

ORIGINAL CONTRIBUTION

Digitalization Training Development Trust and Sustainable Performance: How Ethical Leaders Can Change the Game

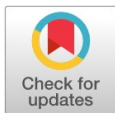
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Abstract— The main objective of this study is to conceptualize and empirically validate a theoretical framework that explains how digital job resources influence the sustainable performance of IT entrepreneurs (social, economic, environmental, and innovative performance). It draws on the Job Demands-Resources (JD-R) and complexity leadership theories. This study attempts explicitly to investigate how employee trust in leaders is affected by digital job resources, mainly digital training and digital communication. Additionally, it looks into how ethical leadership affects creative work practices and how trust in leadership affects long-term performance. Finally, the study looks at whether trust in leadership, digital job resources, and sustainable performance are all influenced by ethical leadership. Information was gathered from IT enterprises located in Lahore and Islamabad using convenient sampling procedures. 250 samples were used for the final data analysis. The study assumptions were tested using Partial Least Squares Structural Equation Modelling (PLS-SEM) with Smart PLS 3.0. The results show that digital training and digital communication significantly influence trust in leadership. However, trust in leadership significantly impacts sustainable performance (social, economic, environmental, and innovative performance). Furthermore, trust in leadership mediates digital training, digital communication, and sustainable performance (social, economic, environmental, and innovative performance). Lastly, ethical leadership indirectly moderates digital training, digital communication, and sustainable performance (social, economic, environmental, and innovative).

Index Terms— Digital training, Digital communication, Sustainable performance (Social, economic, Environmental, and innovative performance, Ethical leadership, Trust in leadership

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Introduction

A significant change in how businesses, particularly those in the manufacturing sector, conduct their operations has been required during the past few decades due to the growing demand for a green economy and sustainability issues (Legood, van der Werff, Lee, & Den Hartog, 2021; Nicolás-Agustín, Jiménez-Jiménez, Maeso Fernandez, & Di Prima, 2024; Shahzad, Qu, Zafar, Rehman, & Islam, 2020). Significant sociological, environmental, and economic factors are currently affecting the ecology. The universal agenda for sustainable development now prioritizes poverty, natural catastrophes, conflicts, unemployment, economic crisis, inequality of opportunity, and climate change.

Meeting current requirements without sacrificing the capacity of future generations to meet their own needs is known as sustainable development (Aslam, Căpușneanu, Javed, Rakos, & Barbu, 2024; Borah, Iqbal, & Akhtar, 2022). The incorporation of sustainable devel-

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opment into the business environment was initially presented by Dey, Bhattacharjee, Mahmood, Uddin, and Biswas (2022), as the management of the "Triple Bottom Line" (TBL) to accomplish social, environmental, and economic objectives. For the benefit of present and future generations, sustainability is the balanced integration of economic performance, social inclusivity, and environmental resilience, according to recent experts (Borah et al., 2022; Sarwar, Ishaq, Amin, & Ahmed, 2020). Regretfully, entrepreneurial activities are typically linked to adverse societal effects, climate change, and global warming.

Two of the most well-known tools to increase workers' digital involvement are digital training and digital communication. According to Zia, Memon, Mirza, Iqbal, and Tariq (2024), digital training is defined as "the efforts made by companies to improve employees' digital skills, knowledge, competencies, and capabilities to achieve the organization's objectives and produce expected results." Conversely, "the ability to communicate and collaborate with others using digital technologies and media via discussion" is the definition of digital communication" Zia et al. (2024). These digital training and communication tools help staff members adjust to evolving situations and technology as efficiently as possible, fostering long-term performance (Tian, Zhang, Mao, & Lin, 2024). In order to determine whether these traits improve sustainable performance, it is necessary to identify key traits, the degree of internal communication, and trust fostered by leadership behavior, particularly during uncertain and market crises. These traits primarily affect the workforce's collaborative behavior, exploration, risk-taking, thinking (Nicolás-Agustín et al., 2024), and positive learning attitude combined with an efficient strategy for learning and the establishment of beneficial educational behaviors (Ang et al., 2022; Majumdarr, Dasgupta, Hassan, Behl, & Pereira, 2024).

