical approaches are necessary and complementary to explain the KS contribution for a Sustainability-Oriented Performance. Table 1 shows the theoretical approaches that support this research.

Table 1. Theoretical approaches.

Approach	Characteristics	Human Resource Management (HRM)	Authors
Resource-Based View (RBV-KBV)	Importance of HRM (knowledge) for the development of knowledge sharing for Sustainability-Oriented Performance	Affective Commitment (AC) Knowledge Sharing (KS)	Grant and Baden-Fuller [29]
Human Relations Theory and Cooperative Systems	Importance of relationships and collaboration for the development of knowledge sharing	Collaborative HRM System (CHRMS)	Van Dijk et al. [26]; Wu and Lee [27]

This paper contributes to the development of both knowledge management and human resource management literature. Furthermore, we propose that the success of knowledge management initiatives is essentially grounded on having employees and external partners who are prepared to share their knowledge for new opportunities. We suggest that HRM dimensions can be used to improve our understanding of what shapes the willingness (or reluctance) of employees and external partners to share their knowledge [17].

2.1. Commitment and Affective Commitment

Commitment lies at the heart of all kinds of human relationships. This construct can be applied in different environments: social exchanges, personal relationships, business relationships, teamwork, school relationships, family relationships, and even among friends.

The literature presents many definitions and dimensions. The most important definition of commitment within the field of management is the Three-Component Model of Commitment (TCM) propounded by Allen and Meyer [32]. In this model, commitment is composed of the following: (a) affective commitment; (b) continuance commitment; and (c) normative commitment. These can be defined as follows, respectively:

(1) Identification with, involvement in, and emotional attachment to the organization.
(2) Retention of the employee because of the high costs of leaving.
(3) Reflection of the decision to remain out of a feeling of moral obligation.

This paper examines affective commitment because it seems to be the most powerful commitment through which a firm can retain talent and knowledge [33]. Authors such as Meyer et al. [34] show that affective commitment is highly beneficial to the firm. In addition, affective commitment is strongly associated with good behaviors [35], e.g., sharing new knowledge, mutual help, making extra effort, and ethical conduct [36,37]. We therefore propose that affective commitment is an important driver of KS [10,11].

2.2. Collaboration-Oriented Human Resource Management Systems

CHRMS are based on the development of connections and quality relationships with external stakeholders and partners [38]. We understand that HRM should be studied from both an internal and an external approach at different levels (individual, organizational, and inter-organizational). CHRMS is based on alliances, relationships between partners, exchange of information or collaboration [28,39], e.g., all the relationships with external institutions such as universities, firms or the government.

Therefore, on the one hand, we have internal HRM oriented toward affective commitment; on the other, we have external HRM outside of the firm oriented toward collaboration with other stakeholders. Both forms of HRM are key antecedents of KS. However, if AC is an important internal source of KS, can a CHRMS be even more useful for generating KS? Authors such as Ashok et al. [12] argue that a CHRMS is conducive to the search for external knowledge.

Managing affective commitment is a way of generating KS; it is one way, but not the only one. Firms build collaborative alliances and links with different stakeholders. Through these new alliances and relationships, firms create new and valuable KS and, consequently, new intellectual capital. This paper proposes a full research model that includes internal and individual human capital through AC, and external and inter-organizational human capital through CHRMS. Firms need to develop internal and unique HRM, but they also need to cooperate in the search for the common good. Relationships are the types of structural, administrative, institutional, resource, relational, and cognitive ties with external entities, which assist in the collection of useful knowledge and information [40]. Through partnerships, organizations can create inter-organizational structures that support KS [12]. Organizations exposed to such broad and complementary knowledge sources have a higher propensity to explore new knowledge [41]. In addition, CHRMS are most effective when the connections are non-competitive, that is to say, there is competition and cooperation between firms. This is called "coopetition". Uzzi [42] found that the inter-organizational sharing of fine-grained knowledge is more effective among organizations that trust each other than among those that keep each other at arm's length [43]. We therefore propose that CHRMS are an important driver of inter-organizational KS [44].

2.3. Knowledge Sharing

Firms determine their KS level by the perceived benefits of information exchange, AC and dependence and collaboration among partners to achieve a sustainable competitive advantage [6,23,30]. In this line, Shih et al. [5] indicate that KS is the capability to identify market opportunities through the business partner's information [45].

This paper goes one step further because we show how firms can leverage emotional capital (AC) and relational capital (CHRMS) for KS. Therefore, emotional capital and relational capital can help to develop intellectual capital exchange between firms (KS) [46,47].

Some authors [48,49] indicate that knowledge is the most important resource for firms to develop new products and a Sustainability-Oriented Performance. However, what human mechanisms or dimensions are necessary? Xie et al. [31] report the positive effect of inter-organizational collaboration and links on KS. Participation in inter-firm KS appears to be an effective tool for obtaining new ideas and information [6]. This paper analyzes the two main HRM determinants for developing KS at the inter-organizational level. The exchange of knowledge is a core resource inside and outside of firms, although more importantly, KS helps firms to be more competitive within globalized economies and to single out players with non-ethical behavior [13]. Therefore:

Hypothesis 1 (H1). *AC has a positive effect on KS.*

AC development is also important regarding KS processes. It has been proposed that knowledge can be enhanced by providing employees with internal career opportunities because this stimulates employees to develop and apply their skills and internal motivation, thereby enhancing group learning.

Finally, employees must exert some control over their own commitment and development and should be responsible for recognizing their own developmental needs [50]. In addition, companies should adopt long-term commitment policies because these promote personal flexibility and sustainability, for example, promoting self-esteem and staff involvement, commitment and learning [51]. Finally, the use of intrinsic versus monetary rewards as a commitment mechanism is also considered to foster KS.

