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## Article

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## Article

# High-Performance Work System and Innovation Capabilities: The Mediating Role of Intellectual Capital

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**Abstract:** This study examined the effect of high-performance work systems on developing incremental and radical innovation capabilities. Drawing on resource-based and knowledge-based theories, the mediating effects of human capital, social capital, and organizational capital were tested. Data were collected from 233 middle-to-senior level managers working in the banking sector of Pakistan, and hypotheses were tested through partial least squares structural equation modeling using Smart PLS 4.0. The findings showed that all components of intellectual capital mediated the relationship to develop both types of innovation capabilities. In terms of the strength of the relationship, social capital was found to be a more effective mediator, and next to this were human capital and organizational capital, respectively. Our findings contribute to the existing literature by explaining the relationship between HPWS and innovation capabilities, which is also referred to as the black box through the mediation of intellectual capital. Decision makers should recognize the importance of this relationship because it develops innovation capabilities that enhance organizational performance by giving them a competitive advantage.



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**Keywords:** high-performance work system; human capital; social capital; organizational capital; incremental innovation capability; radical innovation capability

## 1. Introduction

In the increasingly complex, turbulent, and rapidly changing business environment, innovation capabilities have become a buzzword for firms to create value and stay competitive via leveraging intellectual capital. Innovation capabilities are a vital source of sustainable competitive advantages, enabling organizations and employees to compete in a highly dynamic business environment (Subramaniam and Youndt 2005; Chen and Huang 2009). In other words, the greater innovativeness the firms acquire, the more chances they must act in response to changing environments. Recently, a significant body of research has been conducted to investigate how firms can be more innovative, indicating the importance of high-work performance systems. It can play a significant role in getting people to work as a team and take self-management responsibility effectively. By doing so, only organizations achieve their goals and objectives to sustain competitive advantages and integrate intellectual capital in enhancing innovation capabilities. Possessing innovation capability is a primary way of obtaining a competitive advantage in organizations because of increasing competition arising from rapid technological changes and globalization (Hou et al. 2019; Lei et al. 2021). Globalization and technological advancements undoubtedly have positive effects on the economic growth of a country, but they also have increased the intensity of competition in today's business environment (Le et al. 2020; Kurniawati

2020). Moreover, the world economy has shifted from industrial to knowledge-driven, where the success of organizations mainly depends upon producing innovation in their products, services, and processes (Yin et al. 2019; Choi et al. 2020). Therefore, the shift in the world economy and increasing competition require organizations to be innovative for their long-term success. Innovation capability makes organizations flexible and equips them to respond to the changing business conditions (Yang et al. 2018). It also enables them to achieve a higher level of competitiveness in local and global markets (Lei et al. 2020).

As far as the development of organizational innovation capabilities is concerned, few prior studies show that the high-performance work system (HPWS) positively impacts the development of such capabilities (Obeidat 2016; Escribá-Carda et al. 2017). According to Kaushik and Mukherjee (2021), some important features of HPWS, e.g., performance, system, and synergistic effects, and recommends new features, i.e., adoption of technology and agility are integral for overall innovation capability performance. However, the literature consists of the following gaps in this relationship which our study wants to fill. Firstly, the association of HPWS with developing innovation capabilities has been termed the “black box” in the existing literature (Messersmith and Guthrie 2010; Shin et al. 2018). The black box refers to the mechanism by which this relationship builds up is not known. Although researchers are trying to unfold this link, they assert that there is still little research to explain the connecting mechanism between HPWS and innovation capabilities (Shahzad et al. 2019a; Rasheed et al. 2017; Shipton et al. 2017). Scholars recognize this gap in the literature and call for further research to open the black box (Seeck and Diehl 2017; Al-Ajlouni 2020).

Secondly, the current study takes intellectual capital (human capital, social capital, and organizational capital) to unlock the black box. Intellectual capital is the most important organizational resource that produces corporate innovation capabilities and is mainly developed by HR practices (Sokolov and Zavyalova 2020; Zotoo et al. 2021). However, despite its high importance, it has been considered by just a few studies to date as a mediator in this relationship (Donate et al. 2016; Kianto et al. 2017). Similarly, organizational capital is an integral part of intellectual capital, but little is known about this in the existing literature regarding its mediating role between HPWS and innovation (Wang and Chen 2013). It remained out of consideration in the majority of relevant studies, which mostly focused on human capital and social capital (Kianto et al. 2017; Akay and Kunday 2018; Yousaf et al. 2019). Moreover, past studies have recommended including organizational capital in future studies as an essential linking mechanism between HPWS and organizational innovation capabilities (Donate et al. 2016; Easa and Orra 2020). Therefore, based on these recommendations, as well as the scarcity of literature, organizational capital has been included in the current study along with the other two components of intellectual capital.

### *Significance and Scope of the Study*

This research model is entirely new and has not been tested before with respect to the banking sector of Pakistan. There was a dearth of research undertaken relating to the banking sector of Pakistan. This sector is knowledge-intensive and faces high competition due to the entry of various non-banking firms into the banking sector, such as Jazz Cash and UPaisa. Most relevant studies were conducted in countries such as the USA, Spain, China, and Turkey. Therefore, this research was carried out to demonstrate that HPWS may positively impact the development of innovation capabilities in this sector through intellectual capital. Further, banks may sustain their competitive position in the increasing competition by using their innovation capabilities. Thus, according to our knowledge, this empirical study is the first one of its kind in the banking sector of Pakistan. This shall add to the body of existing knowledge, enhance professional practices in the banking sector, and fill the research gaps.

## 2. Research Model and Theoretical Foundations

The theoretical framework of the current study is based on the resource-based view (RBV) and the knowledge-based view (KBV). These are the most appropriate theories to build the hypothesized relationships for the following reasons. Firstly, both theories suggest that an organization’s investment in HRM practices leads to the development of its innovation capabilities (Shaw et al. 2013).

Current research also proposes testing the relationship of HPWS practices with developing innovation capabilities, which creates alignment with these theories. Secondly, both theories indicate the higher importance of intangibles (intellectual capital) to gain sustainable competitive advantage and increase organizational performance (Barney 1991). Current research also intends to study the role of intellectual capital as indicated by both theories by taking this as a mediator between HPWS and innovation capabilities in the banking sector of Pakistan (See Figure 1). Intellectual capital is considered a major factor in achieving a competitive advantage in knowledge-intensive industries such as banking (Holland 2010). Due to these reasons, the theories of RBV and KBV support to study of the relationship between HPWS, intellectual capital, and innovation capabilities in the banking sector of Pakistan.

