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Role of HPWS in Facilitating Radical Innovation: Mediating Role of Human Capital in the Banking Industry of Pakistan

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Keywords:

HPWS, HRM, HR Systems, Human Capital, Innovation, Banking Sector

ABSTRACT

This study aims to assess the impact of High-Performance Work Systems (HPWS) on radical innovation in the banking sector. Insights from the Resource-Based View (RBV) and the Ability-Motivation-Opportunity (AMO) Framework are used to explore the role of human capital as a mediator between HPWS and radical innovation. Using a simple random sampling technique, 209 responses were received from respondents in the banking sector firms of Pakistan. Structural Equation Modelling was used for data analysis. The results indicate the significance of HPWS as a driver of radical innovation. The study contributes to theory by extending the understanding of the 'black-box' (i.e., the transmission mechanism between systems of HRM and radical innovation). This study focuses on radical innovation as an alternative performance outcome of banks instead of financial outcomes, thus contributing to theory. Insights from our study are relevant to managers because it shows that HPWS implementation helps banks attract, develop, and retain talent and facilitates the development of human capital that is critical for enabling the radical innovation capability of banks. This study has several limitations, e.g., executing a cross-sectional study design, using the quantitative approach, and employing only six bundles of HR practices.

Introduction

Organizations face severe problems due to the ever-changing business environment and the emergence of disruptive technologies. On the one hand, there is an existential threat to organizations and on the other hand an opportunity to adjust to the changing pulse of business dynamics. To cope with the situation, an innovative business approach seems a preferred strategy (O'Reilly et al., 2019). For the survival and growth of the business, innovation is indispensable (Lasrado, 2019). Studies indicate an association between organizational performance and innovation. Thus, in the value chain of business, innovation is seen as an important factor (Bugnar et al., 2016). Prior studies have highlighted several enablers of innovation. However, the human side has gained significant importance in this equation (Pfeffer, 1998). This approach considers employees as important resources that contribute to innovation (Fu et al., 2015). Their abilities, skills, and motivation are considered pre-requisites for innovation, which can be developed with the help of individual HR practices. However, when HR practices are bundled together, the quantum of impact on employees' innovation ability becomes high (Youndt et al., 1996). A

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contemporary phenomenon about bundling of HR practices is the High-Performance Work Systems (HPWSs). These are systems of HRM that can impact workers' knowledge, skills, and abilities positively, leading to increased innovative abilities (Messersmith & Guthrie, 2010). Firms get a competitive edge with the help of HPWS (Delery & Roumpi, 2017). HR systems affect a firm's innovation ability directly (Zhen et al., 2020). However, the transmission mechanism between HPWS and radical innovation (also known as the black box) represents an under-researched area (Kloutsiniotis & Mihail, 2018). Hence, the current study sets out to explore the black box and comprehend the processes inside it in the context of the services sector.

Despite its vital importance, the services sector has attracted little attention from HPWS scholars. The innovation stream of research has traditionally been carried out in the manufacturing sector. Resultantly, the services sector represents an under-researched area (Jaw et al., 2010). Several scholars have pointed out that service innovation needs the attention of academics (e.g., Jaw et al., 2010). The service sector contributes up to 70 percent of developed economies' GDP. However, its role and importance for economic development have not been sufficiently explored (Owusu et al., 2020). The dominant manufacturing sector of the traditional industry depends increasingly on the service sector as a source of innovation, growth, and strategic advantage (Hsieh et al., 2013). Even the manufacturing sector's productivity is affected by several high-quality services (Hjort & Poulsen, 2019). A well-developed and efficient services sector is a prerequisite for the revival of the manufacturing sector (OECD, 2015). Developed economies are now being dominated by services (Wang *et al.*, 2015). In the Asian context, service trade has shown 1.7 times higher growth in contrast to the entire world. A trade-in knowledge-intensive service in the Asian economies is still in the initial stages and provides an opportunity to be capitalized (Dahl et al., 2019).

Most of the service-innovation research has taken place in industrialized economies. Therefore, scholars have called for further research in the background of emerging economies (Carlborg *et al.*, 2014). Recently, the service and finance sectors have been recommended by scholars as the focus areas for future HPWS strands of scholarship (Jewell et al., in press). Thus, the current study has selected the banking sector background of Pakistan's developing economy to address calls from scholars. The country faces low labor productivity issues, which can be addressed by enhancing employees' skills and abilities through implementing HPWSs. Moreover, there is a scarcity of research addressing HPWS, human capital as antecedents of radical innovation. Research on systems of HR practices in Pakistan is scarce (Saqib, 2017). Banks in Pakistan are adopting HR practices (Ahmad & Allen, 2015), but fewer studies have focused specifically on HPWS as a driver of innovation.

The current study concentrates on the transmission mechanism of HPWS to explore the processes through which HR systems affect radical innovation and the extent to which human capital affects radical innovation. To achieve these objectives, we reviewed relevant literature to inform the construction of the conceptual framework for our study. The framework incorporates viewpoints from the "Ability-Motivation-Opportunity (AMO) framework" (Trost *et al.*, 2016) and the "Resource-based view" (RBV) (Barney, 1995). According to the model, an HPWS affects radical innovation positively by influencing a firm's human capital. The model was tested empirically in Pakistan's banking sector.

1. Theoretical Framework and Formulation of Hypotheses

1.1 High Performance Work Systems (HPWS)

There is considerable debate about the definition of HPWS. It is a mix of HR practices and policies designed to boost employees' abilities, motivation, and discretion (Guthrie et al., 2009). Adoption of HPWS by an organization leads to higher levels of operational and financial results (Sun et al., 2007). Individual HR practices have a favorable impact on a company's overall performance. However, bundles of HR practices have a greater impact on business performance than individual HR policies (Saridakis et al., 2017). Recent studies indicate that HPWS has a favorable relationship with organizational success (Zheng et al., 2020). Therefore, scholars (Boon et al., 2019) advocate for focusing on bundles of HR practices.

