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IMPACT OF HUMAN RESOURCE INFORMATION SYSTEMS (HRIS) ON HR OPERATIONAL EFFICIENCY

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Article Info

Abstract

The rapid digital transformation of organizations has made Human Resource Information Systems (HRIS) an essential tool for streamlining HR processes, enhancing decision-making and improving efficiency. This study examines the impact of HRIS on HR operational efficiency within Pakistan's engineering and construction sector, focusing on the mediating roles of task processing time, cost saving, data accuracy and decision-making effectiveness. Despite widespread HRIS adoption, many organizations struggle to measure its true value beyond automation. Previous research confirms HRIS benefits such as reduced onboarding time, cost saving and enhanced decision quality, yet most studies fail to model these mediators collectively. Addressing this gap, the present research adopts a quantitative, survey-based design, targeting HR managers, officers and administrators from the sector of engineering and construction industry. Data will be collected using a structured Likert-scale questionnaire and analyzed through structural equation modeling (SEM) to test hypothesized relationship. Grounded in the Technology-Organization-Environment (TOR) Framework and Dynamic Capability Theory. The study explores how HRIS contributes to operational outcomes in industries facing complex workforce management challenges. Findings are expected to demonstrate that HRIS enhances efficiency not only directly but also indirectly through reduced task processing time, lower HR costs, improving accuracy and faster data-driven decision-making. The research contributes to academic knowledge by integrating mediating factors into single framework and offers practical insight for managers seeking to optimize HRIS investment in project-base industry. Ultimately, this study underscores HRIS as a driver of operational excellence and strategic value in human resource management.

Keywords: *Human Resource Information Systems, HR operational efficiency, Task processing time, Cost saving, Decision-making, Data accuracy, Engineering sector, Pakistan.*

1. INTRODUCTION

In this era by increasing competitive and technology driven environment, the organizations are under perpetual pressure to increase performance efficiency, reduce the operational cost and make data analytics-based decision making. As such, Human Resource Information System (HRIS) appeared as essential tool to transform the traditional HR functions into ore strategic and data driven domain. HRIS support the HR data such as employee record management, payroll, recruitment & selection, performance appraisals and other reporting by combining HRM and IT in processes automation (Siengthai & Udomphol, 2016).

The integration of technology in HR functions has reshape the perspective of HRM across the globe. By optimizing employee related data management, automating HR processes and improved the decision making, the HRIS supports HRM (Shahreki, 2019). Furthermore, HRIS facilitates better access to information, reduce paperwork, and improves communication within the HR functions and allowing HR professionals to focus on strategic initiatives rather than doing administrative tasks (Sadiq et al., 2012). As organizations implement HRIS to streamline operations, there is an increasing need to assess its effectiveness, especially in terms of improving HR operational efficiency.

To access HR department performance, the HR operational efficiency has become a crucial metric. As the business evolves, the demand of digital tools like HRIS also enhancing for data accuracy and through this increase the productivity. However, organizations must justify the cost and effort of implementing these systems through measurable improvements in HR performance areas.

Although HRIS adoption has become widespread, many organizations struggle to determine whether the system truly delivers operational benefits beyond automation. Several firms implement HRIS without fully understanding the outcomes it generates or how it affects key efficiency indicators such as task completion time, HR-related costs, and decision-making capabilities. There is limited empirical research that investigates not just the direct effect of HRIS on operational performance but also the indirect effects via mediating variables. This gap presents a problem for both practitioners and scholars in understanding the full value of HRIS. Understanding the pathways through which HRIS affects operational efficiency—particularly by reducing task processing time, saving costs, and enabling faster, data-driven decisions—will help HR leaders make informed investments. Furthermore, HRIS can only reach its potential if its impact is fully understood and aligned with performance objectives (Samy et al., 2023).

