LEGAL AND ETHICAL IMPLICATIONS OF ALGORITHMIC DECISION-MAKING IN HUMAN RESOURCE MANAGEMENT IN THE CONSTRUCTION INDUSTRY OF PAKISTAN

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Abstract:

In the construction industry, the use of algorithmic decision-making has become an increasingly important practice in the context of human resource management (HRM) operations. It is essential to be aware of the potential ethical and legal repercussions that may result from algorithmic decision-making in the context of discrimination. Especially in the building and construction industry, this study aims to assess the moral and ethical considerations related to the use of algorithmic decision-making in human resource management. This will be done to better understand the implications of such practices. In this particular piece of research, the inquiry technique used was quantitative. The research design calls for surveying workers in the construction industry in Islamabad and Rawalpindi, Pakistan, to collect quantitative data on construction employees' perspectives of legal and ethical implications of Pakistan's construction industry, HRM practices, and performance. This will allow for data collection on employees' perspectives on legal and ethical implications, Pakistan's construction industry, and performance. These workers are engaged in the building and construction industry to gather data on employees' perspectives, specifically concerning the repercussions of legal and ethical concerns, HRM practices, and performance. Research is being done to study the possible legal repercussions of employing algorithms to make choices, especially concerning the requirement to comply with employment standards, anti-discrimination legislation, and regulations for data protection. This research is primarily focused on the need to comply with employment standards. Inadvertent biases and ethical considerations such as fairness, transparency, and privacy are among the topics being investigated as a component of the investigation. The practices of human resource management (HRM), which acted as a mediating variable, influenced the link between the ramifications of law and ethics and the performance of employees. This effect was significant. This impact was noticeable to the point that it might be considered statistically significant.

I. INTRODUCTION

A. Background and significance of algorithmic decision-making in HRM in the construction industry

The building and construction industry is not only one of the most important contributors to the economy of the whole world, but it is also responsible for the employment of millions upon millions of people in almost every country on the face of the earth (Chen & Xu, 2023; Mahmood et al., 2022; Pfeiffer et al., 2023). It is essential to put adequate human resource management (HRM) practices into place if one wants to guarantee that construction projects will be completed and that employees will continue to enjoy good health (Ahmad et al., 2022; Lahbar & Bhatti; Textor et al., 2022).

On the other hand, the widespread application of algorithmic decision-making in construction human resource management carries a plethora of serious ethical and legal implications. These implications may be broken down into many categories. In algorithmic human resource management systems, legal frameworks and regulations, including employment legislation, anti-discrimination laws, and data privacy standards, must be carefully evaluated and adhered to at all times (Park et al., 2021). This is the case even when there is no human intervention involved. Legislation pertaining to employment, anti-discrimination laws, and data protection requirements are all examples of these regulatory frameworks and standards.

Legislation dealing with the protection of personal information and data is an example of legislation that falls under this category. Other examples of such frameworks and regulations include anti-discrimination and employment laws. Suppose construction companies do not comply with these standards. In that case, they expose themselves to the possibility of a legal challenge and may even be held accountable for any damages that may have been caused as a result of their actions (Bader & Kaiser, 2019; Ewing & Demir, 2021; Fauzi et al., 2022; Perez Vallejos et al., 2021; Renkema, 2022; Roundy, 2022).

The use of algorithms in human resource management (HRM) may give rise to ethical problems due to the nature of the work being done. The use of algorithms may give birth to privacy concerns, biases, and other types of discrimination that are not consciously practiced. Unintentional biases and discrimination may cause these issues. These worries may be made worse because biases and discrimination are not usually done on purpose, which adds another layer of complexity to the situation. To offer employees fair treatment and maintain their legal rights, the algorithmic decision-making process must be equitable, transparent, and accountable (Ahmed et al., 2023; Nasir et al., 2023).

Construction companies, HR professionals, employees, and regulators must fully grasp the legal and ethical implications of deploying algorithmic decision-making in human resource management within the construction industry. This understanding is essential since algorithmic decision-making has the potential to have a significant impact on the industry. This is because employing algorithms to make decisions increases the likelihood of unethical and unlawful activity. Given that algorithmic decision-making can affect people's job circumstances, having this knowledge is crucial.

