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Original Article

# Workforce Productivity as a Central Mechanism in the Relationship between HPWS and Performance of Project-based Firms

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## Abstract

This study explores the intermediary mechanism of workforce productivity in the link between High-Performance Work Systems (HPWS) and organizational performance. Grounded in the AMO framework, it posits that HPWS practices categorized as ability, motivation, and opportunity-enhancing directly increase productivity, which then mediates firm performance. Empirical evidence from 472 IT professionals in Pakistan supports all hypothesized relationships. The research design for this study is rooted in a quantitative framework aimed at objectively examining the impact of various factors on organizational performance within project-based IT companies. This design allows for the collection and analysis of numerical data, facilitating the identification of patterns, correlations, and causal relationships. A multi-stage sampling technique was utilized to gather information from participants in this study. In the first stage, we employed a random sampling method to select companies registered with the Pakistan Software Houses Association for IT and ITES (PASHA). A sample size of 306 out of the 1300 IT companies registered with PASHA was calculated using the Taro Yamane sampling technique, with a sampling error of 5%. The findings offer valuable insights for managers in project-based environments, advocating for tailored HPWS to achieve sustainable competitive advantage through a more productive workforce.

**Keywords:** Ability, Motivation, HPWS, Workforce Productivity, Project-Based Organizations.

## Introduction

Human resource management (HRM) practices are widely acknowledged as essential to organizational success, though their specific significance within the project environment remains an area for further discovery (Jaffar *et al.*,2025; Zwikael & Unger-Aviram, 2010). HPWS practices impact both workforce productivity and employee work experiences (Peethambaran *et al*., 2025; Huemann *et al*., 2007), underscoring the critical role of human resources as the foundation for sustainable organizational performance. A High-Performance Work System (HPWS) is described as a bundle of policies and practices designed to create a motivating and empowering environment, which is instrumental in this regard. By aligning organizational objectives with employee goals, HPWS aims to unlock employee potential, thereby enhancing engagement, productivity, and overall performance (Obaid *et al*., 2022). By fostering employees' abilities and providing development opportunities, HPWS helps to cope with project demands in an uncertain environment (Bhardwaj *et al*.,2025). Therefore, the study examines the role of HPWS for improving the productivity of the workforce of project-based firms.

Researchers are increasingly employing the ability, motivation, and opportunity (AMO) theoretical framework to examine the impact of HPWS on individual and organizational outcomes. Although contemporary literature acknowledged the role of HPWS for individual outcomes such as workforce productivity and organizational outcomes (Bhardwaj *et al.*,2025; Jaffar *et al*.,2025), however, the impact of HPWS on workforce productivity and performance of project-based firms is limited, and few studies have examined HPWS-workforce productivity in project-based settings. Thus, the goal of this study is to investigate the impact of HPWS practices, clustered into Ability-, Motivation-, and Opportunity-enhancing bundles, on the performance of project-based firms through the mediating role of workforce productivity.

The primary goal of a High-Performance Work System (HPWS) is to strategically attract and retain talented incumbents who possess a critical blend of both technical expertise and contextual skills. In the unique environment of project-based work, technical skills ensure tasks are completed to specification, while contextual skills—such as adaptability, collaboration, and problem-solving within transient teams—are imperative for navigating complexity and fostering cohesion. By implementing sophisticated practices in recruitment, selection, and onboarding, HPWS ensures the organization secures individuals who not only have the requisite knowledge but also the behavioral competencies to thrive in dynamic project settings, thereby directly investing in the human capital essential for driving productivity.

HPWS adds value to an organization by cutting expenses, increasing productivity, and adding value for employees. They are designed to help employees be more productive. According to Wahid & Hyams-Ssekasi (2018), HPWS is an integrated system of HR practices that aims to enhance employees' performance and productivity by improving their abilities and skills that help the organization achieve sustainable competitive advantage. By placing a high priority on ongoing skill development, HPWS makes sure that its employees have the resources and expertise needed to succeed in their positions. HPWS cultivates a pleasant work environment and inspires dedication and drive that are vital for workforce productivity.