A CHRMS can develop an organizational culture that encourages the acquisition and transfer of knowledge for a Sustainability-Oriented Performance [52].

Although the number of studies on the relation between HRM and KM has experienced an important increase in recent years, few studies have explored the impact of CHRMS practices on the whole KS process. Some research works have focused on specific KM processes and HRM practices. For example, Foss et al. [53] focus on the relationship between job design and knowledge sharing. There are also some papers studying the effect of different HRM practices on KS within the firm [51]. These studies focus on some individual HRM or on a CHRMS [54].

The present paper gives new answers to understand the relations between AC, CHRMS and the whole process of KS. We focus on internal AC and forming a KS-oriented CHRMS. Because teamwork fosters communication and collaboration between employees, teamwork has been suggested to be a key element of KS and sustainable development. Teamwork encourages people to share their ideas and knowledge openly with the other members of the group, and this facilitates the dissemination of individual knowledge throughout the organization and other stakeholders [54]. In this line, the study of Cabrera and Cabrera [55] found a positive relationship between HRM practices orientated towards teamwork and the employees' willingness to share knowledge. Furthermore, the literature maintains that cross-functional teams [55] and autonomous work groups are also considered to be of special benefit to KS. Therefore:

Hypothesis 2 (H2). *CHRMS has a positive effect on KS.*

Therefore, the benefits to KS are maximized when internal HR (AC) and CHRMS are implemented jointly as a system of mutual reinforcement. The impact of HRM on KS is stronger when AC and CHRMS are applied as a system of mutually reinforcing practices. In this context, Laursen and Mahnke [56] have shown that the adoption of different CHRMS can have synergistic effects on learning.

In this line, KS results mainly from an internal and external social interaction, and thus it depends on individuals' behaviors [57]. It requires the desire of individuals participating in the process to aim for mutual benefits. KS is an important component of knowledge management [58,59], corresponding to the transfer, dissemination, and exchange of experiences, competencies, and valuable information through the organization [57]. Therefore, an organizational culture based on AC and collaboration encourages KS and supports the development of new products and the implementation of a Sustainability-Oriented Performance [60].

2.4. Manager and Organizational Conditions as Positive Moderators: Manager's Age, Manager's Gender, and Firm Size

KS is a complex process in which a manager's personal characteristics can have effects. Depending on whether it is a small or a large firm, this may have an impact on a new generation of KS and on HRM antecedents [15]. An adequate environment enables managers to adjust the organizational changes to the firm's knowledge system and its stakeholders [61].

This paper focuses, on the one hand, on a manager's age and gender, as they can influence the management of communication and KS [62,63]. Gumbau [64] contends that a manager's tenure in the firm positively influences the level of resources invested in knowledge and R&D. By contrast, Huergo and Jaumandreu [62] show that the probability of KS and innovation decreases with the manager's age. So, younger managers are more likely to share knowledge. Therefore:

Hypothesis 3 (H3). *The manager's age has a moderating effect on the relationship between:*

Hypothesis 3a. *AC and KS.*

Hypothesis 3b. *CHRMS and KS.*

Hypothesis 4 (H4). *The manager's gender has a moderating effect on the relationship between:*

Hypothesis 4a. *AC and KS.*

Hypothesis 4b. *CHRMS and KS.*

On the other hand, we focus on firm size. Some previous studies suggest that firm size can influence the relationship between HRM and KS [65]. A larger size can enhance and/or facilitate KS. There is a greater possibility of obtaining economies of scale, lower risk, and the possibility of a better performance. In short, larger firms can access a wider range of information and skills, allowing for greater KS [66]. By contrast, a smaller size can enhance and/or facilitate KS. There may be a better communication network, better coordination, and greater motivation among workers to share knowledge. In addition, a smaller size means a greater presence of informal links that support long-term KS [66]. Therefore:

Hypothesis 5 (H5). *Firm size has a moderating effect on the relationship between:*

Hypothesis 5a. *AC and KS.*

Hypothesis 5b. *CHRMS and KS.*

The literature is not conclusive. Rothwell and Dodgson [66] report that large firms have material advantages (financial resources, exploitation of synergies, more qualified scientific personnel), while small firms are associated with behavioral factors (fluid communication, organic structure, informal management). Our paper sheds light on the conditions that managers and firms need to gain a better understanding of the relationships between AC, CHRMS and KS. Vila et al. [14] argue that significant effects can stem from specific characteristics on the probability that managers want to share knowledge inside and outside the workplace.

We consider that age, gender and size are aspects that can help managers and firms to share more knowledge [67]. However, existing analyses of KS tend to focus on role differences but do not yet consider how demographic and social differences—manager's age, manager's gender and firm size—shape KS. We construct this argument from previous studies such as Cook and Glass [68] and McDonald [69].