The rationale for addressing this research problem stems from the growing need for efficient HR practices in the private sector, especially in construction and engineering services where workforce management, project-based recruitment, cost control, and decision-making are central to organizational success. As these industries face increasing competition and labor complexities, integrating effective HRIS solutions can significantly improve operational performance. However, without industry-specific research, organizations risk investing in systems that are poorly aligned with their operational realities. By investigating the mediating roles of task processing time, cost savings, data accuracy, and decision-making effectiveness, this study seeks to provide deeper insights into how HRIS contributes to efficiency in these under-researched sectors. The findings

can guide practitioners and decision-makers in customizing HRIS implementation strategies that are both practical and impactful within the unique context of construction and engineering services. The aim of this research in to determine the impact of Human Resource Information System (HRIS) on HR operational efficiency. The study looks into by following theoretical model to ascertain that how use of HRIS improving the efficiency of HR operations directly and indirectly.

The purpose of this survey based quantitative research is to determine the impact of HRIS on HR operational efficiency in the engineering & construction industry in Pakistan. In this research the independent variable is use of HRIS, mediating variables are HR tasks processing time, HR cost saving & decision-making effectiveness and dependent variable is HR operational efficiency. The aim of this research in to determine the impact of Human Resource Information System (HRIS) on HR operational efficiency. The study looks into by following theoretical model to ascertain that how use of HRIS improving the efficiency of HR operations directly and indirectly.

1.1 Research Objectives

The main objective of this study is to determine the impact of HRIS on HR operational efficiency in engineering or constriction industry in Pakistan.

- To determine the relationship between use of HRIS and tasks processing time.
- To determine the relationship between use of HRIS and HR cost saving.
- To determine the relationship between use of HRIS and decision-making effectiveness.
- To determine the relationship between use of tasks processing time and HR operational efficiency.
- To determine the relationship between use of HR cost saving and HR operational efficiency.
- To determine the relationship between use of decision-making effectiveness and HR operational efficiency.
- To determine the relationship of tasks processing time as mediator between use of HRIS and HR operational efficiency.
- To determine the relationship of HR cost saving as mediator between use of HRIS and HR operational efficiency.
- To determine the relationship of decision-making effectiveness as mediator between use of HRIS and HR operational efficiency.

Earlier research on the impact of Human Resource Information Systems (HRIS) has predominantly focused on public sector institutions, educational organizations, and the IT industry. While these studies have contributed valuable insights into the effectiveness of HRIS in enhancing organizational performance, they present a limitation in terms of sectoral scope. There remains a significant research gap regarding the implementation and impact of HRIS in private sector domains, particularly within construction and engineering services. These industries have unique operational characteristics and HR challenges that differ from the commonly studied sectors, which may influence how HRIS contributes to efficiency and performance. As such, limited empirical data exists to understand how HRIS functions in these settings, underscoring the need for focused research in private sector industries to broaden the applicability and understanding of HRIS effectiveness.

2. LITERATURE REVIEW

2.1. HRIS and HR Operational Efficiency

Modern organizations increasingly rely on HRIS to improve the speed, accuracy and consistency of HR functions. Recent evidence from the private sector firms shows that HRIS not only streamlining administrative tasks but also enhances overall organizational efficiency by centralizing processes and facilitating data-driven practices (Kadry, 2024). However, research also indicates that efficiency gains depend on how effectively a system is utilized, quality of data, user acceptance and managerial engagement determine whether HRIS delivers long term operational improvements (Siddique et al., 2025). Similar benefits have been observed in public and higher education institutions, where digitalized record and personnel records have significantly reduced workload and improved HR service delivery (Mushumba & Mwiinga, 2024).

2.2. HRIS and Task Processing Time

A recurring finding across studies in the HRIS adoption reduces the time required to complete HR functions. Functions such as payroll, employee onboarding and record updates becomes faster because tasks are automated and information is stored in digital form (Delos Santos-Suñga & Moreno, 2024). Further, the integration of HRIS with other enterprise system has been shown to minimize delays in information sharing which shorten end-to-end processing cycle (Štofanová & Cagáňová, 2023). Systematic review of HR digitalization emphasize that speed and process efficiency are among the strongest and most consistent benefits associated with HRIS adoption (Raja et al., 2025).