Businesses have the opportunity to develop responsible human resource practices in accordance with the legal requirements and ethical standards if they analyze the implications of these scenarios and find solutions to the difficulties they unearth. This will allow the businesses to establish responsible human resource practices following the legal requirements and ethical standards. This makes it simpler for companies to gain the benefits of technology while also establishing an atmosphere at work that is equal and tolerant of individuals from all walks of life. This is a win-win situation for everyone involved. As a result, researching the legal and ethical implications of algorithmic decision-making in construction human resource management (HRM) could provide industry stakeholders with vital insights and ideas, provided that the study is carried out acceptably (Park et al., 2021).

B. Research objectives and research questions

Research Questions:

What are the potential legal challenges and risks associated with algorithmic decision-making in construction HRM, such as discrimination and data privacy concerns?

What are the ethical considerations and dilemmas introduced by algorithmic decision-making in construction HRM?
How do HR professionals and employees perceive algorithmic HRM practices' fairness, transparency, and accountability in the construction industry?
What challenges do HR professionals face in implementing responsible algorithmic decision-making in construction HRM?
What are the perspectives of construction industry stakeholders, including employers, managers, and regulatory bodies, regarding algorithmic HRM regarding, legal compliance and ethical concerns?
What recommendations and best practices can be suggested to ensure legal compliance and promote ethical algorithmic decision-making in construction HRM?
Research Objectives:
To examine the legal implications of algorithmic decision-making in human resource management (HRM) within the construction industry.
To explore the ethical considerations associated with algorithmic decision-making in HRM in the construction industry.
To identify the challenges and risks of algorithmic HRM practices regarding legal compliance and ethical responsibilities.
To investigate HR professionals' and employees' perspectives and experiences regarding algorithmic decision-making in construction HRM.
To provide recommendations and best practices for ensuring legal compliance and promoting ethical algorithmic decision-making in construction HRM.

II. LITERATURE REVIEW

A. Definition and explanation of algorithmic decision-making in HRM

In human resource management (HRM), the process of using data analytics and algorithms to automate and aid HR procedures and decisions is referred to as Algorithmic decision-making. "algorithmic decision-making" is included in the phrase "algorithmic decision-making." It needs computer algorithms to analyze huge volumes of data and extract insights that might potentially affect decisions relevant to human resource management. These options include recruiting new employees, evaluating current employees' performance, providing training, and allocating resources (Köchling & Wehner, 2020).
In the discipline of algorithmic human resource management (HRM), algorithms are created to process and analyze different forms of data to offer suggestions or make selections. These categories of data include personnel profiles, qualifications, performance metrics, and historical data. To identify hidden patterns, correlations, and trends within the data, these algorithms may make use of machine-learning approaches, statistical models, or established rules (Weiskopf & Munro, 2012).
The use of algorithmic decision-making in the field of human resource management serves the objective of improving the efficacy, objectivity, and efficiency of HR operations (Kaur et al., 2022; Kleanthous et al., 2022; Roemmich et al., 2023). The capacity of algorithmic HRM to assist HR professionals in making decisions that are better informed, streamlining procedures, and making the most of available resources may be accomplished via outsourcing some jobs and using data-driven insights.
However, it is of the highest significance to realize that using algorithms to make judgments in human resource management is not without its inherent constraints as well as prospective hazards (O'Brien-Pallas et al., 2001). This is one of the most important things that should be acknowledged. Because human programmers develop algorithms, there is always the possibility that they might accidentally discriminate against individuals or inject biases into the system if they are not constructed, taught, and reviewed appropriately. In addition, the opaque quality of some algorithms may give rise to issues about the privacy, fairness, and transparency of the judgments that are reached as a consequence of their use. Therefore, it is essential to understand the legal and ethical implications of algorithmic decision-making in HRM and find solutions to these issues to ensure that HR practices are in accordance with legal requirements, that justice is promoted, and that employee rights are

protected. Researching the implications of algorithmic decision-making in human resource management is one way to reach this goal (Gerards & Borgesius, 2022).

B. Overview of algorithmic HRM practices in the construction industry

In the construction industry, algorithmic human resource management strategies include using data-driven algorithms to different HR processes to expedite and improve them. In construction human resource management, these approaches use technology and automation to increase efficiencies, objectivity, and decision-making. The following is a rundown of some of the most important algorithmic human resource management strategies in the construction industry:

Automated screening of job applicants: Automated processing of job applications may be accomplished via algorithms. Algorithms can swiftly discover the most qualified individuals for construction occupations by researching their resumes, credentials, and other pertinent factors. Because of this, HR professionals can shorten the initial screening process and direct their attention to candidates with the most qualifications (O'Brien-Pallas et al., 2001).