Additionally, the team's understanding of the location of expertise, capacity to integrate skills, and shared leadership improve sustainable performance during uncertainty and aggressive change (Aslam et al., 2024). According to Siyal (2023), leaders possess the necessary skills to utilize digital resources efficiently at work, which benefits the company and its operations. 50% of businesses presently rely on leaders to help them achieve higher levels of digital maturity (Borah et al., 2022; Kim, Kim, & Kim, 2021; Zia et al., 2024). Ethical leaders act morally in their personal and professional lives and are truthful, reliable, and equitable (Wood, Eid, & Agag, 2021). Managing with ethics in mind is a characteristic that sets ethical leaders apart (Schwepker Jr & Dimitriou, 2021). They think about whether a choice is morally right and equitable for all parties while choosing it (Joplin, Greenbaum, Wallace, & Edwards, 2021). They stress that while financial results are crucial, they must be achieved while paying attention to the process and "what is right" for all parties involved. Leaders who uphold ethics convey to their followers that unethical behavior is unacceptable. When ethical leadership is in place, employees are disciplined and rewarded in line with moral principles (Islam, Furuoka, & Idris, 2021; Sarwar et al., 2020; Wood et al., 2021).

This study's primary goal is to provide a theoretical framework that clarifies how digital communication and training support the sustainable performance of IT entrepreneurs. In particular, this study aims to achieve four goals: First, it examines how trust in leadership is affected by digital job resources, specifically digital communication and training. The study also looks at the connection between sustainable performance and leadership trust. Third, the study examines how trust in leadership mediates the relationship between digital job resources (such as digital communication and training) and sustainable performance (social, economic, environmental, and innovative performance). Finally, the study explores how ethical leadership influences trust and sustainable performance.

This study offers scholars a number of insights on accomplishing the research aims. First, it is one of the first to examine the indirect relationship between trust in leadership and digital job resources (such as digital training and communication) and sustainable performance (social, economic, environmental, and innovative performance). A relationship that has been disregarded in previous research. Previous research has examined the relationship between digital communication and training as distinct entities and sustainable performance (social, economic, environmental, and innovative performance) (Zia et al., 2024). Siyal (2023) studied the mediation of trust in leadership between digital training and digital communication with sustainable performance (social, economic, environmental, and innovative performance). Likewise, (Aslam et al., 2024) examined how ethical leadership moderates trust in leaders and sustainable performance (social, economic, environmental, and innovative performance), proposing to apply the same model with several approaches to leadership. As a result, our work fills a glaring vacuum in the literature and answers several research requests. Mediation will make a solid conceptual grasp of the step-by-step procedure needed for digital job resources to support IT entrepreneurs' sustainable performance easier.

Therefore, less is known about digital job resources (such as digital communication and training) as predictors of leadership trust and long-term performance. As determinants of sustainable performance, previous research has frequently concentrated on individual employee qualities Joplin et al. (2021) and organizational leadership styles and trust in leadership within companies (Uhl-Bien, 2021). Majumdarr et al. (2024) pointed out that prior studies frequently overlooked training and communication, hardly considering them as key components for organizational success. If businesses want to promote sustainable performance, these tools should be standard practice to increase staff confidence in leadership. According to a recent poll, almost 85% of employees think using digital tools is necessary to demonstrate innovation in their professional activities (Islam et al., 2021). It would be intriguing to investigate whether digital job resources, such as training and communication, can be the cornerstones for fostering IT entrepreneurs' trust in leadership and sustainable performance.

The following sections examine the Job Demands-Resources (JD-R) and Complexity leadership theories in detail and explain how they

influenced the study's framework and hypotheses. The report then thoroughly summarizes the research strategies used to achieve the study's goals, along with the data analysis methodologies and results. The results are then examined, and the paper ends by emphasizing the findings' theoretical and practical implications.

Theory and Hypotheses Development

Job Demands-Resources (JD-R) theory

The relationship between job demands, job resources, and sustainable performance has been extensively studied using the JD-R theory (Bakker & De Vries, 2021; Demerouti & Bakker, 2023). According to the JD-R, job demands and job resources specifically influence employee outcomes like burnout, work engagement, and job satisfaction (Bakker & Demerouti, 2018; Bakker, Demerouti, & Ana, 2023; Bakker & De Vries, 2021). Aspects of the workplace that require prolonged physical or mental effort and result in physiological or psychological consequences are referred to as job demands. On the other hand, job resources support workers in meeting expectations, accomplishing objectives, and promoting personal development (Granziera, Collie, & Martin, 2021).