HPWS offers value for temporary organizations, boosting productivity and enhancing the success of IT projects. Bundle of HPWS is designed for project-based firms through multifaceted approach by enhancing the skills of project workforce (abilities), intrinsic and extrinsic rewards (Motivation) and providing an environment for their development (opportunity) to make effective decision that is imperative for project-workforce productivity leading to performance of project-based firms (Bhatti *et al*., 2021; Wahid & Hyams-Ssekasi, 2018). HPWS practices are designed to address core challenges of workforce optimization in the project context. This study examined the bundle of Ability, motivation, and opportunity enhancing HPWS practices as a strategic lever for workforce optimization and productivity and performance of project-based firms in developing countries such as Pakistan.

## Hypothetical Development

HR practices that are intended to improve employees' knowledge, skills, and abilities, motivating them through intrinsic incentives, remuneration, and performance management that are essential to demonstrate their abilities at the workplace, leading to boosting their productivity. AMO's theoretical perspective conceptualized ability, motivation, and opportunity-enhancing practices as three different types of HPWS practices (Cai *et al*., 2020; Iqbal *et al*., 2019; Obaid *et al*., 2022).

### *Ability-Enhancing HPWPs*

Ability-enhancing HPWS practices, also known as skill-enhancing or competency-enhancing HRM practices, are employed to improve the skills and abilities of employees (Bos-Nehles *et al*., 2023). It is well-recognized that employees' abilities are positively impacted by personalized hiring, selection, and training (Huang *et al*., 2023). The goal of recruitment and selection procedures is to find the best candidate with the necessary skill set for the position. The goal of the recruitment and selection process, according to (Obaid *et al*., 2022), is to increase the number of highly competent workers by identifying, attracting, and choosing the best incumbent with the necessary knowledge, skills, and abilities. Ability-enhancing HPWS practices like selection, training, and development ensure employees possess the organization-specific knowledge, skills, and abilities (KSAs) needed for their jobs (Boon *et al*., 2014). These practices equip employees with the necessary resources to perform effectively. Employees with high workloads benefit more from a strong match between their KSAs and job requirements and value learning and career opportunities. Consequently, skill-oriented HPWS is likely to reduce absenteeism more among employees with demanding workloads than those with lighter workloads and as a result increase workforce productivity (de Reuver *et al*., 2021; Gazi *et al*., 2025; Iqbal *et al*., 2018). Thus, the following hypothesis was formulated

*H1: Ability-enhancing high-performance work practices have a positive and direct impact on workforce productivity*

### *Motivation-enhancing HPWPs*

Motivation-enhancing HRM practices comprise performance growth orientation, pay for performance, incentives, benefits, rewards, job security, and career advancement (Nadeem *et al*., 2019). Personalized training, performance management, succession and career planning, promotions, rewards and incentives, competitive compensation systems, generous benefits, and job security have all been shown to have a favorable impact on employees' motivation (Bos-Nehles *et al*., 2023; Huang *et al*., 2023; Kirkeng, 2023). These aspects are designed and triggered to motivate employees' efforts and behaviors towards achieving specified unit and organizational goals. According to researchers, even if individuals have the necessary abilities to accomplish their jobs, organizations must nevertheless inspire people to link their talents and interests with organizational needs (Eib *et al*., 2022). This alignment enables the implementation of HPWS practices that enhance motivation and boost workforce productivity (Bhatti *et al*., 2021; Faadhilah, *et al*., 2025). Thus, the following hypothesis was formulated

*H2: Motivation-enhancing high-performance work practices have a positive and direct impact on workforce productivity*

### *Opportunity-enhancing HPWPs*

Opportunity-enhancing HPWP practices encompass a range of strategies, such as involving employees in decision-making, teamwork, flexible job design, innovative information and knowledge sharing, employee involvement, goal setting, decentralization, and increased job autonomy (Bos-Nehles *et al.,* 2023; de Reuver *et al*., 2021; Zhang *et al.,* 2020). How work is organized and how various duties and responsibilities should typically be completed are reflected in practices associated with autonomy, sharing of information, and teamwork (Obaid *et al*., 2022). Such practices play a key role in boosting workforce productivity by offering project employees with needed assistance, enhancing their confidence levels, encouraging employee voice possibilities, and empowering employees to use judgment and autonomy in executing their duties (Bos-Nehles *et al.,* 2023). These HPWS practices are supposed to empower and involve employees by improving communication between coworkers and between employees and managers,

increasing access to information, and giving employees more control over day-to-day decisions that provide a foundation for workforce productivity (de Reuver *et al.,* 2021). Opportunity-enhancing HPWS would have a more substantial impact on reducing absenteeism, which leads to workforce productivity under high demand and uncertain project environments (Boon *et al*., 2014; Kassa & Worku, 2025). Therefore, the following hypothesis was formulated

