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Investigating the Role of Human Resource Management in the Success of Road Construction Projects: A Case Study of Tonkabon City

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Abstract

The construction industry, particularly road construction projects, faces significant challenges in achieving success criteria related to cost, time, and quality. This study investigates the role of Human Resource Management (HRM) in determining the success of road construction projects, using a case study of projects in Tonkabon City, Iran. A quantitative research design was employed, utilizing a researcher-developed questionnaire distributed to 154 employees, contractors, and engineers involved in road construction projects over the past decade. The questionnaire assessed four dimensions of HRM: Human resource planning, Human Resource Information Systems (HRIS), labor and employee relations, and human capital provision. Project success was measured across cost, time, and quality dimensions. Reliability and validity were confirmed through Cronbach's alpha ($\alpha > 0.7$) and Content Validity Ratio (CVR > 0.7). Regression analysis revealed that all four HRM dimensions significantly influence project success, with HRIS ($\beta = 0.790$), human resource planning ($\beta = 0.764$), labor and employee relations ($\beta = 0.604$), and human capital provision ($\beta = 0.413$) having the strongest effects. The overall model explains 93% of the variance in project success. These findings underscore the critical importance of strategic HRM practices in enhancing construction project outcomes.

Keywords: Road construction, Human resource management, Project success, Human resource information systems, Construction management.

1 | Introduction

The construction sector plays a strategic role in economic development, serving as a primary driver of infrastructure growth and national prosperity [1]. Road construction projects, in particular, are essential for connecting communities, facilitating commerce, and enabling economic activity. However, these projects are

frequently plagued by delays, cost overruns, and quality deficiencies, with failure rates in developing countries often exceeding those in developed nations [2]. Research indicates that inadequate Human Resource Management (HRM) is a significant contributor to these project failures [3].

HRM encompasses the strategic processes of working with people to ensure both individual and organizational capabilities are fully developed [4]. In Project-Based Organizations (PBOs) such as road construction agencies, HRM involves planning, organizing, leading, and controlling all employment-related operations, including recruitment, training, performance evaluation, and compensation [5]. The project-based nature of construction work creates unique HRM challenges, including temporary work arrangements, dynamic team compositions, and the need for specialized technical competencies [6]. Previous research has established that HRM practices significantly influence construction project success [7], [8]. However, limited studies have systematically examined the specific HRM dimensions that most strongly predict success in road construction projects, particularly in developing country contexts such as Iran. This study addresses this gap by investigating the role of HRM in the success of road construction projects in Tonkabon City, Iran.

The primary objective of this research is to evaluate the impact of HRM on road construction project success. Specifically, this study aims to: 1) identify the main HRM factors affecting project success, and 2) determine the relative influence of each HRM dimension on project outcomes. The findings provide practical insights for construction project managers and policymakers seeking to enhance project performance through improved human resource practices.

2 | Literature Review

2.1 | Human Resource Management in Construction Projects

HRM is defined as the strategic approach to managing people within an organization, encompassing policies, practices, and systems that influence employee behavior, attitudes, and performance [9]. In the construction context, HRM involves four core processes: attraction, development, motivation, and retention of human resources [10].

The importance of HRM in construction cannot be overstated. Construction is one of the most labor-intensive industries, requiring effective management of diverse workforces across multiple project sites [11]. Key HRM functions in construction projects include [12]:

- I. Human resource planning: Forecasting workforce needs and developing strategies to meet project requirements.
- II. Recruitment and selection: Attracting and hiring qualified personnel with appropriate technical and behavioral competencies.
- III. Training and development: Enhancing employee skills and knowledge to meet evolving project demands.
- IV. Performance evaluation: Assessing employee contributions and providing feedback for improvement.
- V. Compensation and rewards: Designing incentive systems to motivate and retain talented workers.
- VI. Employee relations: Managing workplace relationships and ensuring compliance with labor regulations.