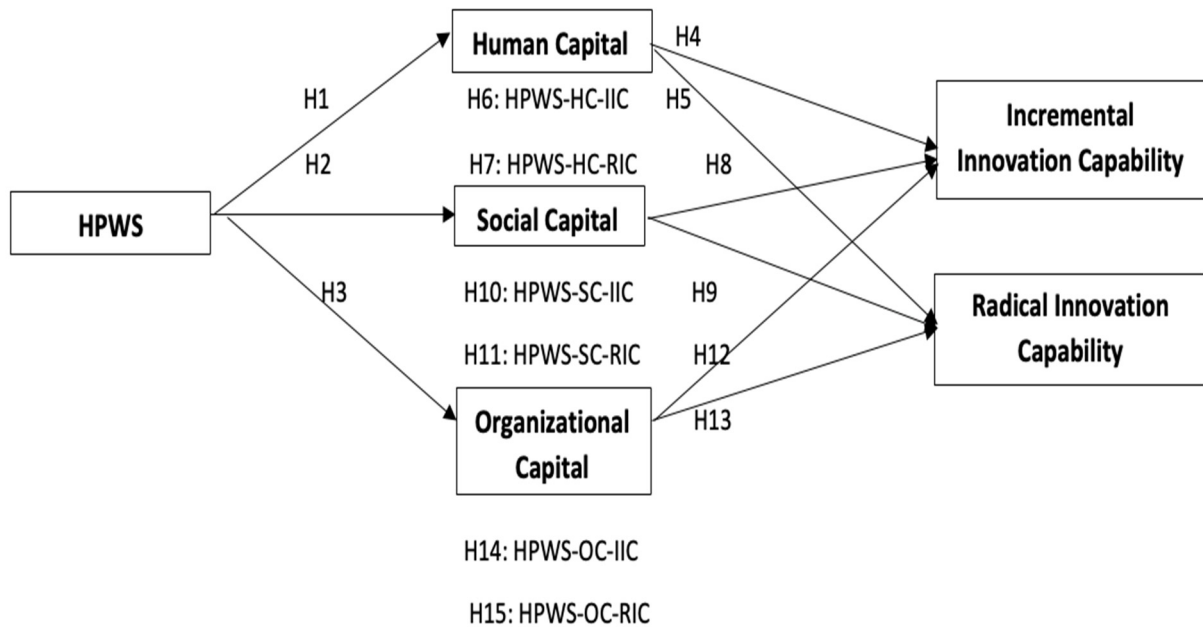


Figure 1. Research Model.

The following literature explains the primary constructs of the current study and later on develops hypotheses. The first construct is the high-performance work system (HPWS). It is referred to as a set of HR practices (such as selective staffing, compensation, performance appraisal, training, team working, participation and empowerment, reduction in status differentials, information technology, and documentation) that work like a system (Prince 2019). The idea of using sets of HR practices to increase organizational performance became popular from the research work of (Huselid 1995). According to HPWS Takeuchi et al. (2007, p. 1069) can be defined as “a group of separate but interconnected human resource (HR) practices designed to enhance employees’ skills and effort”. These HR practices are applied as a bundle that creates a synergistic effect. This positively affects employees’ attitudes and behavior and increases organizational performance (Muduli and McLean 2020; Miao et al. 2021). Moreover, as the banking sector is considered a knowledge-intensive sector, therefore, to be competitive, it needs to show a significant amount of intellectual (Vidyarthi 2019; Buallay et al. 2020; Vo and Tran 2021). Previous studies have used these dimensions of HPWS since they are linked with the development of various

components of intellectual capital. (Youndt and Snell 2004; Wang and Chen 2013; Donate et al. 2016).

The second construct is intellectual capital, and this concept became popular in 1969 by John Kenneth Galbraith and saw major developments in the 1990s (Bontis 1998; Viedma Marti 2007). In the current knowledge-based economy, organizations depend more on their intellectual capital to achieve competitive advantage because it is closely associated with increasing performance (Ni et al. 2020). Research on intellectual capital has been classified into three categories: human capital, social capital, and organizational capital (Youndt and Snell 2004). Human capital refers to individuals' knowledge, skills, and abilities acquired through education, training, and experience (Hitt et al. 2001). Social capital is defined as "the sum of the actual and potential resources embedded within, available through, and derived from the networks of relationship possessed by an individual or social unit" (Nahapiet and Ghoshal 1998, p. 243). Moreover, organizational capital represents the codified knowledge and experiences stored in the organization's structure, systems, processes, and manuals (Youndt and Snell 2004).

The third construct is innovation capability which has become a significant factor in achieving competitive advantage in the 21st century. It enables organizations to meet changing customers' needs by offering them their required products and services (Le et al. 2020). It is defined as the capability of developing new knowledge, technologies, and products & services along with renewing the existing ones (Zheng et al. 2010). Researchers divide innovation capability into two major types, called incremental and radical ones (Sheng and Chien 2016). Both capabilities are different with respect to the application of knowledge. Incremental innovation is associated with minor changes in an organization's products, services, and procedures. In contrast, radical innovation is related to big changes, which probably replace existing products, services, and technologies with new ones (Lei et al. 2020).

### *2.1. Literature on High-Performance Work System (HPWS) and Intellectual Capital*

Most of the empirical research in the existing literature confirms that HPWS practices positively impact the development of different components of intellectual capital. For example, selective staffing attracts qualified people and increases an organization's human capital (Zacharatos et al. 2005). It also helps get people who are good at coordinating and building relationships that develop social capital (Pfeffer 1996). Similarly, training develops an organization's human and social capital by imparting employees the required knowledge and skills and developing relationship-building skills (Collins and Smith 2006; Cabello-Medina et al. 2011). Training also familiarizes employees with organizational routines and encourages them to work collectively (Crossan et al. 1999). According to Kang and Snell (2009), this mutual understanding among employees leads to the development of organizational capital by storing their knowledge in organizational storehouses.