Different HR practices have been grouped by various models. The most popular model is the AMO Framework, which brings together practices that increase workers' ability (e.g., training), practices that boost motivation (e.g., rewards system, incentives, etc.), and practices that enhance opportunity (e.g., job design, participation, communication, etc.). The number of constituent practices of an HPWS differs significantly across various studies and varies between 2 and 16 (Boon et al., 2019).

The seminal work of Huselid (1995) established a correlation between HPWS and a lower turnover of employees. He found that HPWS is associated with improved financial performance. According to Kalleberg *et al.* (1994), there is a link between business HR policy and performance in US organizations. Others demonstrate that implementation of HPWS leads to organizational as well as employee benefits (Zheng et al., 2020). Moreover, the adoption of HPWS accrues a competitive advantage to the firm because HPWS cannot be imitated easily by rival firms (Meuer, 2017).

1.2 Human Capital

Human capital relates to the level of ideas, information, knowledge, abilities, and health conditions of workers in an organization (Becker et al., 2002). Fulmer and Ployhart (2014) define it as "an individual and/or unit level resource that is related to the ability of the firm for the generation of economic value". Human capital is viewed by the RBV as a cornerstone for maintaining a competitive advantage (Barney, 1995).

1.3 HPWS and Human Capital

From the standpoint of RBV, employees constitute resources for a firm (Shaw et al., 2013). Firms recruit and select human resources from the labour market, provide the requisite training, motivate them, and achieve organizational objectives through them. In all these stages, HR practices play a crucial role. According to Wright et al. (2001), when HR practices are bundled together as complementary systems, the firm gains a competitive advantage because other firms are not able to copy them. HR practices can help to improve the human capital level of a company (Delery & Roumpi, 2017). HR practices have a greater impact when they are implemented in a logical and consistent manner. HPWS are such systems made up of bundles of HR practices leading to an improved human capital level (Delery & Doty, 1996).

HR practices can help firms influence workers' abilities and behaviour in the required direction (Chen & Huang, 2009). Companies may create generic and company-specific human capital through recruitment and selection and training programs (Subramony, 2009). Likewise,

team-based HR systems facilitate intra-organizational communication that leads to knowledge sharing. Resultantly, new knowledge creation is facilitated (Smith et al., 2005). Similarly, pay for performance is associated with employee motivation (Rynes et al., 2005).

Swart and Kinnie (2010) find an association between HR practices (like selection, retention of employees, motivation) and employees' learning and performance development. Other scholars report a positive correlation between careful selection processes, extensive training, and the human capital of a firm (Zacharatos et al., 2005). Competitive compensation systems can be used to attract high-quality human capital to the firm (Guthrie, 2001). Thus, building on the insights of the RBV, we propose that businesses using HPWS will attract and develop high levels of human capital. As a result, the following hypothesis is offered:

H 1: HPWS is positively associated with human capital.

1.4 HPWS-Radical Innovation direct link

According to the AMO framework, ability refers to employees' skill set which they use while at work, motivation is related to the internal drive to perform a task, and opportunity means a certain limitation in the workplace (Trost et al., 2016). When organizations enhance workers' abilities, provide proper motivation, and create opportunities in the workplace, employees exhibit innovative work behavior that leads to innovation (Messersmith & Guthrie, 2010). Therefore, firms that pursue innovation should enhance the abilities and skills of their employees, motivate them through incentives, and offer an opportunity to participate in the firm's affairs (Schimanski, 2014). The human resource of the firm plays a key role in enabling organizational innovation (Fu *et al.*, 2015). HPWS implementation increases workers' skills and abilities, increases their level of motivation to seek opportunities to solve customers' problems, which ultimately results in organizational innovation. The connection between HPWSs and innovation has empirical as well as theoretical evidence (Fu et al., 2015). More specifically, Beugelsdijk (2008) has shown that HPWS and radical innovation have positive association. Consequently, we propose that:

H2: HPWS is positively associated with radical innovation.

1.5 Human Capital-Radical Innovation link

Human capital is considered essential for enabling firms for innovation (Zhou, 2006). In the current competitive atmosphere, innovation is seen as crucial for a competitive edge (Teece, 2009). Smith et al. (2005) suggest that innovation depends on workers' capability to generate and handle knowledge. When employees combine and exchange knowledge, it results in innovation. Therefore, human capital should be considered as a significant driver of innovation (De Winne & Sels, 2010). Highly developed human capital may lead to innovation (Wang et al., 2008). Organizations with highly skilled and trained employees are better equipped to generate novel technical ideas. Such ideas and suggestions can be translated to innovation at the firm level (Romijn & Albaladejo, 2002). Therefore, firms that have a highly developed base of human capital are well poised for innovation (Subramaniam & Youndt, 2005). Hence, we propose:

H3: Human capital is related positively with radical innovation.

1.6 Indirect relationship between HPWS and radical innovation

Human capital is critical for organizational performance (Becker, 1983). Human resource practices, especially extensive training, help create high-quality human capital (Combs et al., 2006). The human capital-innovation link can be explained using the RBV (Barney, 1986). Accordingly, corporations gain a competitive advantage by owning and employing idiosyncratic resources that should be scarce. Human capital fulfils these conditions and thus generates economic value. Firms can use various human resource practices to influence various aspects of employee characteristics (Chen & Huang, 2009). Innovation is an organizational performance outcome. It can be significantly influenced with the help of HPWS through different dimensions of intellectual capital, such as organizational capital, social capital, and human capital (Chen & Wang, 2010). HPWS positively influences the firm's human capital, which leads to higher levels of organizational performance (Takeuchi et al., 2009). In this vein, Parker and Axtell (2000) argue that HPWS positively affects the skills and competence of the workforce that sequentially affect their job performance.