Evaluation and Analysis of Employee Performance Algorithmic HRM systems can evaluate employee performance based on metrics and performance indicators specified in advance. Algorithms can create performance scores and give significant insights for performance assessments. These capabilities are made possible by the analysis of data such as productivity, quality of work, and safety records. This makes it possible to evaluate employees' contributions that are more objective and driven by data. It also makes it easier to monitor employees' performances (Tambe et al., 2019).

Workforce Planning and Resource Allocation: Algorithms can assist in determining optimal In construction projects, resource allocation and labor planning are very important. Algorithms can determine the optimal distribution of human resources by examining the needs of the project, the skill sets of the workers, the availability of the workers, and any other relevant aspects. This helps to increase productivity and ensure that project deadlines are met. HR specialists are able to maximize resource utilization and guarantee that the appropriate Staff is allocated to the appropriate duties as a result of this (Kaur et al., 2022; Kleanthous et al., 2022; Roemmich et al., 2023).

Training and Development: Algorithmic HRM may help identify training requirements and individualized development programs for employees working in the construction industry. Algorithms are able to create suggestions for specialized training programs and professional development opportunities by assessing performance data, skill gaps, and individual career aspirations. This encourages lifelong learning and increases the construction industry experts' skills and capacities (Tambe et al., 2019).

The Application of Predictive Analytics to the Problem of Employee Retention: In the construction industry, variables that lead to employee turnover may be identified with the use of algorithms that use historical data and predictive analytics on the data they collect. Algorithms, by their ability to recognize patterns and correlations in data, may offer insights that assist HR managers in proactively addressing difficulties related to employee retention. Because of this, tailored interventions and initiatives to promote employee happiness, engagement, and retention may now be implemented (O'Brien-Pallas et al., 2001).

C. Review of existing literature on the legal and ethical implications of algorithmic decision-making in HRM

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Planning the Workforce and Allocating Resources: Algorithms may be of use in establishing the most effective way to plan the workforce and allocate resources in construction projects. Algorithms are able to determine the optimal distribution of human resources by examining the needs of the project, the skill sets of the workers, the availability of the workers, and any other relevant aspects. This helps to increase productivity and ensure that project deadlines are met. HR specialists are able to maximize resource utilization and guarantee that the appropriate Staff is allocated to the appropriate duties as a result of this (Köchling & Wehner, 2020).

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Utilizing Historical Data and Predictive Analytics to discover variables Contributing to Employee Turnover Predictive analytics may be used to discover variables contributing to employee turnover in the construction industry using historical data algorithms. By analyzing patterns and correlations in data, algorithms can generate insights that help HR professionals proactively address retention challenges. This enables the implementation of targeted interventions and strategies to improve employee satisfaction, engagement, and retention (Marr, 2018).

D. Identification of gaps and research opportunities

While algorithmic decision-making in HRM in the construction industry has gained attention, several gaps and research opportunities still merit exploration. Identifying these gaps and opportunities can contribute to the advancement of knowledge and practice in the field. Some areas for further investigation include:

Legal and Regulatory Frameworks: Research could focus on assessing the adequacy of existing legal and regulatory frameworks in addressing the unique challenges posed by algorithmic HRM in the construction industry. This includes exploring potential gaps or inconsistencies in employment laws, anti-discrimination legislation, and data protection regulations specifically tailored to algorithmic HRM practices in construction (Köchling & Wehner, 2020).

Algorithmic Bias and Discrimination: Investigating the presence and impact of biases in algorithmic decision-making within the construction industry is crucial. Research can delve into understanding the potential biases embedded in algorithms used for hiring, promotion, and resource allocation and how they might perpetuate discrimination based on factors such as gender, race, or age (Walkowiak, 2023).

Transparency and Explainability: There is a need for research on ensuring transparency and explainability in algorithmic HRM. Understanding how to make algorithms more interpretable and transparent to HR professionals and employees in the construction industry can help build trust and address concerns related to fairness and accountability (Langer & König, 2023).