HRIS implementation can significantly reduce the time required for key HR tasks. For example, onboarding time was reduced from 14 to 5 days and payroll processing time from 7 to 2 days in public-sector case studies (Ali, 2024). These reductions contribute directly to HR department throughput and validate task processing time as a key mediating variable (Saputri et al., 2024).

2.3. HRIS and Cost Saving

Another dimension where HRIS provides value is cost reduction. Recent studies confirm that organizations implementing HRIS often experience lower administrative cost mainly because the system reduces reliance on paperwork, manual record keeping and clerical staff (Kadry, 2024). Public institutions report additional saving from consolidating payroll and personnel records into single database, which helps eliminate duplicate entries and reconciliation cost (Mushumba & Mwiinga, 2024). Moreover, HRIS allows HR staff to shift their focus from transactional to strategic activities, indirectly lowering costs while improving the overall contribution of HR organizational goals (Kadry, 2024).

Automation in HR operations—particularly payroll, attendance, and benefits administration—leads to measurable cost savings (Kumar & Jagadeesan, 2024). In some cases, administrative HR costs were reduced by over 20% as a result of digitized processes (Cho et al., 2020).

2.4. HRIS and Decision-Making Effectiveness

Research consistently shows that HRIS strengthen the quality of decision making by providing managers with timely, accurate and accessible information. In manufacturing and service organizations, HRIS data has been found to improve performance management, workforce planning and the policy decisions (Ololade et al., 2023). When HRIS is aligned with broader digital HR strategy, managers are able to make quicker and more evidence-based decision, reducing reliance on institution or incomplete information (Ruiz et al., 2024). More recent work also highlights that effective decision-making outcome depends on system quality, staff capabilities and information reliability, suggesting the decision improvements are not automatic but contingent on effective HRIS use (Siddique et al., 2025).

Several studies support a positive relationship between HRIS usage and HR operational efficiency. Organizations that implemented HRIS reported a 35% increase in HR operational efficiency, largely attributed to reduced administrative time and improved system-driven accuracy (Saputri et al., 2024). Similarly, HRIS contributed to a 30% reduction in onboarding time and significant gains in HR productivity, explaining 45% of the variance in HR performance (Shahreki, 2019).

Taken together, the literature indicates that the HRIS contributed to operational efficiency through multiple channels. First, it reduces task processing time by automating workflows, second it lowers HR related cost by eliminating inefficiencies and third it improves the quality and speed of decision making (Delos Santos-Suñga & Moreno, 2024; Kadry, 2024; Ololade et al., 2023; Štofanová & Cagáňová, 2023). At the same time, researchers stress that these benefits are moderated by system effectiveness, data quality and organizational readiness, meaning that positive outcomes depend on how will HRIS implemented and managed (Siddique et al., 2025).

Although international studies demonstrate strong link between HRIS use and operation efficiency, little imperial evidence exists for the engineering and construction industry in Pakistan. This sector operates under project-based structures with complex workforce needs, making HRIS adoption both challenging and potentially valuable. The lack of the research in this context highlights the need for the studies that examine how HRIS affects efficiency through mediators such as time saving, cost reduction and decision -making in this industry (Raja et al., 2025).