Employees are the breeding ground of creative ideas that drive innovation in the organization (Snell & Dean, 1992). Organizational ability to create innovation is contingent upon employee knowledge and skills. High level of human capital will result in enhanced innovation capability because employees will be able to convert current knowledge into new knowledge (Cohen & Levinthal, 1990). HPWS increases intellectual capital, which relates to a company's ability to innovate (Swart & Kinnie, 2010). Workers' KSAOs mediate the linkage between HPWS and firm outcomes (Combs et al., 2006). Certain HR practices help in the formation of human capital that ultimately results in organizational innovation (Cabello-Medina *et al.*, 2011). Human capital, according to Donate et al. (2015), mediates the link between HPWS and radical innovation. Therefore, drawing on the Resource-Based View (Barney, 1995), we propose that:

H4: Human capital mediates the linkage between HPWS and radical innovation

1.7 Conceptual framework of the study

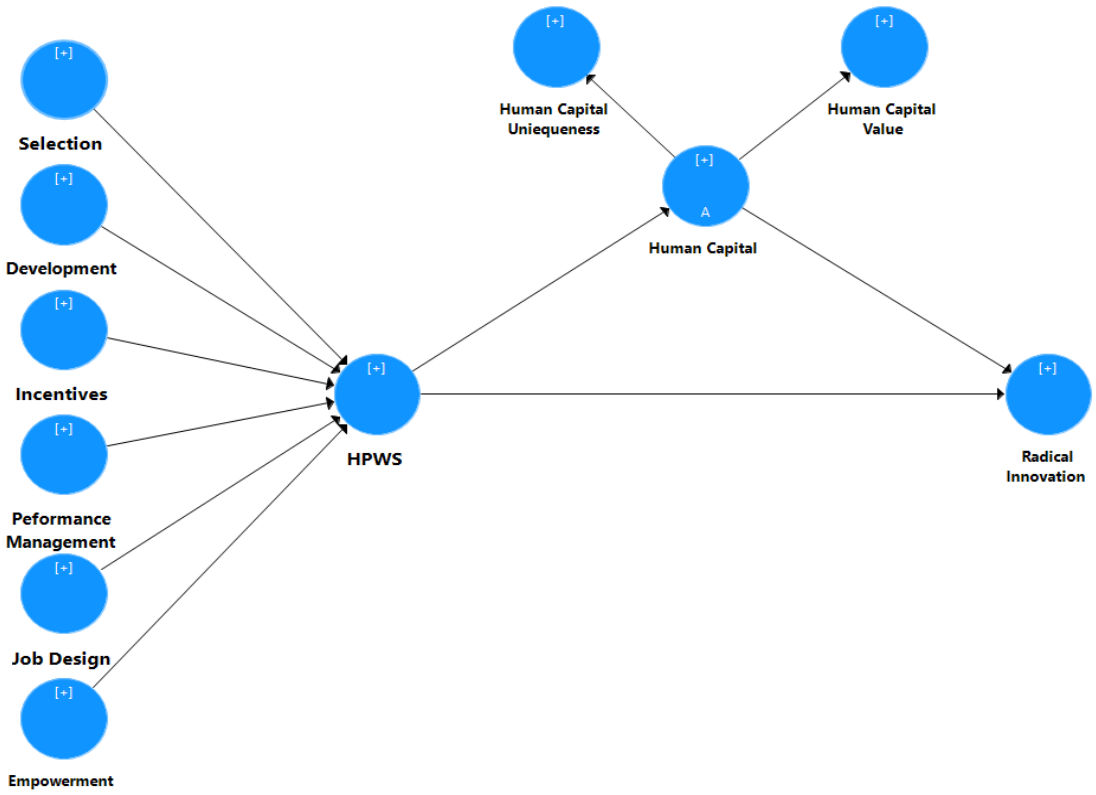
The current study's conceptual framework is made up of three variables. The independent variable of the study is HPWS. Drawing on the AMO Framework, HPWS has been operationalized as a high-order formative construct. The first order is composed of six variables i.e., selection, incentives, development, performance management, empowerment, and job design. These variables are represented by 27 indicators. Human capital and radical innovation are the two dependent variables. Using the RBV, human capital has been operationalized as a higher-order reflective construct. The first order is made up of two variables: human capital value and human capital uniqueness, each with four and five indicators. Human capital is the mediator variable of the study. Radical innovation is a dependent variable and composed of three indicators. The study's conceptual framework is depicted in Figure 1.

Drawing on the RBV, the conceptual framework of the study proposes that HPWS first affects human capital positively by enhancing its value and uniqueness. Following Subramaniam and Youndt (2005), this study considers the two dimensions of human capital (i.e., value and uniqueness). The human capital value indicates the value of the workforce, whereas human capital uniqueness indicates how the workforce differentiates from competitors in novel and useful ways. HPWS is instrumental in developing human capital by helping the firm attract, train, retain, incentivize, motivate, and provide the opportunity to the workforce for higher productivity and

performance. Employing the AMO framework, some dimensions of HPWS are expected to affect the ability of the workforce, e.g., selection, training; others affect motivation level of workers, e.g., incentives, performance management, job design, empowerment; while other dimensions provide the opportunity for workers to offer solutions for firm/customer's problems, e.g., empowerment. The resultant upgraded human capital acts as an enabler of radical innovations. Firm-level radical innovation capability may be enhanced with the help of HPWS through the mediation path of human capital.

