



Navigating Innovation through Ethical Leadership: Insights from the Dam Industry

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Abstract. This study examines the relations among ethical leadership, affective and cognitive trust, job engagement, and employee' Innovation. Four hundred thirty dam employees working in Pakistan were surveyed to collect data. Using PLS structural equation modeling, we have discovered a strong and statistically significant correlation between ethical leadership and employee Innovation. In addition, we have discovered findings of parallel mediation, where affective and cognitive trust and work engagement mediate the connection between ethical leadership and employee innovation. Our research revealed that ethical leadership has a significant impact on both affective and cognitive trust, as well as work engagement. These aspects subsequently motivate followers to demonstrate innovation in their jobs. The results of this study demonstrate that both affective and cognitive trust and work engagement are crucial factors that enable ethical leaders to improve their followers' innovative behavior.

Keywords: Ethical Leadership, Cognitive and Affective Trust, Innovation, Work Engagement, Dam Worker, PLS-SEM.

1 Introduction

In the present economic situation, innovation is a precious research area [1]. It enables organizations to create a dynamic environment that allows them to adapt and achieve their goals. Organizations are prioritizing the development and cultivation of a culture of innovation. Ethical leadership is the primary cause that empowers firms to cultivate and maintain a culture of innovation, such as engineering companies involved in dam construction. Exploring ethical leadership is a prominent focus among scholars and organizations worldwide [2]. Previous studies have discovered that various leadership styles are vital in improving innovation by generating original and valuable ideas. Researchers have shown a correlation between ethical leadership and creativity, indicating a strong and favorable relationship [3]. Leaders with strong moral beliefs contribute to developing a robust community, successfully communicating with their followers [4], and creating an environment at work that encourages people to think innovatively [2].

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Innovation is considered a non-routine task within any company, so fostering innovation requires careful consideration. Senior management must prioritize the recognition of this process. Innovation encompasses thinking beyond norms and practices, embracing novel approaches, and confronting higher authorities [1]. To facilitate this creative process and establish these necessary conditions, ethical leaders must foster both affective and cognitive trust and promote engagement in work among workers. Previous studies have shown a strong correlation between ethical leadership and various aspects of effective leadership, including motivation, work satisfaction, organizational citizenship behavior, and performance [4]. Similarly, successful firms consider workers' work engagement a crucial factor in their continued success.

In addition, ethical leaders consistently establish and strengthen affective and cognitive trust among their followers. This increased trust enhances the followers' sense of morality, motivating them to expend additional effort to achieve organizational objectives with complete dedication. As a result, employees develop a strong emotional commitment and active involvement with the organization. In contrast, innovation is an organizational competency that can be developed by experience and training programs [5]. Research indicates a strong link between employee innovation and corporate effectiveness, with firms aiming to promote it [5]. Morality, supporting behavior, building an environment with proper feedback, trustworthiness, fairness, and fair decision-making might boost employee innovation. These behaviors increase trust and engagement in the workplace, leading to innovation. Given the lack of empirical data on this topic, further investigation is required to understand the correlation between ethical leadership and employee innovation comprehensively. [2]. Therefore, in the particular context of Pakistan's dam industry, we conducted a study to investigate the effect of an ethical leadership style on employee innovation. Ethical leadership has unique and valuable effects in Asian cultures, which differ from those observed in Western countries. To investigate this correlation, we analyzed the influence of ethical leadership on employee innovation, considering the mediating variables of affective and cognitive trust and work engagement.

The current study significantly enhances the existing body of literature in four different manners. This study aims to analyze and comprehensively comprehend how specific attributes of ethical leadership assist followers in improving innovation and developing original and valuable ideas. This is achieved through the establishment of affective and cognitive trust as well as engagement in their work. Secondly, a parallel multiple-mediation strategy was utilized to substantiate the leadership effect on the innovation of employees. Furthermore, this study was carried out in the dam sector of Pakistan, which is characterized by a collectivistic society that significantly differs from Western culture. Additionally, our research has uncovered significant management implications for the dam sector. These implications aim to enhance the sector's knowledge of the value of ethical leadership and assist in creating a culture favorable to employee skill development and the generation of new ideas.