Likewise, organizations can offer high compensation to get highly skilled employees and link different bonuses and incentives to enhance their collaboration with other employees (Youndt and Snell 2004; Pfeffer 1996). This all develops organizational human and social capital. Moreover, performance appraisal also increases employees' performance through their developmental plans and develops human capital (Shipton et al. 2017; Rutherford et al. 2003). Similarly, employees become more vigilant in building networks when performance feedback is provided to employees, which develops social capital (Pfeffer 1996). In addition, participation in decision making and empowerment enable employees to increase their interaction and exchange knowledge and information (Adner and Helfat 2003). Empowerment also develops organizational capital by allowing employees to redesign their jobs, where they review the tasks and responsibilities of employment and arrange them again effectively. During this rearrangement, their knowledge can be institutionalized in organizational databases (Smith et al. 2018). Empowerment also allows employees to provide suggestions for improving organizational processes, routines, and systems. This



process helps organizations store employees' feedback in their storehouses which develops corporate capital (Youndt and Snell 2004).

Similarly, team working provides an excellent opportunity for employees to interact with each other, share their knowledge, and develop human and social capital (Yang and Lin 2009). Furthermore, a reduction in status differences encourages employees to build up networks of relationships with people working at different levels. Status differences may divide people into other social classes, and their removal motivates them to interact more frequently and without hesitation, enhancing social capital development (Pfeffer 1996). Likewise, information technology (IT) also greatly facilitates the exchange of knowledge and information and develops human capital (Zacharatos et al. 2005). This enables employees in different organizations to connect and develop social capital. However, the role of IT in developing organizational capital is most important (Youndt and Snell 2004).

Finally, documentation practice substantially impacts the development of organizational capital by using different strategies. For example, encouraging employees to write detailed reports of their learning experiences after completing any group project that should be added to organizational databases. Similarly, organizations must have a proper system of receiving customers' suggestions, preferences, and complaints. Further, employees should be asked to incorporate these data in organizational repositories to make this part of organizational capital. Additionally, employees should also be encouraged to regularly review and update the stored knowledge in organizational manuals. This all helps in building organizational capital (Youndt and Snell 2004). Thus, based on the above literature, the following hypotheses are proposed for the current study being conducted in Pakistan's banking sector.

**H1.** *HPWS positively impacts the development of human capital.*

**H2.** *HPWS positively impacts the development of social capital.*

**H3.** *HPWS positively impacts the development of organizational capital.*

## *2.2. Intellectual Capital and Innovation Capabilities*

Intellectual capital consists of different components, and literature shows their positive relationship with developing organizational innovation capabilities. For instance, human capital is the most valuable asset, and researchers state developing innovation capabilities in organizations majorly depends upon these creative and bright people who learn faster (Alegre et al. 2006; Hitt et al. 2001). Their expertise enables organizations to perceive, create, and implement new ideas, ultimately increasing organizational innovation performance (Delgado-Verde et al. 2016). Similarly, researchers present positive results that people possessing unique and specialized knowledge, skills, and abilities (KSA) mainly contribute to the generation of novel ideas which are reflected in an organization's products, services, systems, and procedures (Ramsey et al. 2016; Asiaei and Bontis 2019; Ni et al. 2020). Thus, organizations can enhance their innovation performance to a higher level by focusing on their human capital (Lowik et al. 2017). In addition to this, the majority of research conducted worldwide also signifies the existence of human capital as a connecting mechanism between HPWS and innovation capabilities (Cabello-Medina et al. 2011; Chen and Huang 2009; Yousaf et al. 2019). Thus, based on the above literature, the following hypotheses are being proposed for the current study.

**H4.** *Human capital positively impacts the development of incremental innovation capability.*

**H5.** *Human capital positively impacts the development of radical innovation capability.*

**H6.** *Human capital mediates the relationship of HPWS with developing incremental innovation capability.*

**H7.** *Human capital mediates the relationship of HPWS with developing radical innovation capability.*

Similarly, social capital is also linked with developing innovation capabilities in organizations (Agostini and Nosella 2017). Social capital fosters coordination and cooperation, facilitating organizational members to exchange resources and generate value by developing innovation capabilities (Foss et al. 2011). While emphasizing the importance of networking, researchers also contend that creating such capabilities is not an isolated effort and depends upon an organization's collaboration with its different stakeholders, such as customers, research and development institutions, suppliers, and governmental organizations (Manu 1992). Such collaboration provides knowledge about market trends, customers' demands, competitors' strategies, and technological changes (Forés and Camisón 2016; Zahra and George 2002). Thus, these partnership relationships keep the firms informed about market conditions and enable them to bring innovation to their products and services (Romijn and Albaladejo 2002). Social capital impacts positively developing innovation, and literature further proves this as a critical mediating link between HPWS and organizational innovation capabilities (Donate et al. 2016). Therefore, based on the above literature review, the following hypotheses are being proposed for the current study.

**H8.** *Social capital positively impacts the development of incremental innovation capability.*

**H9.** *Social capital positively impacts the development of radical innovation capability.*

**H10.** *Social capital mediates the relationship of HPWS with developing incremental innovation capability.*

**H11.** *Social capital mediates the relationship of HPWS with developing radical innovation capability.*

Finally, organizational capital positively impacts the development of organizational innovation capabilities, which is confirmed by different researchers (Engelman et al. 2017). For example, (Subramaniam and Youndt 2005) assert that the knowledge stored in organizational business processes improves innovation capabilities. Similarly, according to Kaplan et al. (2004), the technologies and climate of an organization strengthen its innovation performance. Moreover, studies conducted by Sciulli (1998) and Liao et al. (2007) also develop a positive relationship between organizational structure with organizational innovation. Likewise, organizational culture has also been described as positively impacting the development of organizational innovation capabilities (Lau and Ngo 2004; Wei et al. 2012). However, scholars state unless this stored knowledge is shared among individuals and applied, it cannot generate innovation (Ju et al. 2006). Therefore, people in the organization should use this preserved knowledge in their repeated activities, increasing their knowledge (Katila and Ahuja 2002). Thus, considering the above literature, the following hypotheses are being proposed for the current study.

**H12.** *Organizational capital positively impacts the development of incremental innovation capability.*

**H13.** *Organizational capital positively impacts the development of radical innovation capability.*

**H14.** *Organizational capital mediates the relationship of HPWS with developing incremental innovation capability.*

**H15.** *Organizational capital mediates the relationship of HPWS with developing radical innovation capability.*

### **3. Research Methodology**

The current study's population was middle-to-senior level managers working in the district offices of all banks in the Punjab province of Pakistan. A district office manages all branches of its respective bank located in that area and is normally managed by two middle-to-senior level managers. These managers were well-educated and possessed several years of experience (Khan 2022; Malik et al. 2011; Abbas et al. 2013; Danish et al.