Independent Variable 1: Legal Implications

This variable shows the legal implications that are linked with using algorithmic decision-making in HRM. Compliance with employment legislation, anti-discrimination standards, and data protection obligations that are particular to algorithmic HRM practices are all included in this need (Fleetwood & Hesketh, 2006).

Independent Variable 2: Ethical Implications

This variable illustrates the ethical issues that arise from using algorithms to make decisions in human resource management. It encompasses issues of justice, transparency, and privacy, in addition to the possibility that algorithmic HRM practices might result in inadvertent biases or discrimination (Guerci et al., 2017).

Mediating Variable: Human Resource Management (HRM)

This variable is intended to indicate the part that HRM procedures, policies, and strategies play in the management of the legal and ethical implications of algorithmic decision-making. Activities like recruiting, selection, performance assessment, training, and resource allocation are included in the realm of human resource management (HRM) (ALDamoe et al., 2012).

Dependent Variable: Performance

Within the framework of algorithmic HRM methods, this variable is intended to reflect the total performance of employees. Objective indicators like as productivity, quality of work, and adherence to safety rules are some examples of metrics that may be used to assess performance (Tanveer et al., 2011).

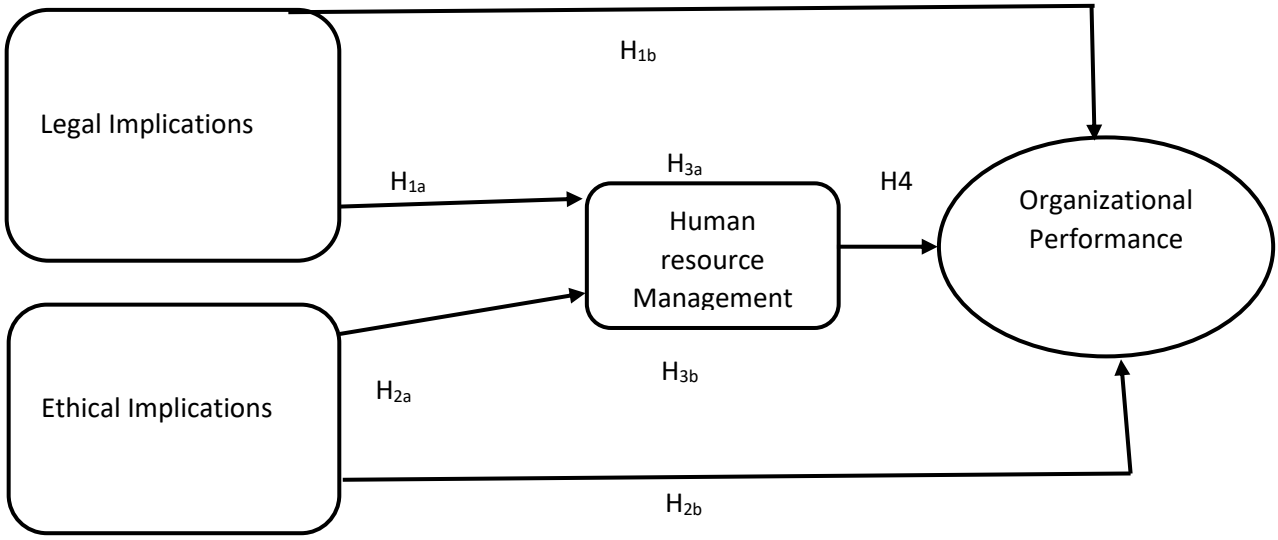
Framework:

Legal Implications → Human Resource Management → Performance

Ethical Implications → Human Resource Management → Performance

The theoretical framework of the study

In this model, it is hypothesized that the legal and ethical implications of algorithmic decision-making



in HRM will indirectly influence employee performance via the mediating function of HRM practices. The legal and ethical implications may have an impact on the way HRM procedures are planned and executed, which in turn may have an effect on employee performance.

The concept implies that the legal and ethical aspects must be addressed successfully via suitable HRM practices to improve employee performance within the context of algorithmic decision-making. In contexts where algorithmic HRM is used, further research and analysis may be carried out to investigate the particular links between the variables, quantify the effect of those associations, and find solutions to assure legal compliance, resolve ethical problems, and improve employee performance.

H_1: There is a significant relationship between the legal implications of algorithmic decision-making in HRM and employee performance.