2.5. Alternative Configurations

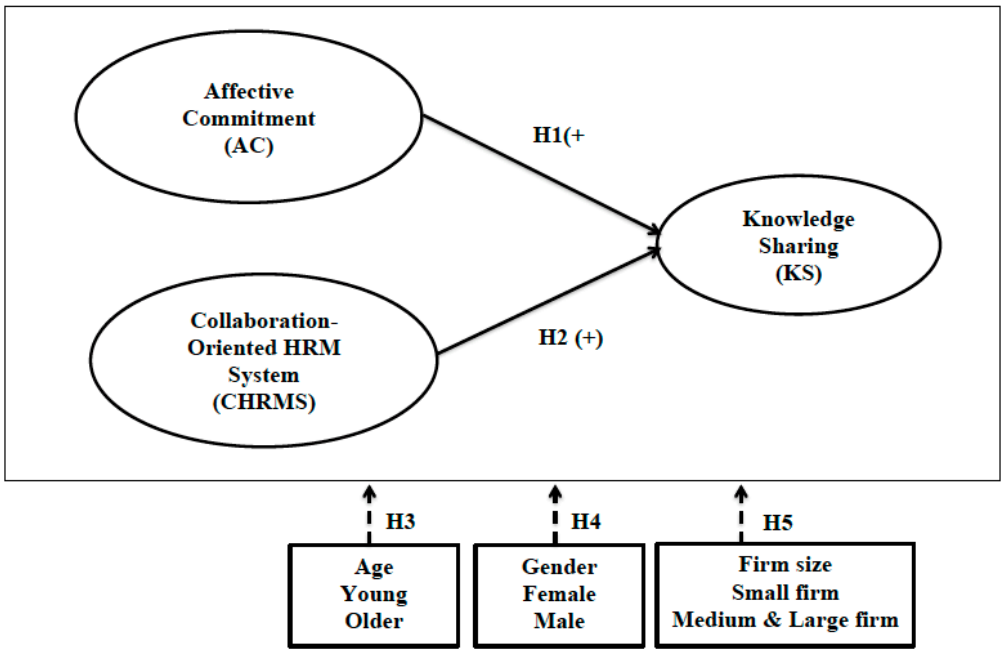
Configuration theory explains the sufficient and necessary conditions to lead to the outcome (KS). In this line, there is equifinality if more than one path of conditions lead to the same result (KS). This paper is relevant because several asymmetric pathways and synergetic effects replace traditional bivariate interaction. Therefore, we show that conditions which lead to KS differ from those which lead to its absence [70]. Therefore:

Hypothesis 6 (H6). *There are alternative configurations leading to KS.*

Hypothesis 7 (H7). *There are alternative configurations leading to the absence of KS.*

Therefore, we present an integrative and full model. In this line, we not only consider AC and CHRMS as two relevant aspects that affect KS. In addition, we propose that manager's age, manager's gender and firm size can improve KS. Finally, we consider it relevant to find alternative causal configurations that lead to KS and to the absence of KS [71,72]. Our model considers aspects that support but also alternative causal configurations that constrain KS to better appreciate how KS processes really unfold [73,74].

The research model is depicted in Figure 1.



H6: There are alternative configurations leading to KS.
H7: There are alternative configurations leading to the absence of KS.

Note: This paper uses the SEM for H1-H5 (antecedents or causal conditions of KS) and the fsQCA for H6-H7 (paths condictions for KS).

Figure 1. Research model.

3. Methods

In this paper, we use a quantitative method to evaluate KS for a Sustainability-Oriented Performance, SEM (H1–H5): Study 1 [6,75]. However, the traditional quantitative methods have several limitations in explaining complex interactions and phenomena between variables [76]. In this line, we use a qualitative method to evaluate KS for Sustainability-Oriented Performance, fsQCA (H6, H7): Study 2. This method looks for the necessary conditions and causal configurations that lead to KS or its absence [77]. Few mixed methods studies provide both a quantitative and a qualitative comparative analysis of KS. Therefore, this study provides new paths and contributions to explain the role of KS for Sustainability-Oriented Performance. It is relevant to know the factors and factor configurations that take companies toward KS. The design of the mixed methodology was carried out carefully to ensure its correct application, and we chose the adequate use of measures in the survey to address the CEO's perception of KS for a Sustainability-Oriented Performance at organizational level.

3.1. Mixed Methods Approach

Research, as a way of knowing, interpreting and transforming reality, cannot ignore the constant demands of an increasingly unstable, complex and diverse business world; hence, for some researchers [77], the two traditional research approaches (qualitative and quantitative) fall short in the resolution of problems and situations that require new perspectives. In this context, the application of mixed methods approaches is important, which allows us to exploit the strengths of both approaches to achieve more complete understandings of business and social problems [78–81].

This paper contributes to the study of HRM and KS from a mixed methods approach. First, from a quantitative perspective, we applied SEM. SEM is a complex statistical technique for studying causal relationships between variables with direct and indirect effects. Secondly, from a qualitative perspective, we applied fsQCA, which is a relevant statistical technique for studying alternative configurations that lead to KS or its absence. Our study therefore provides a unique, complete and coherent understanding of KS [82].

The mixed methods approach can be defined as a kind of research that combines quantitative and qualitative techniques, methods, approximations, concepts and language in a holistic study [83]. Table 2 shows that the research model's characteristics are decisive for choosing the design and application of the mixed methods approach [84].

Table 2. Design and application of mixed methods.

Design	Characteristics	Application
Triangulation	Qualitative and quantitative methods are implemented at the same time.	Quantitative Qualitative
Embedded	One of the datasets becomes the support of the other. Given the need to respond to different questions, each one requires different data.	Quantitative (qualitative)
Explanatory	Qualitative data help explain the initial quantitative results. First, the quantitative data are collected and analyzed, and then the phase of qualitative study develops.	Quantitative → Qualitative
Exploratory	It also involves two phases, so that the results obtained with the application of the qualitative method contribute to the development of the quantitative part.	Quantitative → Qualitative → Quantitative

Our paper's objective is the study of KS through the analysis of data using two different statistical techniques at the same time, which leads us to a complete and joint interpretation of the results. Following Creswell and Plano [84], this is a triangulation design for the application of the mixed methods approach. In short, the mixed methods approach allows for:

(1) Combining the strengths provided by the two approaches.
(2) Attenuating the weaknesses of their separate application.
(3) Gaining a better understanding of KS.