2014). These factors equip them to have good knowledge of people's skills working around them, their social networks, the banking system, and market conditions. The population was determined to a figure of 1494 by calculating district branches of all banks in the Punjab province and taking two managers from each branch. Later on, a sample size of 316 was determined using Taro Yamane's formula (Yamane 1973).

### 3.1. Survey Measures

A self-administered adopted questionnaire consisting of thirty-one (31) items was used for data collection. Six questions were used for demographics, and the remaining twenty-five items were used for measuring model variables using a seven-point Likert scale ranging from (1) = strongly disagree (2) = disagree (3) = somewhat disagree (4) = neither agree nor disagree (5) = somewhat agree (6) = agree (7) = strongly agree. High-performance work system (HPWS) is the first variable composed of ten questions adopted from previous studies, e.g., sample items were 'the bank I work for (i) Adopts very extensive selection process for a job, (ii) Provides extensive training programs to employees, and (iii) Pays higher wages than competitors (Guthrie et al. 2009; Takeuchi et al. 2007; Youndt and Snell 2004). Similarly, intellectual capital based on three dimensions, e.g., human capital (HC), social capital (SC), and organizational capital (OC), were measured by three (03) items, e.g., the bank I work for has employees (i) who are highly skilled, (ii) who share information and learn from one another, and (iii) possesses much of its knowledge contained in manuals and databases (Subramaniam and Youndt 2005). Lastly, three (03) items, each about incremental and radical innovation capabilities, were adapted from Subramaniam and Youndt (2005). Sample items were 'the bank I work for has capability of innovation that (i) reinforces the prevailing products and services, (ii) fundamentally changes the prevailing products and services, and (iii) makes existing expertise in the prevailing products and services obsolete.

### 3.2. Pilot Testing

In research practice, usually, researchers prefer to perform pilot testing before proceeding to a full-scale study (Tashakkori et al. 1998). Based on previous literature, researchers generally recommend 10% sample of a full-scale study or 10–30 participants per group should be adequate (Hertzog 2008). The estimated reliability of a single instrument should be at least 0.70. Preferably; the value should exceed 0.700 if it is an established instrument (Nunnally 1994). Reliability is the degree to which the measures are error-free; it reflects the stability and consistency between items used to measure a variable. The internal consistency measures provide evidence for the homogeneity of multiple measurements of a variable (Sekaran and Bougie 2016) and may ideally be highly interrelated. Before starting data collection, the adopted questionnaire was also piloted among 30 participants to assess its reliability and validity. It met the criteria because Cronbach's alpha values were greater than 0.700 for all constructs, and experts from academia and industry confirmed its validity. After validating the questionnaire items, full-scale data collection was performed, and data from 233 participants were collected using a simple random sampling technique that showed a response rate of 75%.

### 3.3. Partial Least Square (PLS) Structural Equation Modeling (SEM)

One of the major reasons was that PLS-SEM works well with any distributional pattern of data (Marcoulides et al. 2009). Secondly, PLS-SEM has a higher degree of statistical power, which refers to its ability to identify relationships as significant that exist in the population (Sarstedt and Mooi 2019; Hair et al. 2017). Thirdly, it works well with testing and confirming a theory (Hair et al. 2019).

## 4. Data Analysis

The current study consisted of participant gender, age, marital status, education, and experience via descriptive analysis using SPSS 27. Gender-wise, 82% were male and 18% female. In the age bracket, 82.4% belonged to the age group 46 and above, and only 17.6%



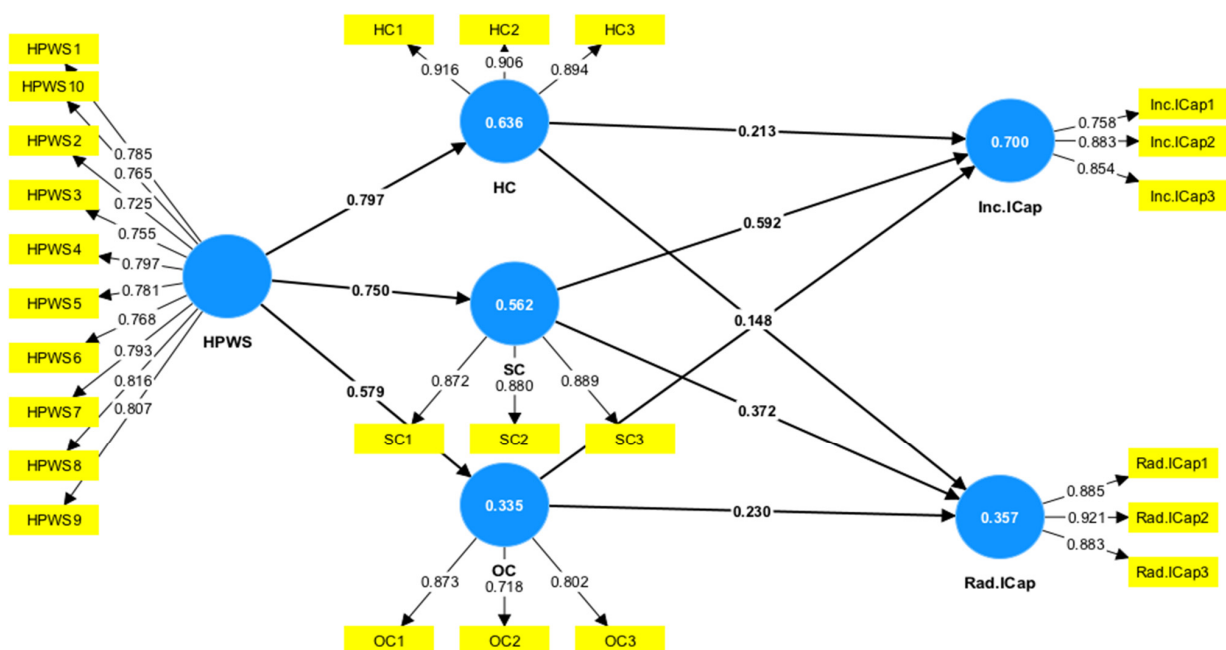
were between 41 and 45. Surprisingly all participants who participated in the current study were married. Based on education, 64.4% of participant held bachelor’s degrees, and 35.6 the master’s credentials. Primarily, 62.2% of participants had more than 20 years of experience, and 37.8% had 16–20 years of experience. Employees under control were 100%. The complete of demographic details are given in Table 1.

