

# EXAMINING THE IMPACT OF HR ANALYTICS ADOPTION ON SUSTAINABLE PERFORMANCE IN PROJECT-BASED ORGANIZATIONS: THE MEDIATING ROLE OF INNOVATIVE WORK BEHAVIOUR

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## Abstract

The purpose of the current study is to examine the impact of human resource analytics adoption (HRAA) on the sustainable performance of project base organization through the mediating role of innovative work behaviour (IWB). The current study collected data from 380 professionals of project-based organisations of Islamabad and the Rawalpindi region through the purposive sampling technique. The data was analysed through SPSS 28. The finding indicated that HRAA is positively associated with sustainable organisational performance (SOP), and IWB significantly mediates this association. The research has contributed to the literature on digital HRM, innovation, and sustainability, and represents practical implications to managers who strive to use HR analytics to achieve sustainable and responsible business performance.

## INTRODUCTION

With a business environment that is becoming unstable and digitally oriented, organisations are increasingly putting strain on the necessity to achieve sustainable performance and the business reaction to the speed of technological change, mounting competition, and the escalating stakeholder demand. Sustainability-oriented performance is not restricted to the short-term financial performance, as it encompasses years of long-term economic feasibility, social responsibility, and environmental stewardship (Li et al., 2023; Lopez-Arceiz et al., 2020; Malesios et al., 2021). On this note, the human capital has already turned into an essential strategic resource, and the human resource (HR) department has become one of the most important factors in

determining the sustainability of the organisation (Prima et al., 2024). HR Analytics, or the systematic application of data and advanced analytics and predictive data to support evidence-based HR decision-making, is one of the most significant areas in current HR management. The HR analytics potential lies in the fact that the HR staff might become a strategic partner by improving the design of workforce, talent management, performance evaluation, and internal development (Marler and Boudreau, 2017).

Companies are turning more and more to analytical tools to become more efficient, objective, and aligned between the HR practices and the business strategy (Khattak et al., 2025). But, with its increased use, there is a lack of

empirical evidence on the larger and long-term performance implications of HR analytics adoption (HRAA). The current literature presents a lot of operational or efficiency-based results, providing a deficient understanding of the contribution of HRAA to the sustainable performance of organisations, constant innovation, flexibility, and sustainable use of resources (Prima et al., 2024). One of the main limitations of the previous studies is that they view HR analytics as a technological intervention, implicitly assuming the presence of a direct and automatic correlation with the performance outcomes. This view does not take into account the importance of the behaviour of employees in the process of converting the analytical knowledge into organisational value (Fernande and Gallardo-Gallardo, 2021). HR analytics is not a concept that creates impact on its own; its success relies on the extent to which the insights gained through the use of data are converted into HR practices and affect the attitude, capabilities, and behaviour of the employees. As a result, the study of behavioural mechanisms is critical to the consideration of how HR analytics can be used to achieve sustainable organisational results (Roul et al., 2025).

Innovative Work Behaviour (IWB) is one of the most topical behavioural pathways in this respect. IWB means the deliberate actions of employees to create, spread, and make new ideas that are likely to enhance working processes, products, or services (Khattak et al., 2023). This type of behaviour has been largely accepted as a predictor of organisational learning, innovation, and sustainable competitiveness (Jong and Hartog, 2010). In organisations that have sustainability as their core, innovation is important in the creation of efficient processes, minimising waste, maximising social impact, and responding to environmental issues (Kamble et al., 2020). Thus, sustainable performance in economic, social, and environmental aspects will be keyed on the innovative inputs of the employees.

The analytics of HR can be a key contribution to IWB as it allows making the HR practices more strategic and informed. With the help of data-driven insights, companies can determine the types of innovation-related competencies, develop specific learning and development

programs, and establish performance management systems that facilitate creativity and active problem-solving (Vargas et al., 2018). Furthermore, it is possible that clear and evidence-based HR-related decisions could increase the perception of fairness and organisational support and thus provide an environment that would encourage experimental and innovative work (Marler and Boudreau, 2017). Although these are theoretical linkages, there are limited empirical studies that investigate the role of IWB as an intermediating factor between HRAA and SOP. This disparity is very noticeable in the emerging or developing economies, where organisations are challenged by resource limitations, institutional demands, and the urgent requirement of sustainable growth. Combining HR analytics with innovation that is driven by employees can present an alternative avenue where such organisations can improve performance and deal with sustainability issues. Nevertheless, insufficient integration of empirical models restricts the development of theories and practice in the field.