This means that quantitative and qualitative methods are not incompatible. Their combination is relevant when looking for the causes and conditions that lead companies to KS [85].

3.2. Sample

The main source of information is an online survey through Qualtrics®. We sent the survey to 6856 Portuguese innovative SMEs in several industry categories: manufacturing, power, and gas supply; water supply and pollution; building; vehicle trade and repair; transport and storage; catering; information and communication; housing; scientific activities; administrative activities; health activities; and other services. The final sample has 367 firms with a 5.4% response rate. Table 3 summarizes the demographic information.

Table 3. Sample characteristics (N = 367).

Sample	Characteristics	Frequency	%
Gender	Male	207	56.4
	Female	160	43.6
Middle Age	44 years old	-	-
	<44 years old	197	53.7
	>44 years old	170	46.3
Level of Training	Secondary	86	23.4
	Graduate	199	54.2
	Post-Graduate	82	22.3
Employees (Firm Size)	<50	242	65.9
	>50	125	34.1
Years in the Company	<2	27	7.4
	2–5	56	15.3
	>5	284	77.4
Age of the Company	<5	3	0.8
	5–10	25	6.8
	>10	339	92.4

The surveys were managed online using the Qualtrics Survey Software. To minimize the probability of errors due to the interpretation of the language used, the survey was initially drafted in English, and the back-translation method was used for the survey items. Therefore, the questionnaire was originally written in English, translated into Portuguese by a certified translator, and then back-translated into English. Before the survey's design, a pre-test was carried out with five prestigious scholars and managers who helped to draft the final survey. Finally, the firms were contacted by telephone to introduce the study, and mass mailings of the survey were then sent to them. The survey took 20 min, and the respondents were the CEOs within each firm. CEOs are responsible for strategic decision making, and they recognize all the information and tools required for human development and KS for a Sustainability-oriented Performance. Thus, CEOs have a realistic and broad vision and they are aware of the firm's condition and the employees' perceptions on the development of KS for a Sustainability-Oriented Performance [49], since knowledge management is a strategic issue [86]. Therefore, the survey was used to obtain information from CEOs (organizational level) to collect information about the perceptions of internal (CA) and external (CHRMS) variables related to organizational KS.

We apply a time trend extrapolation test to compare late and early respondents (non-response bias) [87]. A one-way analysis of variance (ANOVA) shows no significant difference between the early and late responses in terms of metrics such as firm size and age. Therefore, the sample is representative of the population.

3.3. Variables

In this study, we use one-dimensional Likert-type scales from other studies [88]. The ranges are: from 7 (strongly agree) to 1 (strongly disagree). AC is measured using the Meyer and Allen scale [89]; and the CHRMS scale was created by Zhou et al. [90]. The KS scale was created by Chen et al. [30]. GEN reports whether the manager is male or female. AGE is the manager's age measured in years. SIZ is firm size measured by headcount [91]. Therefore, the survey has been designed following the previous literature and focused on the perceptions that the CEO has about the behavior of employees surrounding the sharing of knowledge to achieve greater results in sustainability at organizational level [49].

To assess measurement validity, we use a confirmatory factor analysis (CFA) by AMOS®. The 18 items have a good level, indicating good measurement validity. The factors explain 64.21% of the variance, which is above the recommended value of 60% [92]. Table 4 summarizes the variables' descriptions and the CFA.

Table 4. Description of variables.

Constructs	Mean	SD	Confirmatory Factor A nalysis (CFA)
Knowledge Sharing (KS) (Chen et al., 2014) (Variance explained (V.E) = 75.35%); (α = 0.92)			
KS1. My organization provides relevant knowledge to our business partners for Sustainability-Oriented Performance.	4.59	1.58	0.77
KS2. My organization has teamed up with business partners to enhance inter-firm learning for Sustainability-Oriented Performance.	4.50	1.71	0.88
KS3. My organization and other business partners jointly organize job training to enhance each other's knowledge for Sustainability-Oriented Performance.	3.92	1.73	0.86
KS4. My organization and other business partners share successful experiences with each other for Sustainability-Oriented Performance.	4.12	1.71	0.92
KS5. My organization and other business partners share new knowledge and viewpoints with each other for Sustainability-Oriented Performance.	4.14	1.65	0.91
Affective Commitment (AC) (Meyer and Allen, 1991) (V.E = 65.10%) **1 Factor: +AC** (α = 0.76)			
AFC1. The employees would be very happy to spend the rest of their careers in this organization.	5.44	1.57	0.76
AFC2. The employees really feel as if this organization's problems are their own.	5.58	1.56	0.67
AFC4. This organization has a great personal meaning for the employees.	6.01	1.34	0.82
AFC5. The employees enjoy discussing about the organization with people from the outside. **2 Factor: −AC** (α = 0.81)	5.52	1.53	0.76
AFC6. The employees do not feel a strong sense of belonging to the organization.	1.96	1.61	0.87
AFC7. The employees do not feel like part of the family at the organization.	1.90	1.49	0.83
AFC3. The employees do not feel emotionally attached to this organization.	1.93	1.63	0.74
Collaboration-Oriented HRM System (CHRMS) (Zhou et al., 2013) (V.E = 51.17%); (α = 0.81)			
CHRMS1. My organization provides a formal external learning program with business partners.	3.61	1.88	0.71
CHRMS2. My organization provides consulting service buy-in.	3.53	1.88	0.76
CHRMS3. My organization provides flexible partnerships with autonomous external professionals.	4.31	1.88	0.74
CHRMS4. My organization provides long-term personnel alliances with external academic institutions.	3.43	1.92	0.80
CHRMS5. My organization provides extensive social networks.	3.64	1.85	0.72
CHRMS6. My organization provides professional HR outsourcing.	2.59	1.78	0.63

The survey was designed to reduce the common method bias (CMB) [93]. We use Harman's Single Test to evaluate the existence of CMB. The four factors that emerge from the exploratory factor analysis account for 64.21% of the variance in the data, with the first factor accounting for 35.29% (less than 50% of the total variance). Therefore, there is no CMB.