**Table 1.** Demographic Statistics.

Demographic Variables		Frequency	Percentage
Gender	Male	191	82
	Female	42	18
Age	41–45	41	17.6
	46 and above	192	82.4
Marital Status	Married	233	100
Education	Bachelor	150	64.4
	Masters	83	35.6
Experience	16–20 years	88	37.8
	More than 20 years	145	62.2
Employees under Control	More than 20	233	100

4.1. Measurement Model

Partial least squares-structural equation modeling (PLS-SEM) was applied to perform data analysis by using Smart-PLS 4.0. Since this study develops measurement models consisting of reflective indicators, and their assessment is performed through different reliability and validity tests (Khan 2022). The adjusted measurement model is highlighted loading of each construct in Figure 2. Regarding reliability, the outer loading values of all indicators were acceptable, being higher than 0.7. Similarly, values of composite reliability were also acceptable, being greater than 0.7 (Hair et al. 2011a). Similarly, convergent validity was also confirmed because all latent variables’ average variance extracted (AVE) was greater than 0.5.



**Figure 2.** Adjusted Measurement Model.

Similarly, convergent validity was also confirmed because all latent variables' average variance extracted (AVE) was greater than 0.5. The details are given in Table 2.

**Table 2.** Convergent Validity.

Constructs	Items	Loadings	Composite Reliability (CR)	Average Variance Extracted (AVE)
High-Performance Work System	HPWS1	0.785	0.939	0.608
	HPWS2	0.725		
	HPWS3	0.755		
	HPWS4	0.797		
	HPWS5	0.781		
	HPWS6	0.768		
	HPWS7	0.793		
	HPWS8	0.816		
	HPWS9	0.807		
	HPWS10	0.765		
Human Capital	HC1	0.916	0.932	0.819
	HC2	0.906		
	HC3	0.894		
Structural Capital	SC1	0.872	0.912	0.775
	SC2	0.880		
	SC3	0.889		
Organizational Capital	OC1	0.873	0.841	0.640
	OC2	0.718		
	OC3	0.802		
Radical Innovation Capability	Rad.ICap1	0.885	0.925	0.804
	Rad.ICap2	0.921		
	Rad.ICap3	0.883		
Incremental Innovation Capability	Inc.ICap1	0.758	0.804	0.694
	Inc.ICap2	0.883		
	Inc.ICap3	0.854		

Finally, discriminant validity was assessed through the Fornell–Larcker criterion, Heterotrait–Monotrait (HTMT) ratio, and Cross Loadings. All three assessments met the criteria. Results of all tests to assess reliability and validity are given in Tables 3–5. After validating the measurement model using convergent and discriminant validity assessments, the next section provided details of the structural model through SEM analysis using Smart PLS 4.0 analysis.

**Table 3.** Fornell–Larcker criterion.

	HC	HPWS	Inc.ICap	OC	Rad.ICap	SC
HC	0.905					
HPWS	0.697	0.780				
Inc.ICap	0.631	0.728	0.833			
OC	0.470	0.579	0.601	0.800		
Rad.ICap	0.413	0.465	0.728	0.492	0.897	
SC	0.588	0.750	0.805	0.596	0.560	0.880

**Table 4.** Heterotrait–Monotrait (HTMT) Ratio.

	HC	HPWS	Inc.ICap	OC	Rad.ICap	SC
HC						
HPWS	0.777					
Inc.ICap	0.747	0.830				
OC	0.563	0.678	0.759			
Rad.ICap	0.466	0.508	0.796	0.596		
SC	0.672	0.820	0.770	0.729	0.641	

**Table 5.** Cross Loadings.

	HC	HPWS	Rad.ICap	OC	Inc.ICap	SC
HC1	0.916	0.729	0.567	0.433	0.375	0.528
HC2	0.906	0.714	0.549	0.427	0.354	0.506
HC3	0.894	0.722	0.595	0.415	0.390	0.560
HPWS1	0.710	0.785	0.524	0.400	0.362	0.515
HPWS2	0.661	0.725	0.431	0.356	0.297	0.480
HPWS3	0.677	0.755	0.479	0.365	0.282	0.495
HPWS4	0.554	0.797	0.570	0.439	0.346	0.573
HPWS5	0.550	0.781	0.575	0.448	0.358	0.596
HPWS6	0.546	0.768	0.610	0.534	0.384	0.648
HPWS7	0.572	0.793	0.583	0.459	0.357	0.601
HPWS8	0.679	0.816	0.649	0.519	0.414	0.637
HPWS9	0.644	0.807	0.651	0.510	0.414	0.675
HPWS10	0.622	0.765	0.577	0.458	0.387	0.601
Rad.ICap1	0.361	0.423	0.885	0.415	0.669	0.531
Rad.ICap2	0.386	0.471	0.921	0.495	0.710	0.538
Rad.ICap3	0.361	0.346	0.883	0.407	0.569	0.428
OC1	0.478	0.578	0.626	0.873	0.479	0.597
OC2	0.293	0.366	0.357	0.718	0.307	0.361
OC3	0.317	0.403	0.400	0.802	0.363	0.426
Inc.ICap1	0.420	0.433	0.739	0.430	0.758	0.511
Inc.ICap2	0.565	0.677	0.612	0.554	0.883	0.742
Inc.ICap3	0.573	0.676	0.513	0.507	0.854	0.730
SC1	0.501	0.655	0.701	0.478	0.436	0.872
SC2	0.502	0.632	0.678	0.546	0.502	0.880
SC3	0.547	0.692	0.745	0.549	0.537	0.889