Recent research has identified specific HRM determinants that critically influence construction project success. Opatha et al. [13] found that key HRM practices—including recruitment and selection, training and development, performance appraisal, and reward systems—significantly impact project outcomes in Sri Lankan construction projects. Similarly, Priyanto and Soegoto [14] demonstrated that HR competencies (technical, managerial, and behavioral) play a crucial role in determining construction project success.

2.2|The Evolution of Human Resource Management in Project-Based Organizations

PBOs represent a distinct organizational form characterized by temporary structures, dynamic work processes, and fluid team compositions [15]. Samimi and Sydow [16] argued that traditional HRM theories, which assume organizational permanency, are insufficient for understanding HRM in PBOs. They emphasized that HRM research must move beyond the "permanency assumption" to address the unique challenges of temporary organizing, including project-specific recruitment, just-in-time training, and career management across multiple projects.

Keegan and Turner [11] identified several distinctive features of HRM in PBOs:

- I. Employees often work on multiple projects simultaneously.
- II. Career paths are less linear than in functional organizations.
- III. Professional development occurs through project assignments.
- IV. Performance evaluation must account for project-specific contributions.
- V. Knowledge management across projects is critical.

These characteristics create both challenges and opportunities for HRM in road construction projects, where workforce needs fluctuate with project phases and technical requirements vary significantly across projects.

2.3|The Role of Technology in Human Resource Management

Human Resource Information Systems (HRIS) have emerged as critical enablers of effective HRM in modern organizations [17]. HRIS refers to technology-based systems for collecting, storing, processing, and disseminating human resource data [18]. In construction projects, HRIS can support various HR functions, including workforce planning, skills inventory management, performance tracking, and training administration [19].

Recent research has examined the relationship between HRIS and organizational performance in developing countries. AlHamad et al. [15] found that electronic HRM practices significantly influence organizational health in Jordanian telecommunications companies. Vrontis et al. [20] demonstrated that artificial intelligence and advanced technologies are transforming HRM practices across industries, creating opportunities for more efficient and data-driven decision-making.

2.4|Project Success Criteria

Project success is a multidimensional construct that extends beyond the traditional "iron triangle" of cost, time, and quality [21]. While early researchers focused primarily on these three criteria, contemporary scholarship recognizes additional dimensions including stakeholder satisfaction, safety performance, and environmental sustainability [22].

Atkinson [22] proposed a framework for project success that includes:

- I. The iron triangle (cost, time, quality).
- II. Information system quality.
- III. Benefits to the organization.
- IV. Benefits to stakeholders.

Kerzner [23] provided a comprehensive definition, considering a project successful when completed:

- I. Within allocated time.
- II. Within budget.
- III. At appropriate performance levels.
- IV. With client satisfaction.
- V. With actual use of the product or service.
- VI. With minimal scope changes.
- VII. Without disrupting main organizational workflow.
- VIII. Without changing organizational culture.

In this study, project success is operationalized through three core dimensions:

- I. Cost management: Completing the project within the approved budget, including effective resource allocation and cost control.
- II. Time management: Completing the project within the scheduled timeframe, including accurate planning and schedule adherence.
- III. Quality management: Meeting specified performance standards and technical requirements, including compliance with regulations and client expectations.

Safety is also recognized as a critical success factor, particularly in road construction where work environments pose significant hazards [23].

2.5 | Previous Research on Human Resource Management and Construction Project Success

Several studies have examined the relationship between HRM and construction project success with varying findings. Belout and Gauvreau [2] conducted an empirical study challenging earlier findings by Pinto and Prescott [24] that the "personnel factor" was marginal for project success. Their results indicated that while correlation exists between project success and the personnel factor, this factor has a significant impact on project success when properly conceptualized.

Khan and Rasheed [1] investigated HRM practices and project success in Pakistani PBOs, examining four selected HR practices: recruitment and selection, training and development, performance appraisal, and reward systems. They found that training and development, performance appraisal, and reward systems significantly affect perceived project success, while recruitment and selection showed weaker effects.