*H3: Opportunity-enhancing high-performance work practices have a positive and direct impact on workforce productivity*

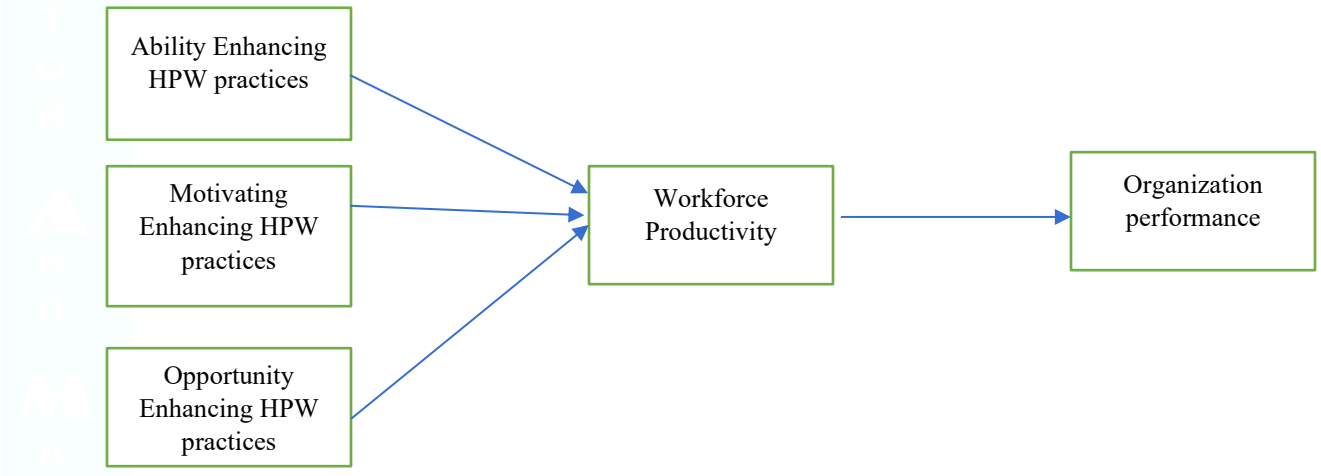
***Mediating Role of Workforce Productivity***

The existing literature on HRM recognizes the importance of HR practices in enhancing organizational and individual outcomes (Hauff *et al*., 2022). In addition, studies in strategic HRM also highlight the use of HR systems in achieving employee performance instead of concentrating on a different HR practice (Boon *et al*., 2019). The organizational performance is greatly influenced by its advanced HR practices (Obaid *et al*., 2022). HPWS practices provide a dynamic, employee-focused workplace that encourages growth, engagement, and high performance (Huang *et al*., 2023). The HRM studies recognized that HPWS practices have an indirect impact on organizational outcomes (Wang *et al*., 2022; Reda *et al*., 2025). By acknowledging contemporary HRM literature, this study postulates that workforce productivity mediates the relationship between different HPWS practices and organizational performance. Employee productivity is the cornerstone of an organization's capacity to compete in the marketplace. HR managers and supervisors should actively monitor the application of HPWS in their organizations since these practices promote good work attitudes among workers, which improves performance. Ability, motivation, and opportunity-enhancing HPWS practices support the project workforce by motivating them to take a proactive problem-solving behavior and offering opportunities to enhance their knowledge, skills, and abilities, resulting in higher performance. It entails intensive education/training, developmental feedback, empowerment, engagement, and professional growth. Therefore, the following hypothesis was formulated