H_2: There is a significant relationship between the ethical implications of algorithmic decision-making in HRM and employee performance.

H_3: The relationship between the legal implications of algorithmic decision-making in HRM and employee performance is mediated by human resource management.

H_4: The relationship between the ethical implications of algorithmic decision-making in HRM and employee performance is mediated by human resource management.

The examination of the links between the independent variables (legal implications and ethical implications), the mediating variable (human resource management), and the dependent variable (employee performance) may begin using these hypotheses as a starting point. In the context of algorithmic HRM practices in the construction industry, the study may use relevant statistical approaches, such as regression analysis or mediation analysis, to investigate the importance of these interactions and the degree to which they are strong (Wang et al., 2020).

III.RESEARCH METHODOLOGY

Survey Design: Researcher Developed a survey instrument with the intention of collecting quantitative data from HR professionals, employees, and other stakeholders in the construction industry. Questions about legal compliance, ethical issues, impressions of algorithmic human resource management, and experiences with algorithmic decision-making in the construction industry are included in the survey (Steinmetz et al., 2011).

Sampling: It was concluded that a sample size of 568 would be adequate to derive significant inferences from the responses provided by employees working in the construction industry. The sample consists of people who took part in the survey from a diverse range of construction companies, as well as HR professionals and employees working in various roles and at various levels within the industry.

Data Collection: The researcher gave the survey to the group that had been identified, utilizing either online or offline techniques to do so. Ensure that data collection is carried out in an ethical way by assuring confidentiality, anonymity, and the engagement of willing participants.

A. Research design and approach

The research design and methodology that would normally be used to investigate the legal and ethical implications of algorithmic decision-making in human resource management (HRM) in the construction industry would entail a mixed-methods approach, which would combine quantitative and qualitative research methodologies. The collection of numerical data as well as rich qualitative insights made possible by this provides for a thorough comprehension of the subject matter. It is possible to take into consideration the following study designs and methods:

Research Design:

a. Exploratory: The research design was exploratory in nature, aiming to gain a deeper understanding of the legal and ethical implications of algorithmic decision-making in construction HRM.

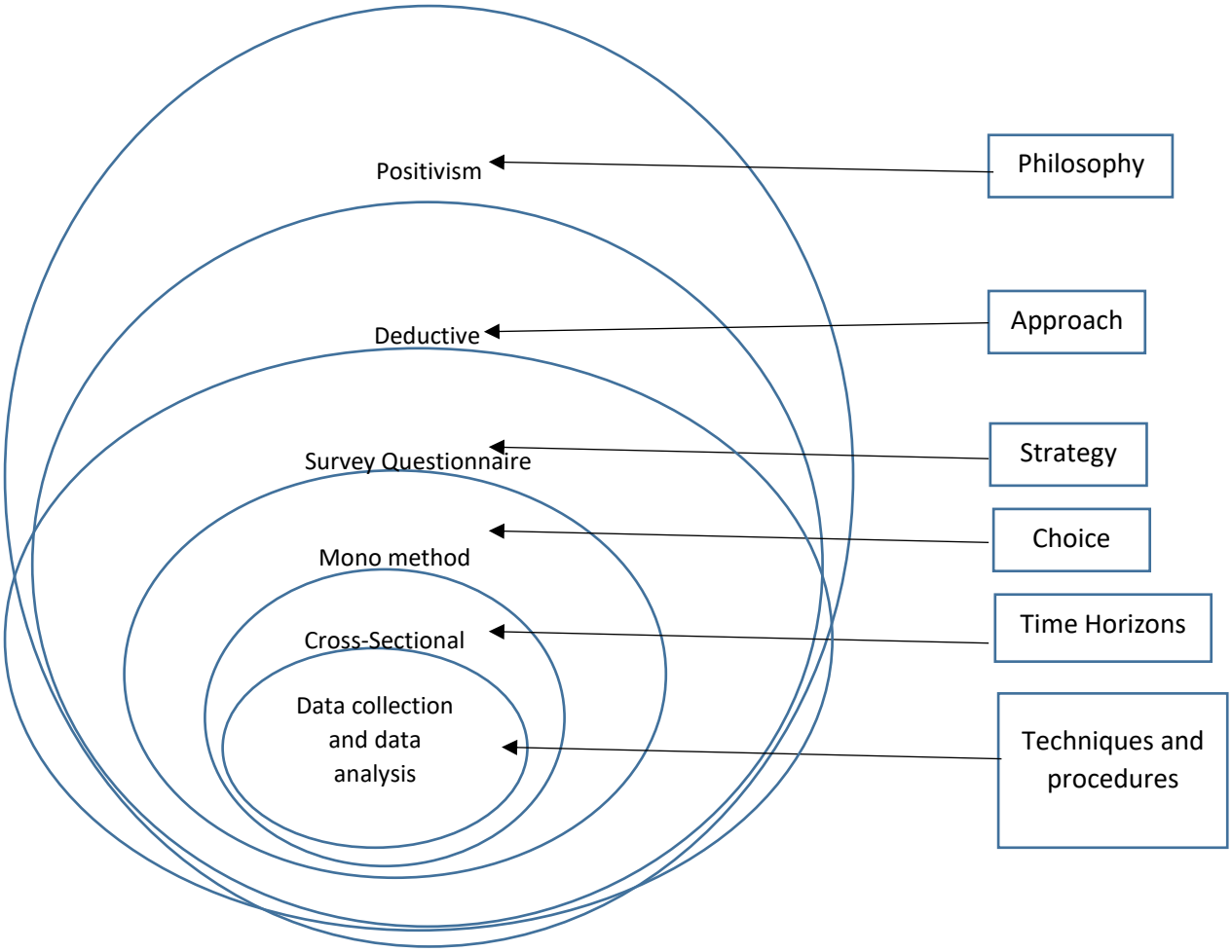
b. Descriptive: The research design included descriptive, focusing on capturing and analyzing the current state of algorithmic HRM practices in the construction industry and the perceptions and experiences of HR professionals and employees.