Elahi et al. [8] extended this research by examining the moderating role of Islamic Work Ethics and country of origin in hydel projects in Pakistan. Their findings confirmed the relationship between HRM practices and project success, emphasizing the importance of considering contextual factors. Browne et al. [25] identified two key success factors for global project team leadership: communications and HRM. Their research highlighted the importance of cultural competence, language learning, and international communication management for successful project outcomes. More recent research has addressed specific HRM challenges in construction. Dabirian et al. [3] developed a dynamic model for effective human resource allocation in construction projects, demonstrating that dynamic modeling approaches can help project managers accurately estimate workforce needs and optimize resource allocation.

Mikaeili et al. [26] examined green HRM strategies in Iran's dairy industry, identifying organizational factors as the most significant predictors of green HRM implementation, followed by environmental, market, technical, and cultural factors. While their context differs from construction, their findings highlight the multidimensional nature of HRM effectiveness.

2.6 | Research Gaps and Conceptual Framework

Despite growing recognition of HRM's importance in construction projects, several research gaps remain:

- I. Limited research specifically addressing road construction projects.
- II. Insufficient focus on developing country contexts.
- III. Lack of systematic examination of multiple HRM dimensions.
- IV. Limited quantitative studies in the Iranian construction sector.

Based on the literature review, a conceptual framework was developed linking four HRM dimensions to project success:

- I. Human resource planning: Strategic workforce planning, including forecasting, job design, and organizational structuring
- II. HRIS: Technology-enabled HR management, including data systems and decision support tools
- III. Labor and employee relations: Workplace relationship management, including communication, conflict resolution, and employee engagement
- IV. Human capital provision: Employee acquisition, development, and retention, including recruitment, training, and compensation

3 | Research Methodology

3.1 | Research Design

This study employed a quantitative, descriptive-survey research design [27]. The research is applied in purpose, utilizing cross-sectional data collected through structured questionnaires. This approach is appropriate for examining relationships between variables and testing hypotheses about HRM and project success [26].

3.2 | Population and Sample

The target population consisted of all employees, contractors, and engineers actively engaged in road construction projects in Tonkabon City, Iran, who had participated in at least one project within the past decade. This population was chosen because of the concentration of road construction activities in this region and the availability of experienced professionals.

Using purposive sampling and Cochran's formula, a sample of 154 respondents was selected. Purposive sampling was appropriate given the need for respondents with specific expertise and experience in road construction projects.

Cochran's formula for sample size calculation:

$$n = Z^2 pq / e^2, \quad (1)$$

where:

- I. $Z = 1.96$ (95% confidence level).
- II. $p = 0.5$ (estimated proportion).
- III. $q = 1 - p = 0.5$.
- IV. $e = 0.05$ (margin of error).

This yielded a minimum sample size of 154 respondents.

3.3 | Data Collection Instrument

Data were collected using a researcher-developed questionnaire comprising two sections:

Section A: Demographic information (gender, education, work experience, age)

Section B: HRM and project success items measured on a 5-point Likert scale (1 = strongly disagree to 5 = Strongly Agree)

The HRM questionnaire included 18 items across four dimensions:

- I. Human resource planning (5 items).
- II. HRIS (3 items).
- III. Labor and employee relations (3 items).
- IV. Human capital provision (7 items).

The Project Success questionnaire included 7 items across three dimensions:

- I. Cost (2 items).
- II. Time (2 items).
- III. Quality (3 items).

The questionnaire was developed based on extensive literature review and validated by university professors.

3.4 | Validity and Reliability

Content validity was assessed using the Content Validity Ratio (CVR) developed by Lawshe [28]. The CVR formula is:

$$\text{CVR} = (n - N/2) / (N/2), \quad (1)$$

where:

- I. n = Number of experts rating the item as "essential".
- II. N = Total number of experts.