This paper will discuss how HR analytics adoption could influence the sustainable performance of the organisation through the mediating role of IWB. The research will contribute to the literature on the topic of digital HRM, innovation, and sustainability, and offer practical implications to managers who have the goal of utilizing HR analytics in achieving sustainable and responsible business performance.

### **Review of Literature and Hypothesis Formulation**

The emergence of HR analytics has turned into a strategic tool which enables making evidence-based decisions and making human capital management more efficient (Marler and Boudreau, 2017). The HR analytics name suggests the strategic application of data analysis applications to HR information with the purpose of optimising the planning of the labour force, recruitment of talent, performance, and employee retention (Dhankhar and Singh, 2022). By turning raw HR data into a meaningful interpretation of the data, organisations can make their HR strategies more consistent with the broader

sustainability objectives. It is the type of analytical tool that would allow companies to predict the workforce trends, identify skills gaps, reduce staff turnover, and get the most out of the resources, which helps make organisations more resilient in the long term (McCartney and Fu, 2022). In terms of strategic considerations, HR analytics improves organisational competencies by promoting transparency, accountability, and making informed decisions (Kiran et al., 2024). Evidence-based HR practices restrict the application of intuition and subjective judgement which leads to superior policy and trust towards the employees. As a result, it contributes to enhancing employee engagement and productivity, and this affects the social sustainability and long-term performance outcomes in a positive way (Ramachandran et al., 2024). In addition, HR analytics can enable economic sustainability by ensuring that workforce management is effectively achieved to assist in reducing operational costs and increasing profitability (Prima et al., 2024). Moreover, proactive talent management and learning as a consequence of the HR analytics usage can be crucial in ensuring abreast with the shifting business environment (Dasari and Devi, 2025). Companies that use analytics have an advantage in forecasting future needs in human capital, creating specific development initiatives, and guaranteeing the flexibility of the workforce (Guru et al., 2021). This is a long-term vision, and it helps organisations to be stable and continue generating value in the long term.

Based on the resource-based perspective, it can be said that HR analytics can be regarded as a valuable and non-copyable organisational resource that contributes to the strategic value of HR functions. Once successfully adopted, it will help organisations to leverage human capital as a source of sustainable competitive advantage. Thus, the advent of HR analytics in HR practices will impact the sustainable organisational performance to a considerable extent. Hence, we postulate the following hypotheses:

**H1:** HRAA is positively related to SOP.

### **Mediating Role of Innovative Work Behaviour**

In the constantly competitive and knowledge-centred economy, the capacity of employees to generate, promote, and implement new ideas is an important determinant of the sustainability of the organisation (Nehles et al., 2017). IWB describes the deliberate establishment, presentation, and utilisation of new ideas, procedures, or practices in a work position, work team, or a company (Widmann and Mulder, 2018). In this regard, IWB is an important behavioural process by which strategic HR programs can be converted into long-term organisational results (Umair et al., 2023). The use of HR analytics dramatically transforms the HR practice by facilitating decision-making based on data, managing talent in a personal manner, and having a clear system of performance evaluation (Ilyas et al., 2025). By making employees believe that HR decisions are objective, fair, and evidence-based, the employees have a high likelihood of feeling psychological safety and trust in the organisation (Wang et al., 2024). Such a facilitating environment promotes experimentation, knowledge exchange, and active problem solving, which are the key components of IWB. Therefore, the adoption of HR analytics will most likely trigger the desire and ability of employees to participate in innovative tasks.

Moreover, HR analytics assists firms in identifying potentially high-performing employees, crafting learning and development schemes, and aligning individual skills with business strategic goals (Kiran et al., 2024). The specified interventions will enhance the level of skills, creativity, and confidence of the employees, as well as help to develop an organisational culture that values the necessity of constant improvement and innovation (Arora et al., 2024). Once the employees are empowered with the relevant expertise and development prospects, they will be more motivated to generate new ideas and implement new solutions to the issues in the organisation (Arora and Mittal, 2024). IWB, in its turn, plays a significant role in maintaining performance in companies.