*H4a: Workforce Productivity mediates the relationship between Ability-enhancing HPWS and organization performance*
*H4b: Workforce Productivity mediates the relationship between Motivation-enhancing HPWS and organization performance*
*H4c: Workforce Productivity mediates the relationship between Opportunity-enhancing HPWS and organization performance*

**Figure 1**

*Theoretical Framework*



## Methods and Materials

The research design for this study is rooted in a quantitative framework aimed at objectively examining the impact of various factors on organizational performance within project-based IT companies. This design allows for the collection and analysis of numerical data, facilitating the identification of patterns, correlations, and causal relationships. A multi-stage sampling technique was utilized to gather information from participants in this study. In the first stage, we employed a random sampling method to select companies registered with the Pakistan Software Houses Association for IT and ITES (PASHA). A sample size of 306 out of the 1300 IT companies registered with PASHA was calculated using the Taro Yamane sampling technique, with a sampling error of 5%. The sample was selected through a random process from a spreadsheet containing all 1300 registered IT companies. We contacted these selected companies via email, and 90 companies agreed to participate by filling out our research questionnaire. In the second stage of our sampling process, we used web scraping to calculate the total number of employees working in these 90 IT companies in Pakistan, which amounted to 14,417 employees. Using the Taro Yamane method with a 3% sampling error, we calculated a sample size of 1,032 employees.

### *Measuring and Scales*

#### Independent Variables

This study treats AMO (Ability, Motivation, Opportunity) enhancing high-performance work practices (HPWS) as independent variables. The questionnaire designed to measure these practices includes specific sections: for ability-enhancing HPWS, there are 5 questions on training and 4 on staffing; for motivation-enhancing practices, there are 6 questions on performance management, 2 on rewards, and 1 on job security; and for opportunity-enhancing practices, there are 4 questions on autonomy, 5 on communication, and 1 on teamwork. This structured approach ensures a comprehensive assessment of HPWS practices, facilitating a detailed analysis of their impact on employee productivity and organizational performance.

#### Mediating Variables

In this research, workforce productivity is treated as a mediating variable. Iqbal et al (2018) scale was used to measure workforce productivity. The responses were recorded on a seven-point scale

#### Dependent Variable

Organizational performance of a project-based firm is employed as a dependent variable. Five measures from the Wickramasinghe et al. (2013) scale were borrowed to measure organizational performance. Seven-point Likert scale was used to capture responses from agree to disagree.

**Table 1**
*Methodological Evidence*

| Methodology Component | Evidence from Previous Studies | Purpose & Justification |
|---|---|---|
| **Quantitative Design** | Jiang *et al*. (2012); Boon *et al*. (2019) | Standard approach for testing causal models and relationships between HR systems and performance outcomes. |
| **AMO Framework** | Jiang *et al*. (2012); Bos-Nehles *et al*. (2023) | A theoretically grounded and empirically validated framework for categorizing HR practices and their mechanisms of action. |

| | | |
|---|---|---|
| **Sampling (Yamane)** | Israel (1992); Common practice in management research | Provides a mathematically sound method for determining a representative sample size with a known error margin. |
| **Established Scales** | Sun *et al.* (2007) (for HPWS); Iqbal *et al*. (2018) (for Productivity); Wickramasinghe & Liyanage (2013) (for PBO Performance) | Ensures reliability and validity by using instruments previously tested and accepted in academic literature. |
| **Mediation Analysis (Bootstrapping)** | Hayes (2017); Preacher & Hayes (2008) | The contemporary and robust statistical method for testing indirect (mediating) effects, as used in current top journals. |

The methodology used in this paper does not seek to introduce experimental novelty but rather exemplifies methodological rigor through the conscientious application of well-established, best-practice techniques from the fields of strategic human resource management and organizational research. This steadfast adherence to validated and recognized approaches significantly enhances the validity and credibility of the study's findings

## Results Discussion

### *Descriptive Statistics*

The demographic composition of the 472 survey respondents is detailed in Table 1. The cohort is characterized by a notably young demographic, as 75.8% are between 20–30 years old—a profile consistent with the youthful labor force commonly found in the rapidly growing IT sectors of developing nations (Ahmed & Scott, 2021). A substantial gender disparity is evident, with males comprising 72.9% of the sample, mirroring persistent gender imbalances across the technology field worldwide (Cheryan *et al*., 2017). Academically, many participants (61.0%) have attained a bachelor's degree, supporting existing research which indicates that highly skilled project-based positions demand considerable educational qualifications (Turner & Müller, 2006). Additionally, most respondents (87.7%) are employed in organizations with a formal HR department, an element linked to more systematic adoption of structured high-performance work practices (Boselie *et al*., 2005).