3.4. Calibration

fsQCA uses calibrated data to transform demographic, categorical and Likert scale variables into conditions with values ranging from 0 to 1. Calibration is the process of classifying conditions from full membership to full non-membership. Following Ragin [94], we define three different anchors to calibrate AGE, establishing the degree of membership in each score: 0.95 for full membership, 0.50 for membership ambiguity, and 0.05 for full non-membership. The transformation of the Likert scale variables (KS, AC, CHRMS) into fuzzy sets involves calculating the average values of the items [95]. Since the measurement uses a seven-point scale, we identify full non-membership, the crossover point, and full membership as 2, 4, and 6, respectively. Following Woodside et al. [96], we adjust the cut-off values depending on the number of items in each variable and its statistics. GEN is a binary variable which requires no calibration (1 for female and 0 for male), and SIZ is a categorical variable that we calibrated in three levels (1, 0.5, 0) (Table 5).

Table 5. Calibration for causal conditions and outcome.

Conditions/Outcome	Descriptive Statistics	Calibration (0.95; 0.50; 0.05)
Knowledge Sharing (KS)	μ = 4.26, σ = 1.45, min = 1.00, max = 7.00	(6.2, 4.4, 1.6)
Gender (GEN)	Binary condition: 1 = female; 0 = male	No need
Age (AGE)	μ = 43.48, σ = 10.55, min = 20.00, max = 82.00	(58.0, 43.0, 29.0)
Affective Commitment (AC)	μ = 4.05, σ = 0.59, min = 2.14, max = 7.00	(4.6, 4.1, 3.2)
Firm size (SIZ)	>250 = 2.7%; 50–250 = 31.3%; <50 = 65.9	>250 = 1; 50–250 = 0.5; <50 = 0
Collaboration-Oriented HRM	μ = 3.52, σ = 1.33, min = 1.00, max = 7.00	(5.1, 3.7, 1.0)

4. Results

4.1. Correlation Analysis

The correlations matrix is reported in Table 6. All correlation coefficients are below 0.8, whereby multicollinearity is unlikely to be a concern.

Table 6. Correlations.

Variable	Mean	SD	1	2	3	4	5	6	7
Gender	1.56	0.497	1						
Age	1.46	0.499	0.211 **	1					
Firm Size	1.34	0.475	0.110 *	−0.080	1				
Positive Affective Commitment	-	-	−0.025	0.125 *	−0.063	1			
Negative Affective Commitment	-	-	−0.071	−0.085	0.068	0.000	1		
Collaboration-Oriented HRM System	-	-	0.011	0.064	0.066	0.273 **	−0.094	1	
Knowledge Sharing	-	-	−0.005	−0.031	−0.024	0.268 **	−0.160 **	0.642 **	1

* $p = 0.10$; ** $p = 0.05$.

4.2. Study 1: Results of Structural Equation Modeling

To test the data fit for hypotheses H1 to H5, we apply SEM. Table 7 shows the absolute indices (χ^2/Df, chi-square/degrees of freedom; RMSEA, root mean squared error of approximation) and incremental ones (CFI, comparative fit index; TLI, Tucker–Lewis index). These indices have a good fit [92,97].

Table 7. Study 1: Structural models.

Models	Paths	Estimate	SE	CR	P	Results
H1 (+)	KS ← AC	0.086	0.057	1.529	0.126	Not Supported
H2 (+)	KS ← CHRMS	0.822	0.140	5.869	***	Supported
Age						
2A: Young (<44)						
H1		0.144	0.066	2.190	0.029	Supported
H2		0.811	0.177	4.572	***	Supported
2B: Older (>44)						
H1		0.004	0.103	0.040	0.968	Not Supported
H2		0.852	0.232	3.669	***	Supported
Gender						
3A: Female						
H1		0.022	0.056	0.389	0.697	Not Supported
H2		0.615	0.152	4.032	***	Supported
3B: Male						
H1		0.119	0.089	1.341	0.101	Supported
H2		0.949	0.213	4.463	***	Supported
Firm Size						
4A: Small						
H1		0.082	0.076	1.078	0.108	Supported
H2		0.892	0.190	4.701	***	Supported
4B: Medium and large						
H1		0.061	0.075	0.821	0.412	Not Supported
H2		0.755	0.214	3.535	***	Supported

Measurement Model: First Order: CHRMS and KS	**X^2**	**Df**	***p*-value**	**X^2/df**	**CFI**	**TLI**	**RMSEA**
	276.786	43	0.000	6.437	0.903	0.876	0.052
Second Order: AC	26.956	13	0.010	2.074	0.984	0.974	0.054
Model	235.567	123	0.000	1.915	0.966	0.958	0.050
2A	189.461	120	0.000	1.579	0.963	0.953	0.054
2B	163.145	123	0.009	1.326	0.973	0.967	0.044
3A	172.638	123	0.002	1.404	0.965	0.956	0.050
3B	180.004	119	0.000	1.513	0.970	0.961	0.050
4A	173.173	120	0.001	1.443	0.975	0.968	0.043
4B	173.657	123	0.002	1.412	0.958	0.948	0.058

SE = standard error, CR = composite reliability, *** = *p*-value < 0.001, X^2 = chi-square, Df = degrees of freedom, CFI = comparative fit index, TLI = Tucker–Lewis index, RMSEA = root mean squared error of approximation, AC = Affective Commitment, CHRMS = Collaboration-Oriented HRM System.