Figure 1

Conceptual framework



2. Research methodology

2.1 Sample and Data Collection

This study is quantitative in nature and used cross sectional study design. Primary data were gathered from the banking sector firms in Pakistan through adopted questionnaire. Executives in the head offices, managers in the branches are the target population. The total number of banks in Pakistan is 33 as of 30.06.2018 (SBP, 2018), which includes four foreign banks. As the study focuses on domestic banks, foreign banks are excluded from the study. Two banks did not participate in the survey. Data was collected from 27 banks in the cities of Nowshera, Peshawar, Mardan, Lahore, Karachi, Faisalabad, and Islamabad during November 2020. The sample size was determined using Hair et al. (2016)'s suggestion of a ratio of 5-10 responders per indicator. There are three constructs in the current study with 39 indicators. We used the maximum number 10 for the calculation of sample size, which comes out to be 390. Anticipating a low response rate, we added 50% more to 390. Thus, through simple random sampling, a sample of 585 bank executives/managers/operation managers was drawn. We received 209 filled and usable forms. The study achieved a response rate of 35.72 %, which is more than the benchmark of 30% proposed by Saunders *et al.* (2009). We used SPSS to obtain descriptive statistics about the profile of the sample, which are shown in Table I.

Table I

Demographic profile of respondents

Demographic characteristics		Number	Percentage
Gender	Male	168	80.4
	Female	41	19.6
Age	20-30 Years	4	1.9
	31-40 Years	25	12
	41-50 Years	78	37.3
	51-60 Years	102	48.8
Experience	1-5 Years	2	1
	6-10 Years	14	6.7
	11-20 Years	84	40.2
	21-30 Years	109	52.2
Designation	Branch Managers	146	69.9
	Branch Operations Managers	30	14.4
	Head Office Executives	33	15.8
Qualification	Graduate	16	7.7
	Masters	187	89.5
	PhD	6	2.9

2.2 Measures

Measures for all the constructs have been adopted from published studies as detailed in Table II.

Table II

Details of measures used in the study

Construct	Variables	Scale Items	Adopted from
High-Performance Work System (HPWS)	Selection, Training, Performance Management, Incentives, Job Design, Empowerment.	27	(Ang *et al.*, 2013; Delery & Doty, 1996; Zacharatos *et al.*, 2005).
Human Capital (HC)	Human Capital Value, Human Capital Uniqueness	9	(Lepak & Snell, 2002)
Radical Innovation (RI)	RI	3	(Subramaniam & Youndt, 2005)