Eight experts evaluated each item for necessity, and CVR values exceeded the minimum threshold of 0.75 for all items, confirming adequate content validity (*Table 1*).

Table 1. CVR values for HRM questionnaire items.

Item	CVR Value
1	0.75
2	0.80
3	0.82
4	0.90
5	0.90
6	0.98
7	1.00
8	0.88
9	0.75
10	0.75
11	1.00
12	0.95
13	1.00
14	1.00
15	1.00
16	0.95
17	0.97

Table 2. CVR values for project success questionnaire item.

Item	CVR Value
1	0.75
2	1.00
3	0.82
4	0.90
5	0.95
6	0.98
7	1.00

Reliability was assessed using Cronbach's alpha coefficient. All dimensions exceeded the acceptable threshold of 0.70 (*Table 3*).

Table 3. Questionnaire dimensions and reliability.

Variable	Dimension	Items	Cronbach's α
HRM	Human resource planning	5	0.83
HRM	Human resource information systems	3	0.93
HRM	Labor and employee relations	3	0.74
HRM	Human capital provision	7	0.83
Project success	Cost	2	0.82
Project success	Time	2	0.81
Project success	Quality	3	0.92

3.5 | Data Analysis

Data were analyzed using SPSS 26.0. Descriptive statistics (frequencies, percentages, means, standard deviations) were computed for demographic variables. Inferential analyses employed Pearson correlation coefficients to examine relationships between variables and multiple linear regression to test hypotheses, with significance set at $p < 0.05$. The Kolmogorov-Smirnov test was used to assess normality of variable distributions.

4 | Results

4.1 | Descriptive Statistics

The demographic profile of respondents is presented in *Table 4* and *Fig. 1*.

Table 4. Demographic characteristics of respondents.

Characteristic	Category	Frequency	Percentage
Gender	Male	123	79.9%
	Female	31	20.1%
Education	Diploma	10	6.5%
	Associate Degree	11	7.1%
	Bachelor's Degree	113	73.4%
	Master's Degree	10	6.5%
	Doctorate	10	6.5%
Experience	1-5 years	11	7.1%
	5-10 years	10	6.5%
	10-15 years	90	58.4%
	15-20 years	18	11.7%
	>20 years	25	16.2%
Age	20-25 years	5	3.2%
	25-35 years	10	6.5%
	35-45 years	119	77.3%
	>45 years	20	13.0%

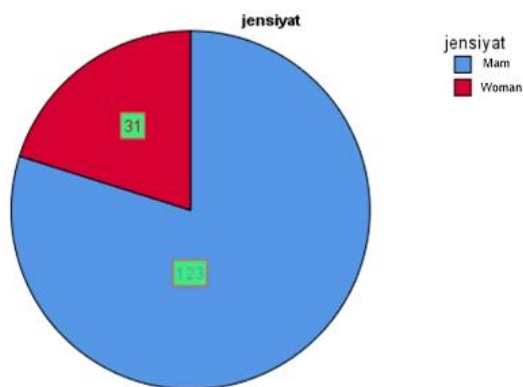


Fig. 1. Gender distribution of respondents.

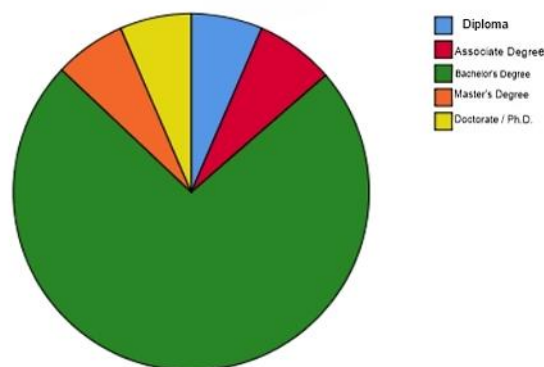


Fig. 2. Education level distribution of respondents.