Quantitative Research:

a. Survey: Design a structured survey questionnaire to collect quantitative data from a sample of HR professionals, employees, and construction industry stakeholders. The survey included questions related to legal compliance, ethical considerations, perceptions of algorithmic HRM, and experiences with algorithmic decision-making in the construction industry.

b. Sampling: An appropriate sample size of 568 respondents was collected to ensure the survey represents a diverse range of construction companies, HR professionals, and employees in different roles and levels within the industry.

The current research is quantitative in nature, and a mono-methods choice was used because the study used primary data from questionnaires (Appendix A) which was analyzed using quantitative procedures of analysis. The current study is cross-sectional because research data from the employees of the construction industry was collected once, and analysis was made on the primary data. No replication of data was used, or longitudinal data was not use in this study.



Research methodology adopted

As the research is quantitative, Data is collected from the construction industry employees and analyzed while applying different statistical tests to analyze the effect of Legal Implications on HRM and performance as well as the the mediating role of HRM. The current study is based on quantitative research, in which a research model has been established while considering different studies (Alegre & Chiva, 2008; Calantone et al., 2002; Chang et al., 2017; Cohen & Levinthal, 2000; Hartley & Rashman, 2018; Jiménez-Jiménez & Sanz-Valle, 2011; Jin et al., 2018). This is an attempt to link the conceptual model with the empirical reality. The variables were operationalized to prove it a scientific study: all the relationships were validated with the help of literature available in the body of knowledge on the subject.

Sampling Process

A process of selecting an appropriate sample from a population is the sampling process. In the sampling process, individual respondents were taken from a group of employees, which provided the subset of the whole population with some specific attributes required by the researcher. The most important factor in the sampling process is the sampling frame.

Sampling Frame

The study has been conducted in the construction organizations of Islamabad. There are a total of 1.7 Million employees in the construction sector of Islamabad, Pakistan (Statistic, 2018). Probability stratified random sampling technique was used to distribute the questionnaires among the entire population. Stratified random sampling divides the whole population into stratum layers and sections, disproportionate random sampling to get the required data from each of its subsections. Each organization got an equal chance due to this method to reduce favoritism and bias. The sample size

was determined by the table of sample size proposed by Krejcie & Morgan (1970). Our final sample is 568: According to the Krejcie & Morgan (1970), a sample size of 568 is sufficient for big populations.

Determine sample size

The study's sample size was determined while keeping in mind the data analysis techniques, homogeneity of the population, and the availability of the resources, which may include budget and time for the study (Krejcie & Morgan, 1970). According to the official website of PEC, there are 58 PEC-registered construction organizations in Islamabad (*PEC*, 2020).