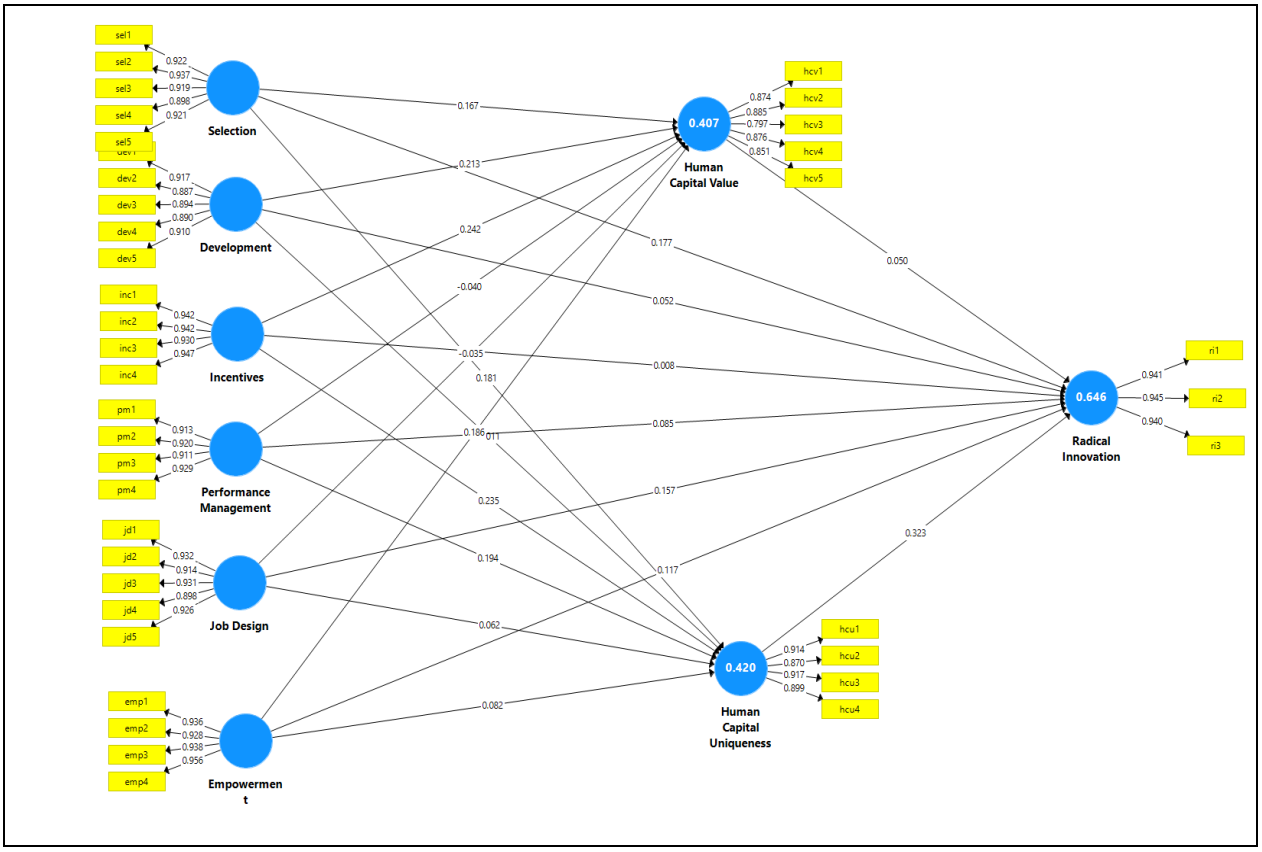
3. Data analysis

Empirical testing of the data was carried out employing the PLS-SEM method. This approach has some advantages concerning other methods, like CB-SEM ("Covariance Based-Structural Equation Modelling") (Joreskog, 1978). PLS-SEM can be employed where: sample size is small, the distribution of data is not normal, or where the path model has a formative construct (Hair et al., 2019). As the data was not normal and one of the constructs in the model is second-order reflective-formative, therefore, PLS-SEM was preferred. We used SmartPLS to analyze data.

SEM application requires the specification of a path model (Hair et al., 2017). The path model is specified in two stages. In stage one, the structural model is developed and in stage two, the measurement model is assessed (Hair et al., 2018). The former indicates the association between the latent variables, whereas the latter depicts the association among the indicators and their underlying construct (Hair et al., 2018). Three constructs were incorporated in the current study's structural model: HPWS, radical innovation, and human capital. HPWS, which is the independent variable, has been operationalized at a higher level as a reflective-formative construct. The first order is made up of six indicator variables i.e., staffing, selection, training, incentives, job design, and performance management. Each one has several reflective indicators (see Fig 2). In the second order, these six variables form a high order formative construct named HPWS. Adopting this method results in increased parsimony and decreases the complexity of the resultant model (Ringle et al., 2019). The "disjoint two-stage" method (Becker et al., 2012) was adopted for estimating the measurement model. In stage one of this approach, only the first-order variables or "lower-order components" (LOCs) are considered. The LOCs are connected with all other constructs to which they are theoretically related. Scores of the LOCs are computed and saved by using the PLS Algorithm of SmartPLS. Next, in stage two, the higher-order construct's score is estimated from these scores. All other constructs are estimated using their standard multi-item indicators.

Figure 2

LOC Measurement model



3.1 Assessment of Measurement Model

Several constructs are included in the path model of the study. Some constructs are reflective, and others are formative. There are different procedures for evaluating the formative and reflective measurement models. These are described as follows.

3.1.1 Reflective Measurement Model-LOCs

Evaluation of measurement model of the reflective constructs comprises testing for reliability, discriminant validity, and convergent validity (Hair et al., 2018). Table III shows the results for these measures. For reliability, rho-A was calculated. The Rho-A value of all constructs was larger than 0.7. Composite Reliability (cut-off values > 0.7) was found above the cut of value. Hence, reliability was established (Hair et al., 2018). The outer loadings of the indicators were used to compute the convergent validity (cut-off value > 0.7 and statistically significant) (Hair et al., 2018). Convergent validity is further verified by calculating AVE. It should be greater than 0.5. Both measures were greater than the cut-off values, thus, convergent validity was established.

Table III

Reflective Measurement Model Results (LOC)

Constructs	Items	Loadings	Cronbach's A	rho_A	CR	AVE
Developmental Practices	Dev 1	0.917	0.941	0.943	0.955	0.809
	Dev 2	0.887				
	Dev 3	0.894				
	Dev 4	0.890				
	Dev 5	0.910				
Selection	Sel1	0.922	0.954	0.957	0.965	0.846
	Sel2	0.937				
	Sel3	0.919				
	Sel4	0.898				
	Sel5	0.921				
Incentives	Inc1	0.942	0.956	0.960	0.968	0.884
	Inc2	0.942				
	Inc3	0.930				
	Inc4	0.947				
Empowerment	Emp1	0.936	0.956	0.958	0.968	0.883
	Emp2	0.928				
	Emp3	0.938				
	Emp4	0.956				
Job Design	JD1	0.932	0.955	0.957	0.965	0.847
	JD2	0.914				
	JD3	0.931				
	JD4	0.898				
	JD5	0.926				
Performance Management	PM1	0.913	0.938	0.939	0.956	0.843
	PM2	0.920				
	PM3	0.911				
	PM4	0.929				
Radical Innovation	ri1	0.941	0.936	0.937	0.959	0.887
	ri2	0.945				
	ri3	0.940				
Human Capital Uniqueness	hcu1	0.914	0.922	0.926	0.945	0.810
	hcu2	0.870				
	hcu3	0.917				
	hcu4	0.899				
Human Capital Value	hcv1	0.874	0.909	0.912	0.933	0.735
	hcv2	0.885				
	hcv3	0.797				
	hcv4	0.876				
	hcv5	0.851				

For discriminant validity, HTMT values were calculated (Table IV). Discriminant validity was established because these values were less than 0.85- threshold values specified by Hair et al. (2017).