#### 4.2. Structural Model

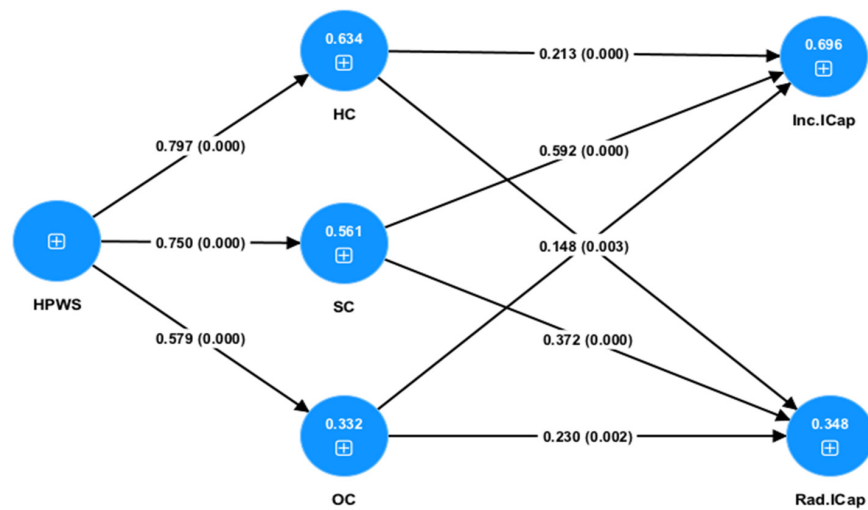
As far as the evaluation of the structural model is concerned, it was performed through bootstrapping with 5000 interactions so that the statistical significance of tests can be confirmed by generating t-values and standard errors (Hair et al. 2011b). To test mediation, researchers applied (Preacher and Hayes 2004), (Preacher and Hayes 2008) approach and selected bias-corrected bootstrapping (Memon et al. 2018). These analyses were conducted at a 0.05 level of significance. Results are given in Tables 6 and 7, which show all hypotheses were supported because T-values >1.96,  $p$ -value < 0.05, and bootstrap confidence interval bias did not straddle a 0 between the upper and lower intervals. However, this impact was a little higher in developing human capital ( $\beta = 0.797$ ) and social capital ( $\beta = 0.750$ ) in comparison to organizational capital ( $\beta = 0.579$ ). Figures 3 and 4 show the path coefficient,  $p$ -value, and T-value, respectively.

**Table 6.** Direct Effects.

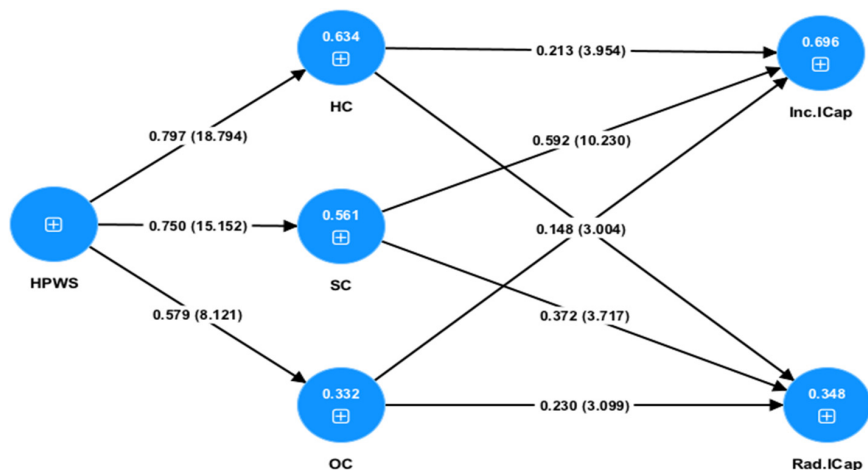
Hypotheses	Original Sample (O)	T Statistics ( O/STDEV )	p-Values	Decision
H1-HPWS → HC	0.797	18.794	0.000	Supported
H2-HPWS → SC	0.750	15.152	0.000	Supported
H3-HPWS → OC	0.579	08.121	0.000	Supported
H4-HC → Inc.ICap	0.213	03.954	0.000	Supported
H5-HC → Rad.ICap	0.148	03.004	0.003	Supported
H8-SC → Inc.ICap	0.592	10.230	0.000	Supported
H9-SC → Rad.ICap	0.372	03.717	0.000	Supported
H12-OC → Inc.ICap	0.148	03.004	0.003	Supported
H13-OC → Rad.ICap	0.230	03.099	0.002	Supported

**Table 7.** Mediation (Indirect) Effects.

Hypotheses	Original Sample (O)	T Statistics ( O/STDEV )	p-Values	Decision
H06-HPWS → HC → Inc.ICap	0.170	3.669	0.000	Supported
H07-HPWS → HC → Rad.ICap	0.117	2.006	0.003	Supported
H10-HPWS → SC → Inc.ICap	0.444	8.952	0.000	Supported
H11-HPWS → SC → Rad.ICap	0.279	3.607	0.000	Supported
H14-HPWS → OC → Inc.ICap	0.085	2.670	0.008	Supported
H15-HPWS → OC → Rad.ICap	0.133	2.760	0.006	Supported



**Figure 3.** Structural model Path coefficient and p-Values.



**Figure 4.** Structural model T statistics and p-Values.

The path coefficient (beta) is more than 0 showing direct positive relationships. The T-value is greater than 1.96, with a  $p$ -value less than 0.05 indicating an acceptable range. The highest value of beta is 0.797, T-value of 18.794, and a  $p$ -value of 0.000 recorded for H1, followed by H2. The details of all direct hypotheses are shown in Table 6. On the other side, they indicated that social capital mediated the relationship most effectively ( $\beta = 0.444$ , 0.279), and next to this were human capital ( $\beta = 0.170$ , 0.117) and organizational capital ( $\beta = 0.133$ , 0.085). Likewise, H10 shows more substantial effects, followed by H06 and H11 in the category of indirect paths. The details of all indirect hypotheses are shown in Table 7.

#### 4.3. The Explanatory Power of the Model ( $R^2$ ) and $F^2$ Statistics

R Square statistics explains the variance in the endogenous variable explained by the exogenous variables. Falk and Miller (1992) have recommended that  $R^2$  values should be equal to or greater than 0.10 for the variance explained by a particular endogenous construct to be deemed adequate. Cohen (1988) has suggested that  $R^2$  values for endogenous latent variables are assessed as follows: 0.26 (substantial), 0.13 (moderate), and 0.02 (weak). Chin (1998) also recommended  $R^2$  values for endogenous latent variables based on: 0.67 (substantial), 0.33 (moderate), and 0.19 (weak). Empirical research on marketing issues suggested that  $R^2$  values of 0.75, 0.50, or 0.25 for endogenous latent variables can, as a rough rule of thumb, be respectively described as substantial, moderate, or weak (Hair et al. 2011a). Inc.ICap represents the highest value of  $R^2$  (0.696), followed by HC (0.634).