3. Theoretical Foundation

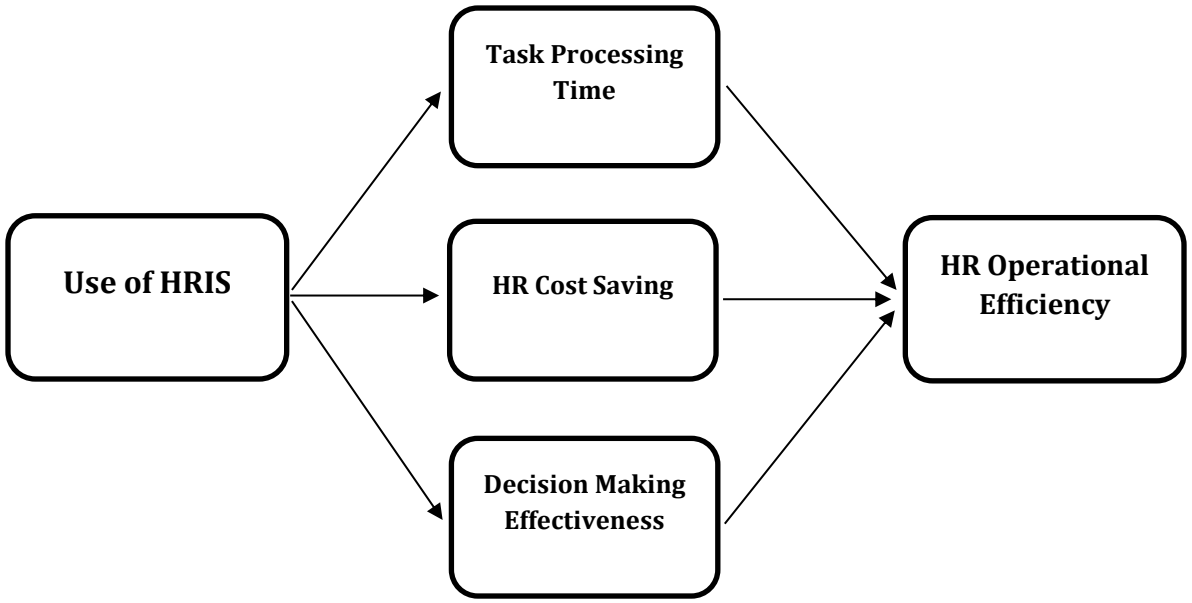
The theoretical foundation of this study is grounded in contemporary and widely accepted theories that explain the relationship between technology adoption and organizational performance. Given the focus on the implementation of Human Resource Information Systems (HRIS) and its impact on HR operational efficiency, this research integrates multiple theoretical perspectives to comprehensively understand how HRIS contributes to performance outcomes in private sector industries, particularly construction and engineering services.

The Technology–Organization–Environment (TOE) Framework, as revised in recent HRIS studies (e.g., Othman et al., 2019), provides a comprehensive view of the internal and external factors influencing HRIS adoption and its varying impact across industries. This theory is especially

pertinent for studying sectors like construction and engineering, where technological readiness, organizational culture, and environmental pressures shape the effectiveness of HRIS deployment.

The Dynamic Capability Theory (Teece, 2014) is also relevant to this research. It emphasizes an organization's ability to integrate, build, and reconfigure internal competencies in response to changing environments. HRIS contributes to this dynamic capability by enabling more agile, data-driven HR operations, particularly in industries where responsiveness and process optimization are critical, such as construction and engineering services.

3.1 Theoretical Framework



3.2 Research Hypotheses

H1: There is relationship between use of HRIS and tasks processing time
H2: There is relationship between use of HRIS and HR cost saving.
H3: There is relationship between use of HRIS and decision-making effectiveness.
H4: There is relationship between use of tasks processing time and HR operational efficiency.
H5: There is relationship between use of HR cost saving and HR operational efficiency.
H6: There is relationship between decision-making effectiveness and HR operational efficiency.
H7: Task processing time mediates between HRIS and HR operational efficiency.
H8: HR cost saving mediates between HRIS and HR operational efficiency.
H9: Decision making effectiveness mediates between HRIS and HR operational efficiency.

4. METHODOLOGY & METHODS

This study adopts a quantitative, survey-based research design to examine the impact of Human Resource Management System (HIRS) on HR operational efficiency with focus on the mediating roles of HR tasks processing time, cost saving, data accuracy and decision-making effectiveness.

The positivist paradigm guides the research, emphasizing objective measurement and hypothesis testing using statistical methods. A quantitative approach is widely adopted in HRIS studies for measuring cause-effect relationships using structural models. Shahreki (2019) used SEM to test the impact of HRIS on HR productivity, while Saputri et al. (2024) employed quantitative surveys to assess mediating effects on HR efficiency. Samy et al. (2023) also used structural modeling to study HRIS impacts on decision-making effectiveness.