Table IV

HTMT values of the reflective measurement model

	Dev	Emp	HCU	HCV	Inc	JD	PM	RI	Sel
Dev									
Emp	0.739								
HCU	0.593	0.527							
HCV	0.627	0.571	0.801						
Inc	0.762	0.620	0.612	0.594					
JD	0.801	0.687	0.577	0.554	0.721				
PM	0.845	0.688	0.640	0.572	0.812	0.803			
RI	0.719	0.649	0.736	0.653	0.642	0.714	0.718		
Sel	0.785	0.671	0.584	0.574	0.635	0.755	0.760	0.712	

3.1.2 Reflective Measurement Model-HOC

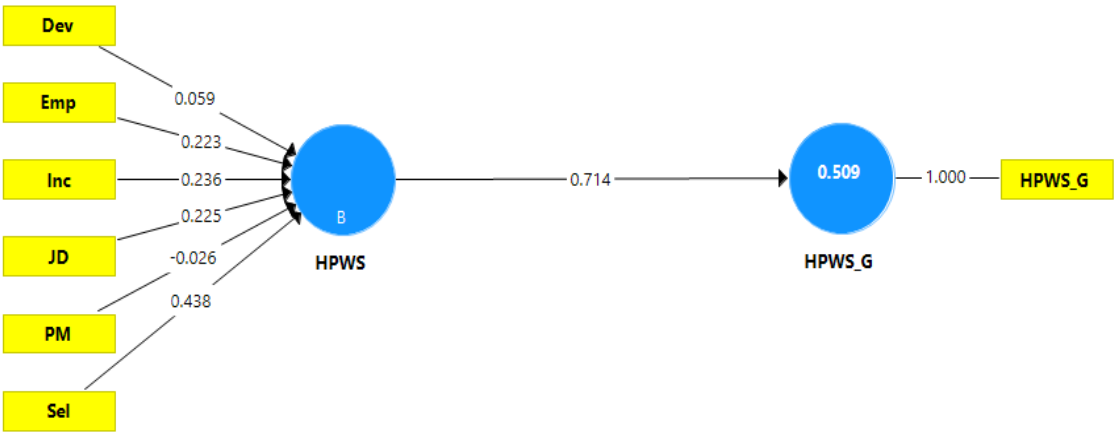
The path model includes one high-order reflective construct i.e., human capital. Internal consistency of the HOC was evaluated by checking the values of Cronbach's alpha, Rho-A, and Composite Reliability (cut-off values: > 0.7). The outer loadings of the indicator variables were used to check for convergent validity (cut-off value: > 0.7). Outer loadings for HCV and HCU were 0.825 and 0.891 respectively, and statistically significant. Additionally, AVE was checked to further confirm the convergent validity of the construct (cut-off value: > 0.5). AVE was 0.737. Values of Cronbach's alpha, Rho-A, CR were 0.847, 0.851, 0.848 respectively (cut-off values for all: > 0.7), hence, convergent validity was not an issue. The discriminant validity was assessed using the HTMT ratio. Hair *et al.* (2017) recommend cut off value < 0.85. The resultant value of 0.778 validates the discriminant validity of the construct.

3.1.3 Formative Measurement Model

To establish the formative construct's measurement model, Hair et al. (2017) advocate analyzing its content validity, convergent validity, construct validity, and reliability. Because this study used pre-existing scales from earlier investigations, content validity was proven. Convergent validity was assessed by conducting a redundancy analysis (Chin, 1998). The path coefficient between the formatively specified HPWS and its reflectively specified construct was 0.714 (Fig 3), which meets the condition of > 0.700 suggested by Hair et al. (2017a).

Figure 3

Redundancy analysis



Construct validity was established by the outer weights of the indicators, which were greater than 0.1 (Table V). Finally, reliability was assessed by checking the VIF (Variance Inflation Factor) values. VIF values were less than the cut-off value of 5, thus, reliability was established.

Table V

Construct Validity Measures of the Formative Construct

CONSTRUCT	VIF	Outer weights	p-value
Dev	4.625	0.111	0.395
Emp	2.187	0.204	0.003
Inc	2.746	0.239	0.089
JD	3.738	0.138	0.330
PM	3.888	0.164	0.277
Sel	2.678	0.302	0.047

3.2 Assessment of the Structural Model

It includes looking for collinearity, relevance, and significance of path coefficients, R^2, f^2, and Q^2 values of the exogenous constructs. The collinearity issue was checked by assessing the inner VIF values of the structural model, which were less than the cut-off value of 5. Hence, collinearity is not an issue. At $p< 0.001$, all path coefficients were significant and relevant, indicating that for human capital development and radical innovation HPWS is a significant driver. Table VI indicates that human capital is the second significant driver for radical innovation. The structural model, showing path coefficients, p-values, outer loading/weights are depicted in Fig 4.