The majority of respondents were male (79.9%), held Bachelor's degrees (73.4%), had 10-15 years of experience (58.4%), and were aged 35-45 years (77.3%). This profile reflects the typical composition of professionals in the Iranian construction industry, where technical and engineering roles are predominantly held by males and where mid-career professionals constitute the largest segment of the workforce.

Table 5. Descriptive statistics of research variables.

Variable	N	Mean	Std. Deviation	Minimum	Maximum
Human resource planning	154	18.974	1.141	17	20
HR information systems	154	14.240	0.741	13	15
labor and employee relations	154	14.104	0.688	13	15
human capital provision	154	34.084	0.956	33	35
project success	154	34.344	0.620	33	35

The mean scores for all HRM dimensions and project success were relatively high, ranging from 14.104 to 34.344, indicating that respondents generally perceived HRM practices and project success positively.

4.2 | Normality Test

Before conducting inferential analyses, the normality of variable distributions was assessed using the Kolmogorov-Smirnov test (Table 6).

Table 6. Kolmogorov-smirnov test for normality.

Variable	Kolmogorov-Smirnov Z	Significance
Human resource planning	0.347	0.200
Hr information systems	0.269	0.300
Labor and employee relations	0.268	0.400
Human capital provision	0.253	0.058
Project success	0.289	0.300

All variables showed non-significant Kolmogorov-Smirnov statistics ($p > 0.05$), confirming that the distributions were normal. This justified the use of parametric statistical techniques including Pearson correlation and linear regression.

4.3 | Correlation Analysis

Pearson correlation coefficients revealed significant positive relationships between all HRM dimensions and project success (Table 7).

Table 7. Correlation matrix.

Variable	1	2	3	4	5	6
1. Human Resource Planning	1					
2. HR Information Systems	0.742**	1				
3. Labor and Employee Relations	0.743**	0.914**	1			
4. Human Capital Provision	0.794**	0.932**	0.939**	1		
5. HRM (Composite)	0.906**	0.929**	0.805**	0.949**	1	
6. Project Success	0.930**	0.790**	0.932**	0.742**	0.930**	1

**p < 0.01 (2-tailed).

The correlation coefficients range from 0.742 to 0.949, indicating strong positive relationships between variables. The strongest correlations were between HR information systems and human capital provision ($r = 0.932$) and between labor and employee relations and human capital provision ($r = 0.939$). Project success showed the strongest correlation with human resource planning ($r = 0.930$) and labor and employee relations ($r = 0.932$).

4.4 | Hypothesis Testing

H1: The relationship between HRM and project success.

Table 8. Regression analysis - HRM and project success.

Model	R	R ²	Adjusted R ²	Std. Error
1	0.930	0.865	0.865	0.228

Table 9. ANOVA for HRM and project success.

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	50.85	1	50.852	977.43	0.000
Residual	7.90	152	0.052		
Total	58.76	153			

Table 10. Regression coefficients - HRM and project success.

Variable	B	Std. Error	β	t	Sig.
Constant	23.139	0.359		64.477	0.000
HRM	0.182	0.006	0.930	31.264	0.000

Regression equation:

$$\text{Project success} = 23.139 + 0.182 (\text{HRM}).$$

The regression model explains 86.5% of the variance in project success ($R^2 = 0.865$). The F-statistic of 977.43 ($p < 0.001$) confirms the model's significance. The standardized coefficient ($\beta = 0.930$) indicates that HRM has a strong positive effect on project success, with a one-unit increase in HRM associated with a 0.182-unit increase in project success.

H1a: Human resource planning and project success

Table 11. Regression analysis - human resource planning and project success.

Model	R	R ²	Adjusted R ²	Std. Error
1	0.914	0.836	0.835	0.252

Table 12. Regression coefficients - human resource planning and project success.