4.1. Research Approach

The research follows the deductive where hypotheses are developed from existing theories and tested empirically through data collection and analysis. This model is based on Technology-Organization-Environment (TOE) framework and Dynamic Capability Theory, both of which are well established for examining technology adoption and performance impact. (Othman et al. 2019).

4.2. Sampling Method

The target population consists of HR professional in the Engineering and Construction sector in Pakistan. These industries face unique operational challenges where HRIS adoption can be highly impactful. A purposive sampling technique will be employed to target respondents which direct experience using HRIS. The study aims for 150-200 respondents, a sample size considered. HR Managers, HR officers and system administrators.

4.3. Data Collection Method

Data will be collected using a structured questionnaires based on a 5-point Likert chart. The instruments will be consisting of the following parts:

- Demographic Information
- Use of HRIS
- HR Task Processing Time
- HR Cost Saving
- Decision Making Effectiveness
- HR Operational Efficiency

5. Results

5.1. Questionnaire Distribution & Demographics

In the light of table 1, the total valid responses received from **149 respondent** in which the majority participants are **male (84.6%)**, it reflects the male employees are dominant in nature in the engineering and construction industry. Form table 2, most of the participants are **31-40 years (66.4%)** followed by **21-30 years (26.8%)**, indicating a predominantly mis-career workforce. In terms of qualification almost all respondents held higher education with **48.3% Bachelor's** and **46.3% Master's** degree. Regarding industry/organization type **64.4%** worked in **Engineering** sector and **35.6%** in **Construction** sector.

Table 1
Questionnaire Distribution

Questionnaire distributed	Questionnaire received	Excluded Responses	Correct Responses	Response rate (%)
200	155	6	149	74.5

Table 2
Respondents Profile

Variables	*Demographics*	*Total (N=149)*	*Frequency (%)*
Gender	Male	126	84.6
	Female	23	15.4
Age	Less than 20 Years	0	
	21-30 Years	40	26.8
	31-40 Years	99	66.4
	41-50 Years	8	5.4
	More than 50 Years	2	1.3
Qualification	Intermediate	8	5.4
	Bachelor	72	48.3
	Masters	69	46.3
	Others	0	0
Organization Type	Engineering	96	64.4
	Construction	53	35.6

Overall, the sample represents a well-educated, mis-career workforce, consistent with the demographics of the target industry.

5.2. Reliability Analysis

In table 3, all constructs demonstrated good internal consistency, with Cronbach's Alpha values significantly exceeding the accepted threshold of 0.7, ensuring the reliability of the measurement scale. Specifically, the **Use of HRIS** scale (6 items) had an alpha of **0.814**, **Processing Time** (5 items) scored **0.839**, **Cost saving** (6 items) was **0.809**, **Decision-Making Effectiveness** (5 items) was **0.742**, and **Operational Efficiency** (5 items) was **0.816**.

Table 3

Inter-item Consistency

Variables	*Cronbach's Alpha*	*N of Items*
HRIS	0.814	6
PT	0.839	5
CS	0.809	6
DM	0.742	5
OE	0.816	5

5.3. Correlation Analysis

The Pearson's coefficients were calculated to examine the relationship among the study variables in table 4. The results indicated that, several significant positive correlations at the 0.01 level (2-tailed)

Table 4

Descriptive Statistics and Correlation Analysis

S. #.	Variables	*M*	*SD*	1	2	3	4	5
1	HRIS	3.9116	0.65547	1				
2	PT	4.0416	0.63172	.733**	1			
3	CS	3.8937	0.61732	.733**	.729**	1		
4	DM	3.9101	0.54547	.590**	.891**	.776**	1	
5	OE	4.1020	0.50490	.400**	.575**	.667**	..650**	1

**Correlation is significant at the 0.01 level (2-tailed).

The variable **HRIS** showed a strong correlation with **Task Processing Time** (*r = .733*), a moderate correlation with **HR Cost Saving** (*r = .460*) and **HR Operational Efficiency** (*r = .400*), a moderate to strong correlation with Decision Making Effectiveness (*r = .590*). It shows that maximum HRIS utilization improves the task processing efficiency, cost reduction, decision quality and overall HR operational performance.