The employees who repeatedly practice innovation will lead to the efficiencies of the

process, the better quality of services, and the creation of environmentally and socially responsible practices (Strohmeier et al., 2022; Kassar et al., 2022). The results of this are not only improving the economic performance but also promoting the sustainability of social and environmental results in the long term. Hence, IWB serves as an important channel that can enable the adoption of HR analytics to produce long-term organisational gains.

With the help of the resource-based perspective and the behavioural perspective, an IWB may be regarded as a dynamic capability capable of converting the insights provided by HR analytics into the sustainable value creation (Dzandu et al., 2025). The strategic potential of HR analytics can be underused without the active participation of employees in innovative behaviours. Therefore, the relationship between the adoption of HR analytics and the sustainable performance of organisations is expected to be mediated by IWB. Hence, we postulate the following hypotheses:

**H2:** HRAA is positively related to SOP.

**H3:** IWB is positively related to SOP.

**H4:** IWB mediates the relationship between HRAA and SOP.

#### Data Collection and Research Context

The Information technology industry of Pakistan is one of the most rapidly expanding and digitally developed sectors, which is very important in the sustainability of the national economy and transformation by innovation. The IT sector is, therefore, a suitable industry to consider the implementation of HR analytics and its influence on the sustainable performance of an organisation because of its high dependency on data-driven decision-making and the best human resource practices. In this regard, the present research is dedicated to IT organisations in the cities of Islamabad and Rawalpindi, which are two of the top technology centres in Pakistan. The information was gathered through a structured questionnaire in the form of a survey, given to the professionals directly connected with

strategic and operational decisions, which are concerned with human resource management and project implementation. A purposive sampling method was utilised so that respondents with the appropriate background of knowledge and experience in the field of HR analytics and innovative work practice should be included. The respondents that were targeted were project leaders, project HR managers, functional managers, and project team members in the software development companies, IT service providers, and technology-based organisations. To start with, 500 questionnaires were administered at various IT companies in Islamabad and Rawalpindi by physically visiting and electronically. The responses were also satisfactory, as a total of 420 questionnaires were completed. The data were screened, and 40 of the questionnaires were eliminated on grounds of incomplete or inconsistent responses. As a result, the size of the final sample that could be used was 380 respondents, which was considered sufficient to conduct the statistical analysis and test the hypothesis. The analysis of the collected data was done with the help of SPSS. The demographic features of the respondents were summarised using descriptive statistics, but inferential tests were used to test the hypothesised relationships. In particular, the paper has investigated how HRAA directly affects SOP and indirectly through the IWB. All the measures of study variables were adopted from well-established previous research to confirm the content validity and reliability. The measures of SOP were based on economic, social, and environmental dimensions, and the adoption of HR analytics and IWB was evaluated with the help of the multi-item scales, which had been previously validated. Table 1 gives the detailed demographic profile of the respondents, and Table 2 gives the measurement scales and their sources, respectively.

**Demographic Profile of Respondents**

| Demographic Variable    | Category          | Frequency | Percentage |
|-------------------------|-------------------|-----------|------------|
| Gender                  | Male              | 256       | 67.4       |
|                         | Female            | 124       | 32.6       |
| Age (Years)             | 20–30             | 136       | 35.8       |
|                         | 31–40             | 152       | 40.0       |
|                         | 41–50             | 68        | 17.9       |
|                         | Above 50          | 24        | 6.3        |
|                         |                   |           |            |
| Qualification           | Bachelor's Degree | 158       | 41.6       |
|                         | Master's Degree   | 194       | 51.1       |
|                         | MS/MPhil          | 28        | 7.4        |
| Work Experience (Years) | Less than 3       | 64        | 16.8       |
|                         | 3–5               | 134       | 35.3       |
|                         | 6–10              | 122       | 32.1       |
|                         | More than 10      | 60        | 15.8       |

**Table 2, Measurement scales**

| S# | Variable | Reference                              | Item |
|----|----------|----------------------------------------|------|
| 1  | HRAA     | Abujraiban et al. (2025)               | 05   |
| 2  | IWB      | Janssen, (2000)                        | 09   |
| 3  | SOP      | Jabbour & de Sousa<br>Jabbour, (2016). | 09   |

**Data Analysis and Results**

SPSS 28 was used to calculate the descriptive statistics and correlation analysis. The mediation research model, current research

utilised, PROCESS macro in SPSS (Hayes, 2012). The descriptive statistics and relationship among the major constructs are provided in Table 3.