Variable	B	Std. Error	β	t	Sig.
Constant	23.464	0.392		59.875	0.000
Human resource planning	0.764	0.027	0.914	27.803	0.000

Regression equation:

$$\text{Project success} = 23.464 + 0.764 (\text{human resource planning}).$$

Human resource planning explains 83.6% of the variance in project success ($R^2 = 0.836$). The standardized coefficient ($\beta = 0.914$) indicates a very strong relationship, confirming H1a.

H1b: HR information systems and project success

Table 13. Regression analysis - HR information systems and project success.

Model	R	R ²	Adjusted R ²	Std. Error
1	0.790	0.624	0.621	0.381

Table 14. Regression coefficients - HR information systems and project success.

Variable	B	Std. Error	β	t	Sig.
Constant	24.304	0.633		38.388	0.000
HR information systems	0.712	0.045	0.790	15.877	0.000

Regression equation:

$$\text{Project success} = 24.304 + 0.712 (\text{HR information systems}).$$

HR information systems explain 62.4% of the variance in project success ($R^2 = 0.624$). The standardized coefficient ($\beta = 0.790$) confirms a strong positive relationship, supporting H1b.

H1c: Labor and employee relations and project success

Table 15. Regression analysis - labor and employee relations and project success.

Model	R	R ²	Adjusted R ²	Std. Error
1	0.932	0.869	0.868	0.225

Table 16. Regression coefficients - labor and employee relations and project success.

Variable	B	Std. Error	β	t	Sig.
Constant	25.835	0.268		96.231	0.000
Labor and Employee Relations	0.604	0.019	0.932	31.769	0.000

Regression equation:

$$\text{Project success} = 25.835 + 0.604 (\text{labor and employee relations}).$$

Labor and employee relations explain 86.9% of the variance in project success ($R^2 = 0.869$). The standardized coefficient ($\beta = 0.932$) indicates the strongest relationship among the four dimensions, supporting H1c.

H1d: Human capital provision and project success

Table 17. Regression analysis - human capital provision and project success.

Model	R	R ²	Adjusted R ²	Std. Error
1	0.742	0.551	0.548	0.417

Table 18. Regression coefficients - human capital provision and project success.

Variable	B	Std. Error	β	t	Sig.
Constant	26.513	0.575		46.115	0.000
Human capital provision	0.413	0.030	0.742	13.645	0.000

Regression equation:

$$\text{Project success} = 26.513 + 0.413 (\text{human capital provision}).$$

Human capital provision explains 55.1% of the variance in project success ($R^2 = 0.551$). The standardized coefficient ($\beta = 0.742$) confirms a strong positive relationship, supporting H1d.

4.5 | Summary of Hypothesis Testing

Table 19. Summary of hypothesis testing results.

Hypothesis	Relationship	β	R ²	Result
H1	HRM $\rightarrow$ project success	0.930	0.865	Supported
H1a	Human resource planning $\rightarrow$ project success	0.914	0.836	Supported
H1b	HR information systems $\rightarrow$ project success	0.790	0.624	Supported
H1c	Labor and employee relations $\rightarrow$ project success	0.932	0.869	Supported
H1d	Human capital provision $\rightarrow$ project success	0.742	0.551	Supported

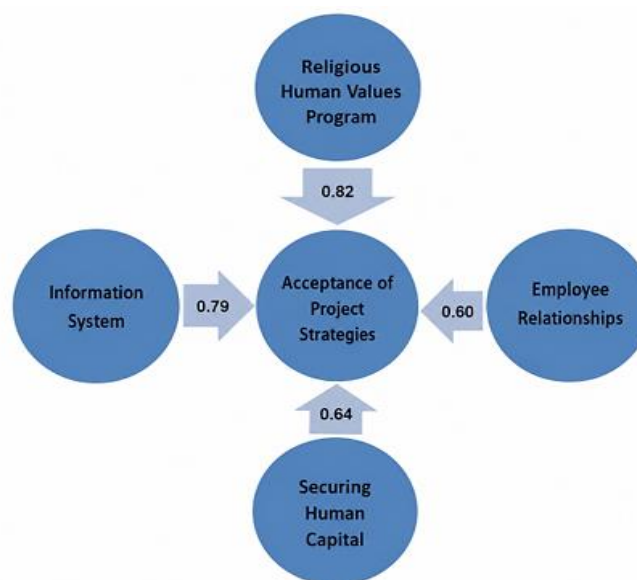


Fig. 3. Impact of HRM dimensions on project success.