Among the mediating variables, **Task Processing Time** is strongly correlated with **Decision Making Effectiveness** (*r = .891*) and **HR Cost Saving** (*r = .729*). Likewise, HR Cost Saving demonstrated a strong positive relationship with **Decision Making Effectiveness** (*r = .776*). These results highlights that the mediating variables are not only related to HRIS but are also interrelated.

The **HR Operational Efficiency** is significantly correlated with **Task Processing Time** (r = .575). **HR Cost Saving** (r = .667) and **Decision-Making Effectiveness** (r = .650). It finds that the HR

operational efficiency is most closely associated with cost saving and decision-making improvement followed by reduction in processing time.

Finally, the correlation results provide the strong initial support to the hypothesized model and confirm that HRIS usage is positively related to mediating variables, that inversely associated with HR operational efficiency enhancement.

5.4. Regression Analysis

The regression analysis applied to find the use of HRIS significantly predicts task processing time, results indicate the strong positive relationship between HRIS and task processing time (R = .733) in table 5. The model explained approximately 53.8% of the variance in task processing time (R^2 = .538, Adjusted R^2 = .535). The unstandardized coefficient (B = 0.707) suggests that for every one unit increase in HRIS use, task processing time improves by 0.71 units on the Likert scale.

Table 5

Regression Coefficients of HRIS on PT (Task Processing Time)

Variable	*B*	β	*SE*
Constant	1.277		0.214
Use of HRIS	0.707	0.733	0.054
R^2	0.538		

N=149

***p<.001

The findings provide strong evidence that greater use of HRIS significantly improve task processing time that supporting the hypothesized role of HRIS in reducing delays and enhancing efficiency in HR operations.

Table 6

Regression Coefficients of HRIS on CS (Cost Saving)

Variable	*B*	β	*SE*
Constant	2.198		0.273
Use of HRIS	0.434	0.46	0.069
R^2	0.212		

N=149

***p<.001

The regression analysis assessed whether the use of HRIS significantly predicts HR cost saving in table 6. The results indicate the moderate positive relationship. The model accounted for approximately 21.2% of variance in HR cost saving. The coefficient (B = .434) suggests that for every one unit increase in HRIS usage, the HR cost saving improves by 0.43 units. That the use of HRIS contributes directly to reduce HR cost by streamlining administrative processes, minimize paperwork and improving efficiency in resource allocation.

Table 7

Regression Coefficients of HRIS on DM (Decision-Making Effectiveness)

Variable	*B*	β	*SE*
Constant	1.99		0.22
Use of HRIS	0.491	0.59	0.055
R^2	0.348		

N=149

***p<.001

The regression analysis tested the HRIS usage predicts decision making effectiveness in table 7. The results showed a moderate to strong positive relationship (R = .590). the variance in decision making effectiveness is 34.8%. The coefficient (B = .491) suggests that for every one unit increase in HRIS use improves the 0.49 units of decision-making effectiveness on the Likert scale. Above finding shows that HRIS plays a critical role in enhancing decision-making effectiveness by providing timely, accurate and integrated information that supports evidence-based HR decisions.

Table 8

Regression Coefficients of HRIS on OE (HR Operational Efficiency)

Variable	*B*	β	*SE*
Constant	2.896		0.231
Use of HRIS	0.308	0.4	0.058
R^2	0.16		

N=149

***p<.001

The regression results showed the moderate positive relationship between HRIS and HR operational efficiency (R = .400) in table 8. The model explained 16% of the variance in operational efficiency (R^2 = .160, Adjusted R^2 = .154). The coefficient showing a significant positive effect of HRIS use, it suggests that for every one unit increase in HRIS use improved the HR operational efficiency accordingly on the Likert scale. These findings suggest that while HRIS directly contributes to HR operational efficiency. Its explanatory power is moderate compared to its stronger effects on the mediating variables. This aligns with the mediating hypothesis that HRIS enhances efficiency indirectly through these mediators.