**Table 3: Descriptive Statistics and Correlation Matrix**

| Variable | Mean | SD   | 1      | 2      | 3 |
|----------|------|------|--------|--------|---|
| 1. HRAA  | 3.75 | 0.60 |        |        |   |
| 2. IWB   | 3.62 | 0.58 | 0.51** |        |   |
| 3. SOP   | 3.58 | 0.64 | 0.47** | 0.44** |   |

Note: \*\*p < 0.01

According to the correlation analysis, HRAA is positively correlated with the SOP (r = 0.47, p <

0.01) and with the IWB. There is also a positive relationship between IWB and SOP (r = 0.44, p

< 0.01), which preliminarily proves the direct and indirect relationships that were the focus of the study. The direct impact of HRAA on SOP was corroborated by the results of PLS-SEM (0.42,  $t = 6.23$ ,  $p < 0.001$ ), meaning that companies using HRAA have a higher SOP. Subsequent analysis found that IWB does this correlation in part (indirect effect 1 = 0.18,  $t = 4.12$ ,  $p = 0.001$ ; VAF = 30%), showing that HRAA contributes to the improvement of SOP not only directly but also through encouraging employees to be innovative (Preacher and Hayes, 2004).

#### Direct Impact of HRAA on SOP

The adoption of HRAA and SOP has a strong positive correlation between the two ( $r = 0.42$ ,  $t = 6.23$ ,  $p = 0.001$ ) as depicted in the analysis. This finding implies that businesses utilising HR analytics as a business strategy competence face a greater chance of aligning the management of the workforce to the long-term economic, social, and environmental objectives.

#### Mediating Role of Innovative Work Behaviour

The mediating role of IWB was also utilised to find the way that HRAA is converted into SOP, accomplished by means of workforce-led innovation. The finding indicates that there is a strong indirect relationship (0.18,  $t = 4.12$ ,  $p < 0.001$ ) between IWB and the relationship between HRAA and SOP. This observation lends credence to the Ability Motivation Opportunity (AMO) model, which indicates that HR practices based on analytics help employees improve their capabilities, motivation, and chances of operating innovatively. In turn, the effect of HRAA on sustainability outcomes is enhanced by the active generation of innovative ideas by employees, their promotion, and implementation. The partial mediation demonstrates that, although there is a direct impact, the maximum potential of HR analytics is obtained in the combination with innovative employee behaviours, pointing to the key behavioural mechanism through which HR analytics can be used to achieve long-term organisational sustainability.

#### Direct and Indirect Effects of HRAA on SOP

| Hypothesized Relationship         | B    | t-value | p-value | Result            |
|-----------------------------------|------|---------|---------|-------------------|
| HRAA → SOP                        | 0.44 | 6.23    | < 0.001 | Supported         |
| HRAA → IWB                        | 0.47 | 7.01    | < 0.001 | Supported         |
| IWB → SOP                         | 0.37 | 5.45    | < 0.001 | Supported         |
| Indirect Effect: HRAA → IWB → SOP | 0.18 | 4.12    | < 0.001 | Partial Mediation |

#### Discussion

The current research discussed the effect of the adoption of HRAA on the sustainable performance of organisations and the mediating effect of IWB in the IT industry of Pakistan. The results have strong empirical evidence that testifies to both hypotheses and are a valuable addition to the literature on the role of data-driven human resource management and organisational sustainability, which is growing. In line with Hypothesis 1, the findings show that the adoption of HRAA has a strong and positive influence on the sustainable performance of the organisation. This observation suggests that IT organisations which actually use HR analytics are better placed to make more productive workforce-

related decisions, make the operations smoother and align the human capital strategies to the long-term economic, social, and environmental objectives.