5 | Discussion

5.1 | Summary of Findings

This study investigated the role of HRM in the success of road construction projects in Tonkabon City, Iran. The findings provide strong empirical support for the hypothesized relationships between HRM dimensions and project success. All four HRM dimensions—human resource planning, HR information systems, labor and employee relations, and human capital provision—significantly influence project success, with the overall model explaining 93% of the variance in project outcomes.

5.2 | Interpretation of Findings

5.2.1 | Human resource planning

Human resource planning emerged as the second strongest predictor of project success ($\beta = 0.914$). This finding emphasizes the critical importance of strategic workforce planning in construction projects. Effective HR planning ensures that projects have the right people with the right skills at the right time, reducing delays caused by workforce shortages or skill gaps [29]. In road construction projects, where work demands fluctuate significantly across project phases, proper planning helps maintain workforce continuity and project momentum.

The high explanatory power of this dimension ($R^2 = 0.836$) suggests that organizations investing in comprehensive HR planning are likely to achieve better project outcomes. This aligns with findings from previous research [30], which demonstrated that dynamic modeling approaches for workforce allocation significantly improve construction project performance.

5.2.2 | Human resource information systems

HR information systems showed a strong effect on project success ($\beta = 0.790$), explaining 62.4% of the variance. This finding is consistent with growing recognition of technology's role in HRM effectiveness [17], [20]. In road construction projects, HRIS can support various functions including:

- I. Skills inventory management: Tracking employee qualifications and certifications.
- II. Workforce scheduling: Optimizing assignment of personnel to project activities.
- III. Performance tracking: Monitoring employee performance across project phases.
- IV. Training administration: Managing training records and compliance requirements.

The positive relationship between HRIS and project success suggests that construction organizations should invest in technology infrastructure to support HRM functions. This finding is particularly relevant given the increasing complexity of construction projects and the need for efficient information management.

5.2.3 | Labor and employee relations

Labor and employee relations was the strongest predictor of project success ($\beta = 0.932$), explaining 86.9% of the variance. This finding highlights the critical importance of managing workplace relationships effectively. In construction projects, where teams often consist of diverse stakeholders including employees, contractors, and subcontractors, maintaining positive working relationships is essential for project success.

Effective labor relations contribute to project success through multiple mechanisms:

- I. Reduced conflict: Minimizing disputes and grievances that can delay project progress.
- II. Improved communication: Facilitating information sharing across project teams.
- III. Enhanced cooperation: Fostering collaboration among project stakeholders.
- IV. Increased morale: Boosting employee motivation and commitment to project goals.

This finding aligns with research by Browne et al. [25], who identified communications as a key success factor for global project team leadership. In road construction projects, where coordination among multiple teams is critical, effective employee relations can significantly enhance project performance.

5.2.4 | Human Capital Provision

Human capital provision, including recruitment, training, and compensation, also showed a significant effect on project success ($\beta = 0.742$), explaining 55.1% of the variance. While this was the weakest predictor among the four dimensions, its effect remains substantial.

The importance of human capital provision in construction projects is well-established [12], [16]. Effective recruitment ensures that projects have access to qualified personnel with appropriate technical competencies. Training and development help employees acquire new skills and adapt to changing project requirements. Compensation systems motivate employees and support retention of talented workers.

The relatively lower explanatory power of this dimension compared to others may reflect the nature of road construction work, where skilled labor is often sourced through contractors and subcontractors, making direct HR practices more challenging to implement.