Figure 4

Structural Model

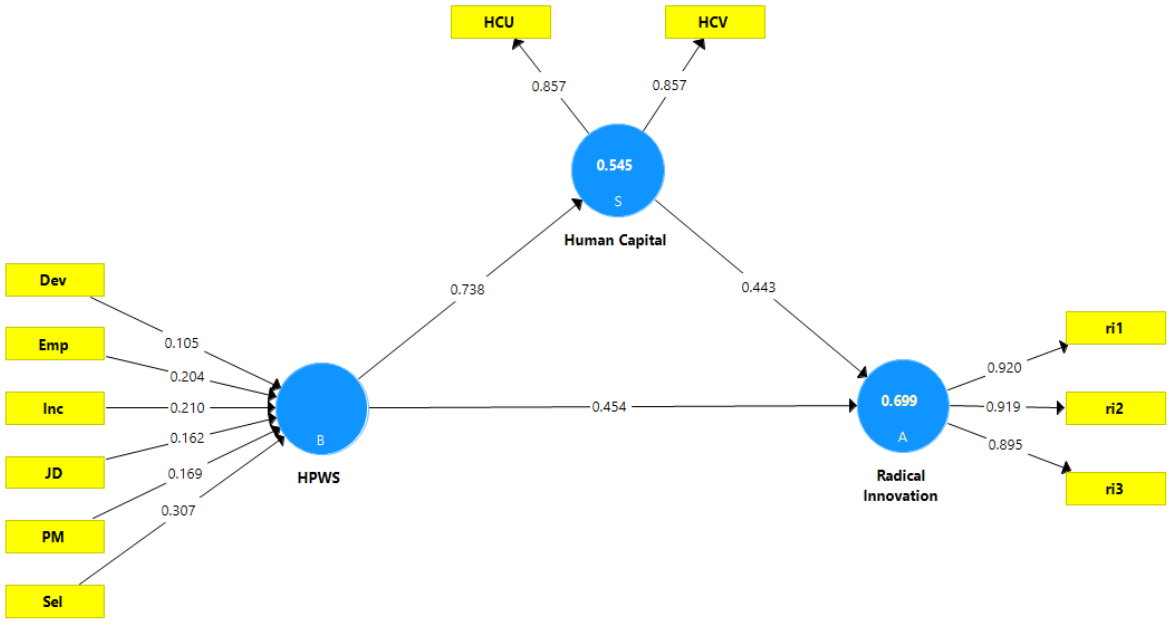


Table VI

Path Coefficients

	Original Sample (O)	Sample Mean (M)	Standard Deviation	T Statistics	CI LL	CI UL
HC -> RI	0.443	0.441	0.131	3.393***	0.245	0.759
HPWS -> HC	0.738	0.744	0.058	12.670***	0.623	0.852
HPWS -> RI	0.454	0.457	0.136	3.351***	0.130	0.670

R^2 values indicate the degree of explained variance in the endogenous construct (Hair *et al.*, 2018). Results indicate that HPWS explains 54.60% of the variance in human capital (R^2

0.546), whereas HPWS and human capital explain 69.80% of the variance in radical innovation (R^2 0.698). R^2 values of 0.698, 0.546 are greater than the threshold value of 0.50, hence, indicating a moderate model (Cohen, 1988).

Next, effect size (f^2) was measured. It indicates the "effect on endogenous constructs when in the structural model a specific exogenous construct is omitted" (Hair et al., 2018). Cohen's (1988) guidelines were followed when measuring f^2 values (0.02 represents a small effect size, 0.15 represents a medium effect size, and 0.35 represents a large effect size). Results indicate a strong effect of HPWS on human capital and radical innovation (Table VII), whereas the effect of human capital on radical innovation was moderate.

The model's predictive relevance was then assessed using the Stone-Geisser Q2 value (Chin et al., 2008). The blindfolding option was selected in SmartPLS, omission distance (D) was set at 7, and using the CV (cross-validated) redundancy procedure, Q2 was calculated. Q2 > 0 shows presence and Q2 < 0 indicates the absence of predictive relevance (Hair et al., 2018). Table VII shows Q2 values, which are above zero, hence, the model's predictive relevance is established.

3.3 Hypothesis Testing

Summary of hypothesis testing are provided in Table VII. The first hypothesis (H1) is that HPWS and human capital are directly related. Results of the data analysis showed the existence of a significant association between HPWS and human capital, thus H1 supported (β= 0.739, P < 0.000). H2 investigated the impact of HPWS on radical innovation. Results showed that the influence of HPWS on radical innovation was significant (β= 0.451, p=< 0.001), indicating support for H2. The link between human capital and radical innovation was examined by H3. Results revealed a significant association between human capital and radical innovation (β= 0.445, p=< 0.001). Therefore, H3 endorsed.

Table VII

Hypotheses Testing-Total Effect

Hypothesis	Relationship	Std Beta	Std Error	t-value	f square	q square	2.5% CI LL	97.5% CI UL
H1	HPWS-> HC	0.739	0.064	11.565***	0.866	0.383	0.626	0.869
H2	HPWS-> RI	0.451	0.137	3.296***	0.400	0.550	0.687	0.879
H3	HC-> RI	0.445	0.132	3.362***	0.164		0.225	0.692

3.4 Mediation Analysis (H4)

To assess human capital's mediation effect on the association between HPWS and radical innovation, we conducted mediation analysis by using the bootstrap method in SmartPLS (Zhao *et al.*, 2010). As compared to the Sobel test (Sobel, 1982), the statistical power of results of the bootstrap method is high (Hair *et al.*, 2014). The findings indicated a significant effect of HPWS upon radical innovation in the banking sector firms of Pakistan (β= 0.780, p= < 0.000). The direct effect of HPWS on radical innovation was diminished when the mediator was included in the model (β= 0.451, p= < 0.001). Human capital (mediator) was found to have a significant indirect effect

(β= 0.329, p= < 0.005). These findings suggest that human capital of banking firms partially mediated the HPWS-radical innovation linkage, hence, H4 supported.

VAF (Variance Accounted For) value was checked to assess the weight of the indirect effects of human capital. The results (Table VIII) indicated that human capital of banks partially mediated the association between HPWS radical innovation, with a VAF value of 0.42. (VAF values < 0.20 = no mediation, 0.20 – 0.80 = partial mediation, > 0.80 = full mediation) (Hair et al., 2013).

Table VIII

Findings of Mediation Analysis

Relationships	Std Beta	Std Error	t-value	VAF	Decision	2.5% CI LL	97.5% CI UL
HPWS -> HC -> RI	0.329	0.112	2.791***	42.0 %	Supported	0.156	0.607

4. Discussion

This study tested a hypothesized model, consisting of HPWS as the independent variable, human capital as the mediating variable, and radical innovation as the dependent variable. The RBV and the AMO Framework have been employed as the underpinning theoretical perspectives. Analysis of SEM supported all hypothesized relations, indicating that for human capital development and radical innovation HPWS is a significant driver. Results show that in the banking firms, HPWS leads to increased radical innovation. However, the path from HPWS to radical innovation is partially mediated by human capital of the banks. This finding indicates that banks need to consider the value and uniqueness of their human capital to achieve higher levels of radical innovation capability.