These results are in line with the RBV, which argues that the existence of valuable, scarce, inimitable, and non-substitutable organisational resources, such as analytics-based HR capabilities, may be turned into an origin of a sustainable competitive advantage (Barney, 1991). HR analytics will enable companies to convert collected data about employees into useful knowledge, thereby leading to efficient decision-making and sustainable performance outcomes. As per hypothesis 2, the findings also establish that IWB mediates the

relationship between the adoption of HR analytics and the sustainable performance of the organisation, partially. The discovery indicates the relevance of the innovative behaviours of the employees, such as idea generation, idea promotion, and idea implementation, in transforming analytics-related HR practices into actual sustainability outcomes. The assistance of HR analytics results in the establishment of a working environment that facilitates creativity and innovation. These findings are in line with the earlier study, which means that the analytics-driven HR systems are able to enhance employee engagement and innovation, which ultimately translates into high-performing organisations (Janssen, 2000; Marler and Boudreau, 2017).

The mediating role of IWB underscores that IWB cannot be assured by the power of HR analytics only, but it will be efficient to the degree innovative ability of the employees is aroused by the HR decisions made guided by the analytics. Specifically, the observation applies to IT organisations, the behaviour of which depends on the innovation factor among the employees as a key to sustainable growth and long-term competitiveness.

### Theoretical Implications

This work offers several valuable theoretical contributions. The first one is that it contributes to the existing literature on HR analytics through empirical research linking the adoption of HR analytics to the SOP, which has been under-empirically studied, especially in the contexts of developing countries. Second, by applying IWB as a mediating variable, the study answers recent demands to reveal the conceit of workings by which the HR analytics impacts organisational results. Third, the paper reinforces the use of the Resource-Based View by placing HR analytics as a strategic organisational competence that allows improving sustainability by improving human capital-based innovation. The results are also based on the concepts of the innovation theory, as they show how analytics-based HR systems contribute to employee innovation, which connects the knowledge gaps between strategic HRM, innovation, and sustainability literatures.

### Practical Implications

In terms of practicality, the results provide great information to managers, human resource experts, and policymakers in the IT industry. To begin with, the adoption of HR analytics as a strategic tool instead of a technical or administrative functionality should be a priority in organisations. The development of analytics infrastructure, data quality, and analytical competencies can contribute to the sustainable performance results to a large extent. Second, HR managers are expected to base HR practices on insights gained through analytics to design HR practices that promote IWB, like focused training programs, performance-based compensation, and leadership practices that support innovation. The HR analytics contribution to sustainability can be enhanced by providing a favourable environment where the employees will not be scared to experiment and offer new ideas. Third, the policymakers and industry players should encourage the development of analytics capability in the IT sector through skills-building, data governance models, and digital transformation strategies that can aid organisations to implement HR analytics in an efficient way.

### Limitation and Future Research Prospects

Though useful, this research has a number of limitations that precondition future research opportunities. To begin with, a cross-sectional research design restricts the possibility of coming up with causal relationships. Future research can be based on a longitudinal or experimental design to obtain the dynamic effects of the adoption of HR analytics over time. Second, the research was based on self-reported information, which can also lead to common method bias. Even though the procedural remedies were used, future studies might include multi-source data, including supervisor ratings or objective performance indicators, to make measurements stronger. Third, the researcher only considered the IT sector in Islamabad and Rawalpindi, which can be a constraint to the external validity of the results. The model can be replicated in other industries, regions, or countries in the future to ensure the outcomes are validated in various organisational environments. Lastly, future research can look at other mediators or

moderators to give a more holistic view of the circumstances in which HRAA can lead to sustainable performance.

### Conclusion

This paper gives empirical information on the strategic position of HRAA in improving SOP in the Pakistani IT industry. Through the introduction of IWB as a mediating aspect, the study can contribute to the field of knowledge regarding the effects of analytics-based HR practices on sustainability outcomes due to employee-level innovation. The findings affirm the fact that adoption of HR analytics leads to sustainable performance and indirectly enhances the same by encouraging IWB. These results highlight that companies that aim to be sustainable in their success are not only supposed to invest in high-quality HR analytics systems, but also to create an organisational culture that promotes innovation and creativity among organisational employees. In general, the research makes its contributions in the field of theory and practice by proving that, when used properly, in combination with innovation-based approaches towards human resource management, HR analytics are capable of becoming a potent engine of organisational sustainability in the emerging economies.

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