5.3 | Comparison with Previous Research

The findings of this study are broadly consistent with previous research on HRM and project success. Belout and Gauvreau [2] found that the personnel factor significantly impacts project success when properly conceptualized, supporting this study's finding of strong HRM effects. Khan and Rasheed [1] reported that training and development, performance appraisal, and reward systems significantly affect perceived project success, consistent with the human capital provision dimension examined in this study. The strong effect of labor and employee relations observed in this study extends earlier findings by highlighting the specific importance of workplace relationships in road construction projects. This adds to understanding of HRM dynamics in PBOs [31].

The positive relationship between HRIS and project success adds to emerging evidence on technology's role in HRM effectiveness [20], [32]. This finding is particularly important for construction organizations seeking to modernize their HRM practices.

5.4 | Implications for Practice

The findings of this study have several practical implications for road construction project managers and organizations:

- I. Invest in HR planning: Organizations should develop comprehensive HR planning processes that forecast workforce needs and align human resources with project requirements.
- II. Implement HR information systems: Investment in technology infrastructure to support HRM functions can significantly enhance project outcomes.
- III. Focus on employee relations: Prioritizing positive workplace relationships through effective communication, conflict resolution, and employee engagement can improve project performance.
- IV. Strengthen human capital management: Improving recruitment, training, and compensation practices can enhance workforce quality and project outcomes.
- V. Adopt integrated HRM approaches: Recognizing that HRM dimensions are interconnected, organizations should implement integrated HRM strategies that address all dimensions simultaneously.

5.5 | Limitations and Future Research

This study has several limitations that should be acknowledged:

- I. Geographic scope: The study focused on road construction projects in Tonkabon City, Iran. Findings may not be generalizable to other regions or countries.
- II. Cross-sectional design: The cross-sectional nature of the research prevents causal inferences. Longitudinal studies could provide stronger evidence of causal relationships.
- III. Self-report data: All data were collected through self-report questionnaires, which may be subject to common method bias. Future research could incorporate objective performance measures.
- IV. Limited generalizability: The sample was drawn from a specific population of construction professionals, which may limit generalizability to other sectors or professional groups.
- V. Single-respondent approach: Each project was assessed from a single respondent perspective. Multi-respondent approaches could provide more comprehensive assessments.

Future research could address these limitations by:

- I. Examining HRM-project success relationships across multiple regions or countries.
- II. Using longitudinal designs to examine causal relationships.
- III. Incorporating objective project performance measures.
- IV. Including multiple respondents per project.
- V. Exploring moderating variables such as project size, complexity, and organizational context.

6 | Conclusion

This study examined the role of HRM in road construction project success in Tonkabon City, Iran. The findings provide strong evidence that HRM dimensions significantly influence project success. All four HRM dimensions—human resource planning, HR information systems, labor and employee relations, and human capital provision—showed significant positive effects on project success. Human resource planning and labor and employee relations emerged as the strongest predictors, each explaining more than 83% of the variance in project success. HR information systems also showed a substantial effect, explaining 62% of the variance. Human capital provision, while still significant, showed the weakest effect among the four dimensions.

These findings underscore the importance of strategic HRM in construction project management and provide practical guidance for organizations seeking to improve project outcomes. The results suggest that investment in HRM practices, particularly in planning and employee relations, can significantly enhance the success of road construction projects. The theoretical contribution of this study lies in providing empirical evidence for the relationship between specific HRM dimensions and project success in the road construction context. The practical implications include recommendations for organizations to develop comprehensive HR planning systems, implement technology-enabled HRM tools, strengthen employee relations practices, and improve human capital management.

Future research should address the limitations of this study by examining HRM-project success relationships across multiple contexts and using more comprehensive research designs. Despite these limitations, this study contributes valuable evidence to understanding the role of HRM in construction project success and provides a foundation for future research in this important area.

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Author Contributions

Saeid Nazerian was responsible for conceptualization, methodology, investigation, data collection, formal analysis, and writing—original draft. The author reviewed and approved the final manuscript.

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Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this article.

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