**Table 2**
*Descriptive Statistics of Sample Demographics (N = 472)* *

| Variable | Category | n | % |
|---|---|---|---|
| **Age** | 20 to 30 years | 358 | 75.8 |
| | 31 to 40 years | a | a |
| | 41 to 50 years | a | a |
| | Above 50 years | a | a |
| **Gender** | Male | 344 | 72.9 |
| | Female | 128 | 27.1 |
| **Education** | Bachelor's Degree | 288 | 61.0 |
| | Other Categories B | 184 | 39.0 |
| **Experience** | 1-3 years | 274 | 58.1 |
| | Other Categories C | 198 | 41.9 |
| **HR Department** | Yes | 414 | 87.7 |
| | No | 58 | 12.3 |

The study's participant pool is characterized by a young demographic, with three-quarters of respondents falling between the ages of 20 and 30. A significant majority are male and possess at least a bachelor's degree. More than half of the participants are in the initial phase of their professional journey, reporting 1-3 years of experience. Furthermore,

most are employed in firms with a formal HR function. Consequently, the results primarily reflect the perspectives of early career, educated males in structured Pakistani IT companies.

### *Correlation Analysis*

Correlation was carried out to check the significance of the association between variables. Pearson's correlation was used to check the association among variables. Results in Table 2 indicate the association between different types of HPW practices, workforce productivity, and organizational performance of project-based firms

**Table 3**
*Intercorrelations Among Study Variables*

| Variable | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **1. Ability_HPWP** | — | | | | |
| **2. Motiv_HPWP** | .720** | — | | | |
| **3. Oper_HPWP** | .730** | .731** | — | | |
| **4. Workforce Prod.** | .456** | .495** | .508** | — | |
| **5. Org. Performance** | .405** | .382** | .357* | .451** | — |

*Note.* *p < .05, **p < .01.*

The results indicate strong, positive intercorrelations among all three HPWS bundles (ability-, motivation-, and opportunity-enhancing practices). Each bundle is significantly and positively associated with both workforce productivity and organizational performance. A significant positive correlation is also observed between workforce productivity and organizational performance. These correlations provide initial empirical support for the study's theoretical model, affirming that AMO-enhancing practices are positively linked to critical performance outcomes.

### *Hypothesis Testing*

#### Direct Relationship

Regression analysis was conducted to test the direct relationship between Ability, motivation, and opportunity HPW practices on workforce productivity and organizational performance. The first hypothesis postulates the relationship between ability-enhancing high-performance work practices and workforce productivity. Table 3 illustrates the positive and significant relationship between ability-enhancing HPW practices and workforce productivity (β=0.41; t= 11.10).

Therefore, H1 is accepted. Table 2 demonstrates that motivation-enhancing HPWS influences workforce productivity (β=0.43; t= 12.36). Thus, H2 is accepted. The study hypothesizes that opportunity-enhancing HPWS influences workforce productivity. It is evident from Table 3 that the opportunity to enhance HPW practices has a positive impact on productivity of the project workforce (β=0.39; t= 12.78). Therefore, H3 is accepted.

**Table4**
*Regression Results for Direct Effects of High-Performance Work Systems on Workforce Productivity*

| Hypothesis | Relationship | β | *t*(469) | Status |
|---|---|---|---|---|
| **$H_1$** | Ability-enhancing → WP | 0.41 | 11.10 | Supported |
| **$H_2$** | Motivation-enhancing → WP | 0.43 | 12.36 | Supported |
| **$H_3$** | Opportunity-enhancing → WP | 0.39 | 12.78 | Supported |

*Note.* WP = Workforce Productivity. All coefficients are significant at *p* < .001.