Measurement and structural model fit. The overall fit of the measurement is evaluated through CFA [92]. The first-order confirmatory test with multiple factors shows an adequate fit (Table 4).

Table 7 shows the results for the hypotheses. Hypothesis 1 considers the relationship between AC and KS. The results show a non-significant support effect on KS in model 1. Nevertheless, the results confirm the significantly positive effects of AC on KS in model 2A (young: <44 years, ß = 0.144, $p < 0.05$), in model 3B (male, ß = 0.119, $p < 0.10$) and in model 4A (small firm: ß = 0.082, $p < 0.10$). Models 2A, 3B and 4A support H1. AC has a positive impact on KS if the manager is a young man in a small firm. However, there is no evidence for when the manager is older, female, and works in a large firm. Hypothesis 2 refers to the relationship between CHRMS and KS. The results confirm the significantly positive effects of CHRMS on KS in all the models (model 1: (ß = 0.822, $p < 0.001$); model 2A: young (ß = 0.811, $p < 0.001$), model 2B: older (ß = 0.852, $p < 0.001$); model 3A: female (ß = 0.615, $p < 0.001$), model 3B: male (ß = 0.949, $p < 0.001$); model 4A: small firm (ß = 0.892, $p < 0.001$), and model 4B: medium and large firm (ß = 0.755, $p < 0.001$)). All models support H2.

The findings show that if the manager is a young man working in a small firm, this significantly affects the impact of AC on KS. However, there are other cases in which AC does not have a significant impact on KS: older managers, female managers, and large firms. Considering H2, the results show significantly positive effects for all the models. Consequently, (a) the results partially support H1; and

(b) the results support H2. In addition, there is major evidence for three moderating effects: manager's age (H3), manager's gender (H4), and firm size (H5).

4.3. Study 2: Results of the Fuzzy-Set Qualitative Comparative Analysis

To address the paths that lead to KS or its absence (H6, H7), we use fsQCA [77,94].

fsQCA accepts alternative configurations of conditions, asymmetry and equifinality. In this analysis, we uses equal calibrated variables from SEM.

Necessity and sufficiency analysis. In fsQCA analysis, the condition's degree of sufficiency shows the extent of its relationships with the explanation of KS (configurations of several conditions that lead to KS). The condition's degree of necessity shows its impact on achieving KS (consistency score that exceeds 0.80) [94]. CHRMS is the single necessary condition for the outcome (KS). There are no necessary conditions for its absence (~KS) (~ refers to the absence of). Regarding the sufficiency analysis, we respect the truth table thresholds for raw consistency of 0.80 [94]. The fsQCA solutions regarding KS and ~KS respect the consistency threshold of 0.80 [70,94], and the solutions' coverage levels are within the suggested range limits of 0.25 to 0.90 [94]. Both solutions (KS and ~KS) involve solely core conditions, revealing the relevancy of their contributions to the configurations (Table 8), which are the ones included in both the parsimonious and the intermediate solutions [70,94].

Table 8. Study 2: Intermediate solutions for Knowledge Sharing and ~Knowledge Sharing.

Overall Solution Coverage: 0.788860								**Overall Solution Consistency: 0.808225**
Configurations	**GEN**	**AGE**	**SIZ**	**AC**	**CHRMS**	**Coverage**		**Consistency**
						Raw	**Unique**	
1	○				●	0.464449	0.079734	0.810847
2		○			●	0.533123	0.082746	0.860001
3				○	●	0.529411	0.051922	0.813150
Overall solution coverage: 0.792277								Overall solution consistency: 0.787306
1					○	0.782221	0.742476	0.788682
2	●	●	●	○		0.049801	0.010056	0.890021

Model: ~KS = function of GEN, AGE, SIZ, AC, CHRMS. Black circles (●) indicate the presence of a condition, and open circles (○) indicate its absence. Blank spaces indicate that the condition does not contribute to the configuration. KS = Knowledge Sharing, GEN = Gender, AGE = Age, SIZ = Firm Size, AC = Affective Commitment, CHRMS = Collaboration-Oriented HRM System.

Causal configurations. Regarding the KS solution, it comprises three parsimonious configurations and three intermediate ones. The intermediate solution reported in Table 8 shows three configurations, each one involving two conditions. Considering the ~KS solution, there are two parsimonious configurations and two intermediate ones. The intermediate solution reported in Table 8 shows that one configuration involves a single condition, which is the absence of CHRMS. The other configuration involves four conditions.

5. Discussion

5.1. Summary of Results

The quantitative results show (Study 1): first, AC does not always have an effect on KS. Second, CHRMS always has a positive effect on KS, and CHRMS is the single necessary condition for KS [60]. Third, the SEM analysis addresses the moderating effect of manager's age, manager's gender, and firm size. This is consistent with the configurations leading to KS and ~KS. The results show that manager's age, manager's gender, and firm size have a major impact on the model. For younger male managers (age <44) in small firms (<50 employees), AC has a significant effect on KS. In the models with manager's age, manager's gender, and firm size as moderator effects, CHRMS always

has a positive effect on KS. This finding shows that older female managers (age >44) in large firms (>50 employees) do not use AC to achieve KS. The analysis therefore accepts all the hypotheses in the models in which the manager is a young man working in a small firm. Such findings significantly extend the research on KS in SMEs because this paper reports the important role that a manager's personal characteristics and firm size play for KS [68,69].