Finally,  $R^2$  indicates research model explanatory power, and its values elaborate that HPWS through intellectual capital components explained 63% of the variance in incremental innovation capabilities whereas 69% of innovation capabilities. This level of variance is respectively described as substantial and moderate for other variables (Hair et al. 2011b). Likewise, F-Square ( $F^2$ ) means a variable in a structural model may be affected by several different variables. Removing an exogenous variable can affect the dependent variable.  $F^2$  is the change in R-Square when an exogenous variable is removed from the model. The  $F^2$  is effect size ( $\geq 0.02$  is small;  $\geq 0.15$  is medium;  $\geq 0.35$  is large) (Cohen 1988). Results indicated that human and social capital have higher values as compared to other variables, respectively. The details of all other values are given in Figure 5.

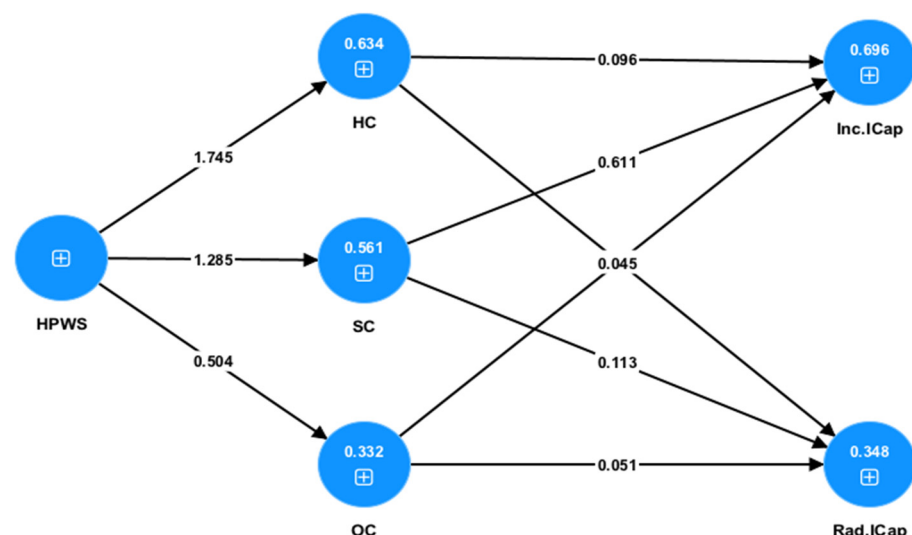


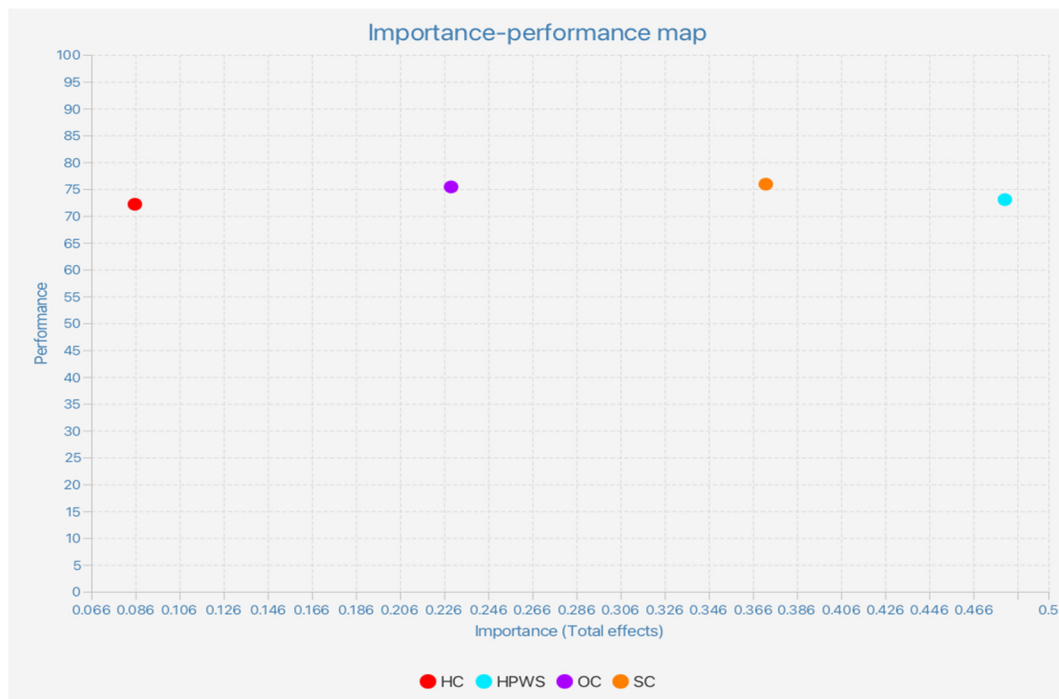
Figure 5. Square and F Square Statistics.

#### 4.4. Importance–Performance Map Analysis

PLS-SEM 4.0 importance–performance map analysis (IPMA) analyses were performed to provide information on the relative importance of constructs in explaining other constructs in the structural model. IMPA extends the results of PLS-SEM by also taking the performance of each construct into account, which is particularly important for prioritizing



managerial actions. Consequently, results revealed that, e.g., HC (72.171), HPWS (73.038), OC (75.396), and SC (75.913). Preferably, all constructs primarily exhibit large importance regarding their explaining Rad.ICap/Inc.ICap, at the same time, have the relatively highest of all antecedents' factors important for variability in the outcome variable (See Figure 6).



**Figure 6.** Importance–performance map [Rad.ICap/Inc.ICap (constructs)].

### 5. Research Findings and Theoretical Implications

Data analysis shows that HPWS positively impacted the development of all three components of intellectual capital and supported hypotheses from H1 to H3. Similarly, hypotheses (H4, H5, H8, H9, H12, and H13) associated with testing the impact of human capital, social capital, and organizational capital to develop incremental and radical innovation capabilities were also supported. Regarding mediation testing effects, the following hypotheses supported H6, H7, H10, H11, H14, and H15. These results fully support the underlying theories of the resource-based view (RBV) and knowledge-based view in the banking sector of Pakistan. In addition to accepting or rejecting hypotheses through T- and P-values, data analysis also provides  $\beta$ -values, which indicate how respondents have ordered the strength of different relationships in the current study, which is also necessary to explain. According to them, HPWS strongly impacts the development of all three components of intellectual capital.