Sampling Technique

Both types have some advantages as well as disadvantages, but the choice of sample type is subject to the type of study and the objective of the research type of data. The population of the current study is Top/Middle Managers, supervisors and Technical /Non-Technical workers of the construction organizations of Islamabad, where complete data regarding the total number of employees is available in the Bureau of Statistics (Statistic, 2018). Data for the current study was collected through a stratified random sampling technique. A stratified random sampling technique is considered a subdivision of a probability sample that is taken from a big population. This type of sampling was used because maximum participation of the respondents was required for the collection of data.

A total of 1580 questionnaires were distributed among the Top and middle managers, supervisors, and technical and non-technical Staff who were familiar with the topic of this study from construction companies situated in Islamabad for current study. The respondents returned 635 filled-in questionnaires from these companies, with a response rate of 35%. A total of 67 questionnaires within the returned forms were dropped due to major mistakes and missing data. Analysis was made on the responses of the 568 respondents.

Sample Characteristics

Designation of the respondents (N=568)

Designation	Total	Percent	Cumulative Percent
Top Management	212	37.32394366	37.32394366
Middle Management	152	26.76056338	64.08450704
Supervisor	48	8.450704225	72.53521127
Technical Staff	80	14.08450704	86.61971831
Non-Technical Staff	76	13.38028169	100
Total	568	100.0	

4.1.1 Designation of Respondents.

Complete information regarding the construction industry employees was collected in the survey to confirm the effectiveness and strength of the research. Table 13 is the frequency table of the Designation of the respondents. Top management is 37.32% with a frequency of 212, whereas Middle management is 26.76% with a frequency of 152 and Supervisors 8.4% with a frequency of 48. Technical Staff is 14.08% with a frequency of 80, and Non-Technical Staff is 13.38% with a frequency of 76.

Age of the Respondents (N=568)

Age	Frequency	Cumulative Percent
Below 25	54	9.507042254
26-30	184	41.90140845
31-35	159	69.8943662

36-40	130	92.78169014
45 and Above	41	100
Total	568	

4.1.2 Age of Respondents

Table 13 is a frequency table of the age of the respondents. The age group below 25 has a frequency of 54, whereas 26-30 and 31-35 have 184 and 159, respectively; the age group 36-40 has a frequency of 130, whereas 41-45 has 41.

Experience of the Respondents (N=568)

Experience	Frequency	Cumulative Percent
Less than 3 year	158	27.81
4-6 year	134	51.4084507
7-9 year	150	77.81690141
10-12	72	90.49295775
above 13	54	100
Total	568	

Experience of Respondents

Table No 8 is cumulative percentage of the experience of the respondents. Service less than 3 years is 27.81% with frequency of 158, 4-6 years is 51.40% and frequency is 134, 7-9 years 77.81% with frequency of 150 whereas age 10-12 is 90.49% with frequency of 72 and above 13 have cumulative percentage 100% and frequency of 548.

Table 1. Correlation of variables and AVE

Variables	Inter-organizational learning	HRM	Ethical Implications	Performance	AVE	C.R
Legal Implications	1.000				.539	0.874.
Human Resource Managemen	.545	1.000			.534	.950
Ethical Implications	.393	.515	1.000		.538	.789
Performance	.397	.617	.366	1.000	.523	966

**p<0.01, *p<0.05”

The analysis of Table 2 highlights that performance is positively and significantly correlated with legal implications (r = 0.393 p < 0.01), Human resource management (r = 0.593, p < 0.01), and ethical implications (r = 0.371, p < 0.01). AVE (Appendix C) and C.R. were analyzed. The AVE of all the variables is above 0.50, showing the construct validity. The value of C.R. was above .7, which shows the reliability of the instrument.

Mediation Analysis

Table 1. Mediation analysis (IV= implications)

LI → HRM→ PERF

Variable	M1	M2	M3
Control Variables			
Age	.043	.061	.043
Experience	-.041	-.048	-.048
Designation	-.004	-.075	-.048
Independent Variable (LI)	0.257**	0.065	0.257**
Mediating Variable (HRM)			0.404**
R^2	.075	.418	.629
ΔR		.343	.211

** **Significant value**

This study cross-examined the mediating role of HRM in the relationship between Legal Implications activities and performance was assessed in the first step; control variables, age, experience, and Designation were added then the independent variable, ethical implications, was included. In the third step, the mediating variable was included in the study. In the third step, the value of the independent variable decreased and also became insignificant, showing that model is showing full mediation.