**Mediating Role of Workforce productivity**

The study hypothesized workforce productivity as an intermediate mechanism for HPW practices and organization performance causal relationship. The mediation model was assessed for the mediating role of workforce productivity. The mediation analysis was performed based on Hayes and Preacher's methodology for the examination of the indirect effect of different types of HPW practices on the organizational performance of project-based firms. Results of mediation are shown in Table 4, which shows an indirect relation of Ability HPWP-WP-OP (β=-.14; p<0.01). 95% CI boot [LL= .08, UL=.21] does not turn into zero that showing the mediation effect is statistically significant, hence supporting H4a. The table also indicates the mediation effect of WP for motivation-enhancing HPW practices and the organizational performance causal chain (β=-.15, p<0.01). 95% of CI boot [LL= .08, UL=.0.22], thus not turning a zero, indicating a mediation effect, therefore supporting H4b. workforce productivity also mediates the relationship between opportunity-enhancing HPW practices and organizational performance, with an indirect effect of .14. value for 95% CI bootstrapping [LL= .09, UL=.21] also exhibit that mediation thus supporting H4C.

**Table4**

*Results of Mediation Analysis for the Indirect Effect of HPWS on Organizational Performance Through Workforce Productivity*

| Hypothesis | Path | Indirect effect | | Total Effect | | Status |
|---|---|---|---|---|---|---|
| | | β | 95% CI | β | 95% CI | |
| $H_{4a}$ | Ability → WP → OP | 0.14 | [0.08, 0.21] | 0.38 | [0.30, 0.45] | Partial Mediation |
| $H_{4b}$ | Motivation → WP → OP | 0.15 | [0.08, 0.22] | 0.33 | [0.26, 0.41] | Partial Mediation |
| $H_{4c}$ | Opportunity → WP → OP | 0.14 | [0.09, 0.21] | 0.28 | [0.21, 0.35] | Partial Mediation |

*Note.* WP = Workforce Productivity; OP = Organizational Performance. All indirect effects are significant, as zero is not contained in the bootstrapped confidence intervals.

## Conclusion and Contributions of the Study

This research establishes that High-Performance Work Systems (HPWS), organized through Ability, Motivation, and Opportunity (AMO) practices, substantially increase workforce productivity and thereby strengthen organizational performance in project-based settings. Analysis of 472 professionals confirms the positive contribution of all three practice types, with ability-focused practices such as performance management having a pronounced effect. The study offers an empirical model connecting HPWS to outcomes via productivity, addressing a theoretical and applied research gap. For practitioners, it recommends adopting customized HPWS—integrating rigorous selection, incentive-based rewards, and delegated autonomy—to elevate productivity. Effectiveness depends on aligning these practices with the organization's unique cultural environment to optimize results and maintain a competitive edge.

## Practical Implications

Based on the findings of this research, project-based organizations can derive several practical implications. This research provides valuable insight into project-based firms by investigating the extent to which individual HPW practices improve workforce knowledge, skills, and abilities of the project workforce for a higher level of productivity. Such an approach may help in achieving firm-level outcomes such as organizational performance. Organizational culture needs to be considered while designing HPWS practices to influence productivity. It may help tailor HPWS practices to fit specific cultural contexts.

## Limitations and Directions for Future Studies

The use of cross-sectional data limits the ability to infer causality between HPW practices and workforce productivity and organizational performance. Longitudinal studies should be conducted in the future to provide a holistic overview of workforce productivity indirect mechanism between HPWP bundles and organization performance. The findings may not be generalizable to some industries or organizational settings, particularly those that differ significantly from the project-based organizations studied. In the future, the model of the study may be applied to non-projectized organizational settings to increase the generalizability of the study.

## Declarations

## Ethical Statement

This study strictly adhered to the Declaration of Helsinki and relevant national and institutional guidelines for ethics. Informed consent was not required, as secondary data available on websites was obtained for analysis. All procedures performed in this study were conducted in accordance with the ethical standards of the Helsinki Declaration.

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## Authors' Contributions

**SI and NI:** Original draft writing, data curation, methodology, and conceptualization. **MW and AN**. Formal analysis, research, writing, editing, and review. **SI**: Verification, illustration. **NI, MW, AN**: Editing, reviewing, and supervising.

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## Declaration of Interest

The authors declare that we have no competing/ conflict of interest in publication of this paper.

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