While the results of this study are statistically significant, however, different beta ( $\beta$ ) values represent variation in the responses of the participants of this study. On the one hand, in comparison to previous studies, the path coefficients of this study from HPWS to; human capital, social capital, and organizational capital were higher than studies such as (Donate et al. 2016; Kianto et al. 2017; Akay and Kunday 2018; Yousaf et al. 2019). However, on the other hand, the path coefficient values of this study from all components of intellectual capital to innovation capabilities align with these studies. Thus, the study confirms the higher impact of HPWS on intellectual capital than similar studies, specifically in the banking sector of Pakistan, but a similar impact of intellectual capital on innovation capabilities.

This study has contributed to the theory and practice in the following ways. Firstly, this has tested the theory and added to the efforts to explain how the relationship of HPWS develops with innovation capabilities from an intellectual capital perspective. This relation-

ship was termed a black box (Shin et al. 2018), and extant literature also contained a limited number of empirical evidence to explain this. Secondly, this study has extended the theory by taking a holistic approach with respect to including all three components of intellectual capital in one study, which most of the studies did not consider. We have particularly responded to the calls for further research regarding the inclusion of organizational capital as a mediator in the relationship of HPWS with innovation (Donate et al. 2016; Easa and Orra 2020). Although the literature has discussed the link between HPWS and innovation capabilities in SMEs (Do and Shipton 2019; Haar et al. 2022; Shahzad et al. 2019a), there is a research gap in studying this relationship with respect to Pakistan and particularly its banking sector. This study bridged that gap by empirically testing the mediating effects of three dimensions of intellectual capital, e.g., (HC, SC, and OC) on the relationship between HPWS and radical and incremental innovation capabilities in the context of the Pakistani banking sector.

### *Practical Implications*

Empirical findings of the current study have shown the importance of HPWS in developing innovation capabilities through intellectual capital. These findings are of great importance for the decision makers in the banking sector and require their attention to the following actions. The purpose is to further develop innovation capabilities through the undertaken relationship. Firstly, they should recognize to implement HR practices in the form of a system (HPWS) because this creates a synergy effect in comparison to stand-alone HR practices and significantly impacts the development of different components of intellectual capital. Secondly, though mediating appropriately but management should further strengthen the mediating impact of human capital, social capital, and organizational capital in the given context through the following plan of action. For example, they should make their employees realize the importance of possessing innovation capabilities through different training programs. Having conducted this, employees should be motivated to contribute to developing innovation capabilities through their knowledge, skills, and abilities (human capital) as well as by using the stored knowledge in the organizational databases, structure, and system (organizational capital).

Their motivation can be developed and enhanced through different monetary (e.g., pay for performance and bonuses) as well as non-monetary incentives (e.g., recognition of efforts on different occasions). Moreover, the trend of working in self-managed teams should be encouraged, where employees find solution to problems by using their own competencies as well as the organization's stored knowledge, thus contributing to developing innovation capabilities. Similarly, employees should be empowered and allowed to participate in decision making because this enables them to bring new ideas. To further enhance social capital's contribution, management should fully focus on developing such an organizational environment that is attributed to coordination, cooperation, and open communication. This can be achieved by promoting team working, empowering employees, and reducing hierarchical barriers. This will encourage employees to further develop and use their networks of relationships from inside as well as outside the organization to contribute to developing innovation capabilities. Furthermore, a performance appraisal system that includes parameters to evaluate employees' contributions in developing innovation capabilities should also be implemented. Thus, when all components of intellectual capital are further strengthened, this will have a synergy effect and catalyze the process of developing innovation capabilities.

### **6. Research Limitations and Recommendations**

This study has the following limitations, which need to be addressed in future studies. Firstly, the current study was conducted in the banking sector and collected data from respondents in the Punjab province of Pakistan. Considering just a specific locality to collect data may compromise the generalizability of the research findings (Sekaran and Bougie 2016). Therefore, future research should include samples from other provinces of Pakistan

to increase its scope. Secondly, possessing innovation capabilities are necessary not only for the banking sector but also for every sector of the economy to meet increasing competition. Therefore, future research should also be extended to other knowledge-intensive sectors of the economy, such as hospitality, education, and information technology, to obtain more empirical evidence to test and strengthen theories. Thirdly, this study used a cross-sectional design to collect data. However, this design does not establish causal inferences between HPWS and innovation capability over time. Therefore, a longitudinal design should be adopted in future studies for a deeper understanding of how a change in HPWS affects innovation capabilities over time through intellectual capital. Fourthly, this study focused on the mediating role of human capital, social capital, and organizational capital. Future studies should consider other mediators (like workforce health, work-life balance, and organizational learning) and moderators (like personality traits and leadership development) to explore further the underlying mechanism between HPWS and innovation capabilities in knowledge-intensive industries.

Human capital is an essential component of intellectual capital that needs further attention to unleash its true potential to develop radical innovation capabilities, and for that, the management of the banking sector should consider the following steps. Firstly, they should make their employees realize the importance of possessing radical innovation capabilities through different training sessions. Secondly, employees should be encouraged to use their knowledge, skills, and abilities to develop such capabilities. Thirdly, their encouragement should be enhanced through different monetary and non-monetary incentives. Fourthly, the trend of working in self-managed teams should be encouraged, where employees find solutions to problems by using their competencies and participating in decisions making. This would enable them to bring new ideas. Finally, a performance appraisal system that includes parameters to evaluate employees' contribution to developing radical innovation capabilities should also be implemented.

## 7. Conclusions

The aim of the current study has been fulfilled, and an important but less researched relationship has been elaborated from the perspective of a new country and industry. This has added to the body of existing knowledge and professional practices. Literature contained limited empirical evidence to describe the relationship of HPWS with developing innovation capabilities, termed a black box. Therefore, this study was undertaken in the banking sector of Pakistan, and the role of intellectual capital was explained to unfold the connecting mechanism. Most results were statistically significant, and social capital emerged as a more effective mediator than organizational and human capital. Moreover, results also revealed that HPWS explained moderate and weak variance in incremental and radical innovation capabilities, respectively. This is how the current study has contributed theoretically and empirically. Moreover, findings also suggest that the banking sector should properly implement HPWS practices to develop intellectual capital because resulting innovation capabilities would help them to compete as well as achieve sustained competitive advantage.

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