Therefore, the apparently low AC levels reported for older managers, female managers and large firms may mean that this represents a key problem for KS.

Considering the qualitative approach (Study 2) [98], there is only one necessary condition for KS, which is CHRMS (according to fsQCA and SEM). It is necessary, but not sufficient, because the three alternative configurations involve CHRMS and another condition for KS in the sufficiency analysis. Therefore, alternative configurations exist that lead to KS and ~KS. Regarding the number of configurations, the results show more configurations (3) that lead to KS than those that lead to its absence (2). Such evidence indicates the existence of more pathways leading to KS between firms [73,74]. This is a very important finding for SME managers because it can help them to find new ways of sharing knowledge. The results corroborate the assumptions of the fsQCA: (a) more than one configuration leads to KS (as well as ~KS); (b) alternative configurations produce the same outcome; and (c) the conditions for KS differ from the conditions for ~KS. The balanced fsQCA results show that a CHRMS is a necessary condition for KS, which along with other alternative core conditions, is sufficient for KS: ~GEN, ~AGE and ~SIZ. On the other hand, GEN, AGE and SIZ are core conditions in the ~KS solution, as well as ~AC and ~CHRMS. These findings reinforce the results from the SEM analysis regarding H2. CHRMS (having a collaboration-oriented HRM system), ~GEN (male), ~AGE (young) and ~SIZ (small firms) are core conditions for KS, indicating their importance in promoting KS. GEN (female), AGE (older), SIZ (medium firms) and ~AC (no affective commitment among employees) are core conditions for ~KS, which indicates their importance in preventing KS in SMEs. Also, ~CHRMS (the absence of a collaboration-oriented HRM system) alone is enough to prevent KS.

The findings help managers to make balanced decisions on KS. From an internal and individual level (AC) and on an external and organizational/inter-organizational level (CHRMS), this can contribute to KS through several comparative SEM models (with moderator effects of manager's age, manager's gender, and firm size) and with several combinations (fsQCA). The findings show that a firm with CHRMS tends to have a high level of KS. In addition, if the firm has a CHRMS, and it is also small or managed by a young person or a man, it shares knowledge. Firms with CHRMS practices can develop more trust among employees, and more networks between stakeholders, and consequently KS. On the other hand, firms not adopting CHRMS practices will not develop KS [12].

This paper creates interesting questions for future research:

(1) What conditions must be created within the firm so that women can also contribute to the development of KS?
(2) What conditions must be created within the firm so that older managers/employees can also contribute to the development of KS?
(3) What practices should managers use to stimulate KS within medium-sized firms?

Our paper serves as a guide for future research. SME managers can develop KS through three pathways, which is indeed an inspiring perspective. Managers should also be alert to the danger of the two pathways that lead to ~KS, and they should seek to avoid them at all costs. The application of an fsQCA to determine the configurations that lead to KS makes a significant contribution to the literature [77]. The results show that both approaches, SEM and fsQCA, can open up different paths within the same research model, reaching similar and consistent conclusions. Furthermore, the equifinality of fsQCA provides insights into how to improve our understanding of SMEs.

5.2. Theoretical Implications

This paper contributes to both KS and HRM literature by linking two relevant HRM variables (internal and individual vs. external and organizational/inter-organizational) that lead to KS (external and inter-organizational), and different pathways that lead to absence to KS. We operationalize two HRM multilevel variables for KS. In other words, we examine how firms enhance two HRM variables to achieve KS to support new product development and Sustainability-Oriented Performance. Human resources are dynamic, and they are the most important ones that add value to firms in the long term [99].

We use an online survey in Qualtrics®. We thus find support for the influence of antecedents on KS with primary information on firms and their managers. The results support the argument that the impact of CHRMS on KS is always positive. The manager's personal characteristics (age and gender) and firm size are three important moderating variables that strengthen the effects of HRM on KS [68,69].

Conversely, not adopting a CHRMS leads to ~KS. Regardless of adopting a CHRMS or not, if a firm's manager is a woman or an older person, or if the firm is medium-sized and lacks an affective commitment among its employees, it tends not to achieve KS. From a methodological perspective, this paper examines the complementarities of SEM and fsQCA. fsQCA extends the contribution made by the traditional quantitative statistical method [100]—SEM—that gives only a single estimated solution to the model predicting the dependent variable (KS in this case) by providing several and alternative configurations to reach the desired outcome (KS), as well as its absence (~KS). The SEM method suitably explains the direct and indirect relationships of two HRM variables with KS, whereas the fsQCA provides a deeper understanding of the complex, nonlinear, and synergistic effects of the pathways leading to both KS and ~KS. The SEM results show the adequacy of the model, while the fsQCA findings indicate multiple alternative pathways that lead to KS and ~KS.

5.3. Practical Implications

In practice, the results of this study provide managers with a clear understanding of the antecedents of KS for innovation or sustainable development. On the one hand, the SEM results show the main influences on KS and, on the other, the fsQCA results reveal the ways of obtaining KS, as well as the paths to ~KS. Both results are robust, consistent, and integrating. This will help managers to select the paths and conditions that will take them toward KS. In addition, this paper opens up important research horizons: (1) what mechanisms should firms implement to improve the effect between HRM and KS with female managers? (2) And among managers over 44? (3) And within medium-sized firms? All of these research questions can serve as an important guide for other researchers.