2 Hypotheses

Following our discussion, we present the subsequent hypotheses. These hypotheses aim to thoroughly comprehend how ethical leadership fosters innovation in the dam sector, specifically in Pakistan, considering the distinctive cultural characteristics that impact leadership effectiveness.

Ethical leadership has a significant effect on employee innovation.

Ethical leadership enhances the affective and cognitive trust of employees.

Ethical leadership significantly affects work engagement.

Affective and cognitive trust significantly affect employee innovation.

Work engagement significantly affects employee Innovation.

Work engagement intervenes in the link between ethical leadership and employee Innovation.

Affective and cognitive trust Intervene in the association between ethical leadership and employee innovation.

3 Research Methodology

We selected participants from the dam sector who were full-time workers in Pakistan's dam construction. We selected 600 individuals at random and guaranteed the secrecy of their information. We sent them a survey link following their desire to engage in this study. The poll encompassed inquiries regarding their leadership abilities, level of trust within the workplace, and recommendations for enhancing performance. An analysis will be conducted on the data obtained to determine prevalent patterns and trends among workers in the dam sector in Pakistan. We selected questionnaire items from past research that had already undergone evaluation, and we confirmed that their reliability and validity had been established through prior assessments. The questionnaire items were assessed using a five-point Likert scale. The study researchers excluded 33 incomplete or unresponsive responses from the initial review. The total number of 463 responses collected was from workers who actively participated in the study. At first, the research concentrated on demographic characteristics, and subsequently, the PLS software was employed to analyze the hypothesized relationships.

3.1 Data Analysis and Results

The survey participants were categorized into three groups depending on their gender, age, and education. Four hundred thirty people completed the survey, and their results were categorized. Because women are underrepresented in the workforce, especially in fields like dam construction in Pakistan, 95.3% of the participants in our study were men, and 4.7% were women. 37.2% of the respondents were between 18 and 25, while 38.6% were between 26 and 30. 24.2% of the individuals were older than 31 years. According to the respondents' educational backgrounds, 73.5 percent have a bachelor's degree, while 26.5%3 have a master's degree.

3.2 Measurement Model

The convergent validity approach and the discriminant validity method are employed to assess measurement models and confirm the reliability and validity of the data. This specific case of convergent validity brought to light the factors of factor loading, composite reliability, and alpha, in addition to the extracted value of the average variance. According to threshold criteria, each factor loading is more prominent than 0.60 and significant [6]. The findings indicated that each construct's Cronbach alpha and CR exceeded the threshold value 0.70. Moreover, the AVE value for each construct exceeds 0.50 and is therefore considered acceptable. Ethical Leadership had seven indicators with loadings from 0.614 to 0.845, a Cronbach's alpha of 0.895, a CR of 0.918, and an AVE of 0.618. Work Engagement included three indicators with loadings between 0.886 and 0.929, a Cronbach's alpha of 0.900, a CR of 0.938, and an AVE of 0.834. Cognitive and Affective Trust used six indicators with loadings from 0.684 to 0.812, a Cronbach's alpha of 0.841, a CR of 0.883, and an AVE of 0.558. Employee Innovation had seven indicators with loadings from 0.723 to 0.767, a Cronbach's alpha of 0.873, a CR of 0.902, and an AVE of 0.568. All constructs showed high reliability and validity. Furthermore, the level of discriminant validity was assessed using the Fornell-Larcker criterion and the Heterotrait-Monotrait ratio (Table 1). The diagonal and upper values indicate the overall values of Fornell-Larcker, and the below values refer to HTMT.

Table 1. Discriminating Validity | Heterotrait-Monotrait | Fornell-Larcker

Constructs	CAT	EI	EL	WE
CAT	0.747	0.586	0.608	0.463
EI	0.674	0.753	0.745	0.558
EL	0.681	0.837	0.786	0.638
WE	0.526	0.626	0.709	0.913

The collinearity data, also known as VIF values, concerning the inner model indicates no severe multicollinearity issues among the variables, and all VIF values fall within an acceptable range [7]—the VIF values in your analysis range from 1.000 to 2.132, which are within the acceptable threshold. Common method variance (CMV) bias is a considerable problem in a survey sample. To assess the presence of CMV in this research, the researchers employed "Harman's single-factor test." The objective is to create a single-variate test that can determine the presence of CMV in constructs. The initial component explained 33.1% of the overall variance, which falls short of the suggested threshold of 50%.