Table 2. Mediation analysis (IV= Ethical Implications)

Variable	**M1**	**M2**	**M3**
Control Variables			
Age	.043	.033	.036
Experience	-.041	-.057	-.050
Designation	-.004	-.008	-.032
Independent Variable (EI)		0.243**	0.046

Mediating Variable (HRM)			.418**
R^2	.075	.378	.626
ΔR		.303	.248

** **Significant value**

The mediating role of HRM in the relationship between Ethical Implications and performance was examined through the three-step hierarchical method. The demographical variables were added in the first step, and in the second step, the independent variable, Ethical Implications, was included. In the third step, the mediating variable was included in the study. In the third step, the value of the independent variable decreased and also became insignificant, showing that model is showing full mediation.

DISCUSSIONS

the increasing use of algorithmic decision-making in construction HRM raises important ethical and legal concerns. These concerns encompass various aspects, including the need to comply with legal frameworks and regulations such as employment legislation, anti-discrimination laws, and data privacy standards. Even in the absence of human intervention, construction companies must carefully evaluate and adhere to these regulations. Failure to comply can lead to legal challenges and potential liabilities for damages.

The use of algorithms in HRM can also give rise to ethical issues, particularly concerning privacy, biases, and discrimination. Unintentional biases and discrimination may occur, further complicating the situation. E algorithmic decision-making processes must be equitable, transparent, and accountable to ensure fair treatment and protect employees' legal rights.

Having a comprehensive understanding of the legal and ethical implications of algorithmic decision-making in construction HRM is crucial for construction companies, HR professionals, employees, and regulators. Algorithmic decision-making has the potential to significantly impact the industry and individuals' job circumstances, increasing the risk of unethical and unlawful activities. By analyzing these implications and finding solutions to the challenges they present, businesses can develop responsible HR practices that align with legal requirements and ethical standards. This creates an inclusive and tolerant work environment, benefiting all parties involved. The correlation analysis revealed significant positive relationships between various variables. The performance showed significant positive correlations with legal implications ($r = 0.393$, $p < 0.01$), human resource management ($r = 0.617$, $p < 0.01$), and ethical implications ($r = 0.366$, $p < 0.01$).

Mediation Analysis:

The mediation analysis examined the role of human resource management as a mediator between legal implications and performance. The results indicated that the inclusion of the mediating variable (HRM) reduced the significance of the independent variable (legal implications), suggesting full mediation. A similar pattern was observed in the mediation analysis between ethical implications and performance, indicating that HRM fully mediated the relationship.

Overall, these findings suggest that both the legal and ethical implications of algorithmic decision-making in HRM play a significant role in employee performance within the construction industry. The mediating role of HRM highlights the importance of effective human resource management practices in shaping the relationship between legal and ethical implications and performance outcomes.

Future Recommendations

- The establishment of transparent guidelines and policies is something that should be done by construction companies. The use of algorithmic decision-making in HRM should be governed by a set of norms and policies that are crystal obvious to all parties involved.

- Audits and assessments have to be carried out on a regular basis. Audits of the decision-making tools in HRM that are based on algorithmic processes have to be performed on a regular basis. These audits might be useful in uncovering potential instances of prejudice and discrimination, as well as issues pertaining to privacy.
- Increase Transparency and Expandability: It is of the highest need to ensure that algorithmic decision-making processes are both visible and explainable. It is of the utmost necessity to increase transparency and explainability. It is important to provide employees with clear explanations of how decisions are made and how these algorithms are used in the workplace. This transparency fosters a culture of trust, makes it feasible for choices to be analyzed, and gives individuals the ability to grasp and, if necessary, challenge decisions.
- Businesses in the construction industry should use bias mitigation measures to reduce the impact of unintentional biases on algorithmic decision-making. In order to achieve this goal, it may be necessary to do periodic data audits, gather a wide variety of training data, and modify algorithmic parameters in order to reduce the likelihood of obtaining biased findings. Continuous monitoring and evaluation are required in order to identify and resolve any new biases that may appear in the future.

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