Therefore, organizational/inter-organizational and external HRM (CHRMS) are managerial options for generating KS. This paper demonstrates the value of investing in a CHRMS to generate new KS. As noted previously, and based on the SEM results, the study reports that HRM, a manager's characteristics (age and gender), and firm size positively influence and improve KS. The fsQCA results show three paths for reaching KS; each manager can therefore choose which ones to follow, taking into account that CHRMS is a necessary but insufficient condition. The fsQCA results also provide two pathways to ~KS, which should warn managers of the threat that they pose.

5.4. Limitations and Future Research

This study have considered the contribution that other HRM variables make to KS, or address other management variables such as teamwork or motivation. Future studies may involve different variables, e.g., manager's training level or tenure, and include other industries. This paper considers the effects of AC and CHRMS on KS. These two aspects are relevant but are not the only ones that affect KS in organizations. For example, changing government regulations, unexpected events, competition,

and especially the unwillingness of external partners to share knowledge affect KS. In this line, it is necessary to consider aspects that support but also aspects that constraint KS [73,74].

The sample size of 367 is small (response rate of 5.4%). However, the survey is nationwide and it is representative of Portuguese SMEs. Future studies on other countries could be used to extrapolate our conclusions.

Finally, longitudinal studies that incorporate several levels of analysis could provide evidence on the causal relationships and interactions among different variables, contexts and levels for KS. Future research could also uncover new networks in which KS between SMEs is commonplace.

5.5. Gaps in the Existing Literature and Main Contributions

This paper identifies within the dimensions of human capital what are the resources, ways or practices that lead firms to KS for Sustainability-Oriented Performance or innovation. According to Gratton and Ghoshal [25], human capital is composed of three dimensions: Intellectual Capital, Emotional Capital and Social Capital. This paper looks for alternatives to see how we can reach KS or its absence. In this line, AC is proposed as a cornerstone resource within Emotional Capital to achieve KS [11].

On the other hand, and as a relevant resource of Social Capital, CHRMS is proposed as a system of collaborative practices inside and outside the firm for KS development [44]. Therefore, two clear backgrounds of KS (Intellectual Capital) are established, one inside (AC) and another outside (CHRMS) of the firm.

To be sure, this is a paper that broadens KS knowledge with several contributions:

1. We found human antecedents that lead to KS and its absence.
2. In addition, this paper not only looks for KS antecedents but establishes paths or non-causal configurations that can lead to KS (or not). Therefore, this paper serves as a guide for managers and academics to know the paths that lead to KS and thus support new organizational results.
3. Firms operate in an environment with different characteristics and conditions between them. In this line, we propose: (a) Can a certain manager's characteristics (age and gender) facilitate KS? (b) Can a firm's size facilitate KS?

In summary, this paper establishes the human foundations of KS, taking into account the manager's characteristics and the firm's size [67].

Until now, the literature has focused on measure scales [30] or the effects of KS on other outcome variables (profit, Organizational Learning Capability, Product Innovation Performance, etc.) with linear causal relations [48,101]. This paper goes a step further by extending knowledge about KS in two directions:

1. How are commitment and CHRMS implemented in knowledge sharing? New human background for KS (linear causal relations).
2. Does knowledge sharing require distinct human resource configurations? Paths leading to KS and its absence (non-linear causal relations).

Therefore, we cover an important gap in the theoretical literature [76]. We study the mechanisms and ways that lead to the absence of KS, and we propose new, non-linear causal relations that lead to KS and its absence.

Finally, this paper serves as a guide to managers, researches and firms who want to know what are the dimensions, ways or human mechanisms that lead firms to KS, aiming to reach new results, or inhibit it. The absence of KS is a vital aspect in terms of competitive strategy, and it has been less studied in the literature [74]. Knowledge sharing processes within firms and with other stakeholders allow firms to achieve sustainable environmental, financial, and social goals. In addition, managing the impact of firms' operations on the environment could be supported by the adoption of innovative knowledge management systems, as CHRMS [102].

Finally, we offer four relevant practical recommendations and implementation guidelines for SMEs:

1. Collaboration-oriented human resource management systems for knowledge sharing:
   * The willingness of employees to help with new practices and new partners.
   * Participation in meetings and sessions for the exchange of information and knowledge.
   * Continuous vigilance to detect new information and opportunities.
   * The involvement of the entire team to collaborate on joint projects internally and externally with other partners.
2. Investment in and development of new internal and external human resource practices for knowledge sharing:
   * Courses and training in new information technology support for knowledge sharing.
   * Creation of a culture that encourages knowledge sharing.
   * The build-up of norms that encourage knowledge sharing.
   * Teamwork and effective communication.
3. Affective Commitment for knowledge sharing:
   * Reinforcement of information sharing with new engagement alliances.
   * Creation of a culture that encourages internal knowledge sharing.
   * Creation of internal motivation with emotional attachment and identification to facilitate knowledge sharing.
4. Age, gender and firm size for knowledge sharing:
   * Hiring a committed young manager within a small firm helps to ensure knowledge sharing.
5. Knowledge sharing for Sustainability-Oriented Performance:
   * Encouragement of employees to share their knowledge and ideas with outside partners on themes of environmental practices.
   * Support for business networking for sustainability (forums, congress, meetings, etc.). For example, COP25 (Conference of the Parts) in Madrid, December 2019.
   * Use of performance management systems oriented to sustainability to promote voice and knowledge sharing [103].
   * Creation of incentives oriented to sustainability performance (e.g., promotion, bonus, higher salary) to facilitate knowledge sharing for sustainability-oriented performance.

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