Drawing on the RBV, HPWS first affects human capital positively by enhancing its value and uniqueness. The RBV considers human capital as the basis of competitive advantage. HPWS is instrumental in developing human capital by helping the firm attract, train, retain, incentivize, motivate, and provide the opportunity to the workforce for higher productivity and performance. Some dimensions of HPWS affect the ability of the workforce, e.g., selection, training; others affect motivation level of workers, e.g., incentives, performance management, job design, empowerment; while other dimensions provide the opportunity for workers to offer solutions for firm/customer's problems, e.g., empowerment. Banks can implement carefully designed HPWS that help them attract and upgrade the needed human capital. The upgraded human capital may lead to higher levels of banking innovations. As a result, banks will get a competitive edge. Empirical validation of these aspects contributes to theory by supporting the tenants of the AMO framework. The outcome of the current study indicates that firm-level radical innovation capability is enabled with the help of HPWS through the mediation path of human capital.

The resultant upgraded human capital acts as an enabler of radical innovations. Following Subramaniam & Youndt (2005), this study addressed two dimensions of human capital (i.e., value and uniqueness). The human capital value indicates the value of the workforce, whereas human capital uniqueness indicates how the workforce differentiates from competitors in novel and useful ways. Relying on the RBV, our empirical analysis indicates that both aspects of human capital can be targeted positively with HPWS. Human capital uniqueness is expected to contribute to the greater ability of a firm for radical innovations.

Our findings support a positive relationship between HPWS, human capital, and radical innovation, which is consistent with past empirical studies (e.g., Beugelsdijk, 2008; De Winne & Sels, 2010; Delery & Roumpi, 2017; Donate et al., 2015; Fu *et al.*, 2015; Subramony, 2009; Subramaniam & Youndt, 2005). Innovation is considered a critical enabler of competitive advantage in the current business environment (Al-Ajlouni, 2020). To achieve higher levels of innovation, firms need to invest more in designing and implementing HPWS. HPWS is instrumental in upgrading employee's KSAOs, which will translate into firm-level innovation. Our findings are relevant to managers because human capital is an antecedent of innovation. With the help of HPWS, various aspects of human capital can be targeted for business development.

5. Significance of the Study

5.1 Theoretical contribution

Previous studies have excessively focused on financial outcomes, which are a short-term shareholders approach (Abu Khalaf et al., 2019). This study used radical innovation as an alternative measure of firm performance, thus contributing to the theory. We followed an interdisciplinary approach that intertwined HRM and innovation disciplines, hence, contributing to theory. By articulating the underlying processes through which HPWS impact radical innovation, the current study makes another theoretical contribution. In doing so, we addressed the calls of scholars (e.g., Issue & Held, 2015; Kloutsiniotis & Mihail, 2018).

5.2 Contribution to literature

Our research adds to the body of knowledge by empirically showing the function of two dimensions of human capital, as well as the link between HPWS and radical innovations. Views from respondents at different organizational levels were incorporated in this study. Opinions of branch managers and operational managers were obtained at the micro-level. Perspectives of higher-level executives were taken at the macro level. This approach is suitable to get a realistic understanding of the variables of the study, hence, adding to the literature.

HPWS strand of research dominated the manufacturing sector with little attention to the important services sector. By extending this line of inquiry into the services sector, our work adds to the literature. Moreover, the HPWS line of research was undertaken mostly in the western developed economies with scant studies in the emerging economies. The current study validated the hypothesized model in the latter context, hence, contributing to the literature.

This study has made a methodological contribution by establishing HPWS as a high order formative construct, represented by six lower-order reflective variables. Operationalization at higher level results in significant model parsimony (Hair et al., 2018). An additional methodological contribution of our work is the operationalization of human capital as a high-order reflective construct represented by two lower-order reflective constructs. The current study makes a methodological contribution by testing the proposed model by employing PLS-SEM. Most researchers use CB-SEM, whereas PLS-SEM is an important alternative technique (Hair et al., 2013). For assessing discriminant validity, we made use of the HTMT ratio (Henseler et al., 2015). Thus, our study has made a methodological contribution.

5.3 Managerial Implications

By considering the competitive atmosphere prevailing in the banking industry, banks must leverage their human capital for achieving higher levels of radical innovations. Competitive

advantage is not possible without focusing on innovations. The nature of the present workforce is highly fluid. Banks must attract, develop, and retain the best talent. Banks can use HPWS to attract the best employees, develop them through rigorous training, motivate them through incentives and rewards, and give them the opportunity through job design, performance management, and empowerment to participate in bank affairs, provide solutions to problems and offer novel and creative ideas for innovation. Consequently, the firm will achieve an elevated level of radical innovation. Innovation is considered as a key enabler of competitive advantage.

Our research is relevant to managers because it implies that HPWS can enable radical innovation through human capital. Managers should focus on the development of their human capital first. Improved human capital will enhance the organization's ability for radical innovation.

6. Limitations and Future Research Suggestions

First, the association among HPWS, human capital, and radical innovation has been established empirically by the current study. These findings are consistent with the theoretical underpinnings of the study. Yet, causal inference cannot be made because the study executed a cross-sectional study design. However, future research may use a longitudinal study design to ascertain causal association among these variables. Second, we used the quantitative approach, which is the norm in empirical research. However, to get better results, a triangulation approach should be used in future research that makes use of mixed methods. Third, we have used six bundles of HR practices, which is not an exhaustive list. Future research may employ HR practices other than these six bundles to tell a more nuanced story. Fourth, due to COVID-19 situation in the country, we could collect a small sample. As a result, the findings of the study cannot be generalized. The sample size can be improved in future research.

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