6. DISCUSSION

As the objective of this study was to examine the impact of Human Resource Information System (HRIS) on HR operational efficiency in the Engineering and Construction industry of Pakistan, specifically the research finds that how HRIS influences task processing, cost saving and decision-making effectiveness and whether these mediating variables contributes to improving operational efficiency.

The results confirmed that HRIS has a significant positive effect on task processing time, HR cost saving and decision-making effectiveness thereby supporting **H1**, **H2** and **H3**. These findings

demonstrate that HRIS utilization enhancing HR operations by streamlining administrative tasks, reducing manual workload and providing accurate information for decision making. However, when assessing the mediating variables with operational efficiency, the results were mixed. **H4** was not strongly supported, as task processing time did not significantly predict the HR operational efficiency. In comparison, **H5** & **H6** were supported as HR cost saving and decision making were both significantly predictor of operational efficiency. These results suggest that cost reduction and improved decision making are more critical drivers of efficiency outcomes. The mediating hypothesis **(H7 & H9)** were also supported. HRIS demonstrated stronger indirect effects on operational efficiency through cost saving and decision-making effectiveness than through direct effects. This confirms that HRIS contributes to organizational performance primarily by enabling cost efficiencies and better HR decision making processes.

The findings are consistently with earlier studies that emphasize HRIS as a tool for reducing HR cost and supporting evidence-based decision making (Al-Dmour et al.,2021; Malik & Ahmed, 2019). Studies also highlight HRIS's role in improving efficiency by integrating HR data and enhancing analytical capabilities (Bondarouk & Brewster, 2016; Obeidat & Tarhini, 2020). Interestingly, the non-significant role of task processing time contrasts with some prior findings (Khashman & Khashman, 2016), suggesting that in context like Pakistan's engineering and construction sector, time-saving benefits of HRIS may already be realized, making cost and decision support the more impactful benefits.

This study contributes to HRIS literature by empirically validating its role in operational efficiency through mediating mechanism. While past research has emphasized HRIS's direct impact on efficiency, the present findings highlight that efficiency gains are mostly realized indirectly, particularly through cost saving and decision-making effectiveness. This extends the resource-based view (RBV) by showing how HRIS functions as an enabling capability that supports operational outcomes via mediators rather than as a stand-alone driver.

7. CONCLUSION & STUDY LIMITATIONS

Overall, the study confirms that HRIS significantly contributes to HR operational efficiency, primarily through its ability to enable cost savings and enhance decision-making effectiveness. The findings provide both theoretical insights into the indirect role of HRIS and practical guidance for organizations seeking to maximize returns from HRIS investments.

The non-significant effect of task processing time on operational efficiency was unexpected. One possible explanation is that while HRIS automates routine tasks and reduces manual processing time, these gains may not directly translate into improved operational efficiency unless coupled with cost control and better decision-making. Future research could further investigate why task automation may not always yield efficiency outcomes, particularly in industries with complex workflows.

7.1. Study Limitations

Although prior research confirms HRIS benefits, several limitations persist. Most studies examine direct impacts such as cost savings or process efficiency but fail to statistically model how these factors mediate the relationship between HRIS usage and operational efficiency (Kumar & Parumasur, 2013; Siengthai & Udomphol, 2016). While Samy et al. (2023) examined HRIS as a

mediator for decision-making, they did not consider task processing time or cost savings in an integrated framework.

Additionally, much of the existing research is context-specific—focused on select countries like Thailand, Egypt, or South Africa—limiting the generalizability of findings across diverse organizational and cultural settings. Studies also often overlook factors such as employee readiness, IT competence, and organizational support, which influence both HRIS adoption and performance outcomes (Frontiers in Psychology, 2021).

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