3.3 Structural Model

The assessment of the structural model focused on the final decisions made based on the predicted hypothesis using several statistical measures such as beta value (β), t-values, p-values, and Standard deviation. These measures were generated through the application of the 5000-bootstrapping approach in PLS-SEM. Table 2 presents the results of a path analysis. The t-values for all hypotheses exceeded the minimal required threshold of > 1.96. All hypotheses have p-values less than the required minimum of

0.05, except H5 and H6, demonstrating strong statistical evidence for these correlations. Although the p-values of H5 and H6 are close to 0.05, they are still within an acceptable range. Table 2 provides a comprehensive overview of the correlations, β coefficients, SD, p-values, t-values, and decisions.

Table 2. Path Analysis

Hypothesis	β	SD	t-values	p-values	Result
EL \rightarrow EI	0.551	0.050	11.009	0.0000	Supported
EL \rightarrow CAT	0.608	0.032	19.233	0.000	Supported
EL \rightarrow WE	0.638	0.036	17.521	0.000	Supported
CAT \rightarrow EI	0.199	0.046	4.331	0.000	Supported
WE \rightarrow EI	0.114	0.048	2.405	0.016	Supported
EL \rightarrow WE \rightarrow EI	0.073	0.031	2.230	0.020	Supported
EL \rightarrow CAT \rightarrow EI	0.121	0.029	4.111	0.000	Supported

4 Conclusion

Ethical leadership (EL) directly and indirectly affects EI through cognitive and affective trust (CAT) and work engagement. A strong correlation ($\beta = 0.551$, p-value = 0.0000) between EL and EI suggests a significant impact. This implies that ethical leadership alone generates innovation. Ethical leadership substantially impacts cognitive and emotional trust. The β coefficient of 0.608 and p-value of 0.000 indicate that ethical leadership boosts trust. A significant connection ($\beta = 0.199$, p = 0.000) indicates that trust positively impacts employee innovation (EI). When employees have cognitive and affective confidence in their superiors, they innovate more. A substantial positive effect of EL on WE is indicated by a β coefficient of 0.638 and a p-value of 0.000. Ethical leadership increases worker engagement. A correlation exists between work engagement (WE) and employee innovation (EI) ($\beta = 0.114$, p = 0.016), indicating that engaged workers are more innovative. Mediation occurs via significant indirect channels. Employee innovation (EI) is linked to ethical leadership (EL) via work engagement (WE) ($\beta = 0.073$, p = 0.020) and trust in the organization (CAT) ($\beta = 0.121$, p = 0.000), indicating that these factors mediate the relationship. All p-values < 0.05 support mediation. Ethical leadership builds trust and employee involvement, boosting innovation.

In this study, ethical leadership mediated innovation through affective and cognitive trust and job engagement. This study discovered strong relationships between ethical leadership, innovation, engagement, and trust. Trust and workplace engagement buffered ethical leadership and innovation. These findings support evidence that outstanding leadership inspires innovation [8]. Followers need constant leader support since innovation is risky and non-routine. Innovation and leadership are related. Researchers found that trustworthy and fair leaders stimulate innovation [4]. This study demonstrated that trust and work engagement promote employee innovation. When followers believe they can attain an organization's goals through specific activities and behaviors,

they are likelier to take on challenges, generate new and valuable ideas, and be innovative. This study adds to ethical leadership and employee innovation research by revealing some previously unknown aspects of the relationship between ethical leadership and employee innovation. The findings matter to practitioners. Our study found that ethical leadership boosts employee innovation. To develop ethical leadership, top management should foster trustworthiness, fairness, integrity, honesty, and self-esteem. This lets workers use these skills to generate new ideas. Our study found that trust and involvement strongly impact ethical leadership and staff innovation. Executives must gain employee trust and engagement.

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