The JD-R theory has been widely applied to forecast long-term performance. According to researcher, JD-R has been used in thirty-four research to explain how various organizational and individual aspects affect training, communication, and performance. JD-R theory has also served as the foundation for a number of other studies' models of sustainable performance. Using JD-R theory, Bakker et al. (2023) created their model to comprehend how job demands and resources interact to increase or decrease sustainable performance. Building on the JD-R hypothesis, this study suggests that digital communication and training serve as tools that improve workers' skills and competencies and reduce work-related stress, allowing them to perform their duties more effectively. As a result, there is a great deal of zeal and excitement for using digital tools, a notion known as digital training and communication. Prior studies have shown that digital communication and training result in better performance, including enhanced digital leadership abilities (Bakker & Demerouti, 2024; Bakker et al., 2023; Bakker & De Vries, 2021).

Complexity leadership theory

Complexity leadership theory, which holds that leadership is a shared duty based on strict administrative control with a substantial bureaucratic hierarchy, developed as an adaptation mechanism for complex organizations in the modern information age (Arena & Uhl-Bien, 2016). Furthermore, complexity leadership entails an adaptable role that prioritizes innovative problem-solving while considering the new, dynamic market conditions and learning. According to (Mendes, Gomes, Marques-Quinteiro, Lind, & Curren, 2016; Tourish, 2019), the third facet of complexity leadership is an action-centered approach that involves prompt decision-making in times of uncertainty, crisis, and dynamic productivity. Thus, leadership is no longer confined to individual skills in a complex system like today's organizations; rather, it is the result of interaction, exchange, and tension rules that shape perceptions and understanding-related changes (Bakker & Demerouti, 2014), highlighting the necessity of the complexity leadership strategy. Therefore, by embracing the dynamic tension between the two systems rather than suffocating it, leadership in complex systems aims to build an adaptive space at the interface of digital training and communication with trust in leadership. This adaptive space is produced by serving as a communication facilitator between different groups or clusters, encouraging the creation of fresh concepts and then capitalizing on the inherent advantages that arise from the two systems' unity, like moral leadership and performance (Uhl-Bien & Marion, 2011). Furthermore, some complexity academics portray leadership practice via a non-complex lens, assuming that leaders in complex systems continue to exert significant, logical, and intentional influence over their followers (Arena & Uhl-Bien, 2016; Tourish, 2019; Uhl-Bien, Marion, & McKelvey, 2007).

Digital training and communication with trust in leadership

Two of the most important digital tools for boosting leadership trust are digital training and digital communication (Zia et al., 2024). Digital training, which is defined as "Efforts made by companies to improve employees' digital skills, digital knowledge, digital competencies, and digital capabilities to achieve the organization's objectives and produce expected results," has been used in this study as a resource for employees at work (Tian et al., 2024; Zia et al., 2024). Conversely, "the ability to communicate and collaborate with others using digital technologies and media via discussion" is what is meant by "digital communication" (Zia et al., 2024). Video conferencing, social media use, and messengers are examples of digital communication technologies (Majumdarr et al., 2024). According to Belonovskaya et al. (2020), using digital training and communication will have two benefits: it will boost employees' knowledge, skills, and capacities while also increasing their trust in leadership. An intentional effort by businesses to increase their staff members' proficiency with digital platforms is represented by digital training. Previous studies have shown that trust and training are directly positively correlated because training promotes skill development and increases employees' capacity for more competent work (Bonnes, Leiser, Schmidt-Hertha, Rott, & Hochholdinger, 2020; Stuij et al., 2020). Businesses may assist employees develop their abilities and boost their productivity

by giving them the proper training and preparing them for digital jobs (Borah et al., 2022). Digital training has a significant impact on micro-entrepreneurs knowledge, business practices, sales, and profitability, according to Ang et al. (2022), Digital training expands staff knowledge of the organization's IT infrastructure and gives them a more thorough understanding of systems. Thanks to this expertise, they are more equipped to use and understand digital tools, which boosts their motivation, confidence, and online engagement. Digital training is generally seen as a job resource that enhances workers' engagement at work (Sklar, 2021). Digital training helps employees meet work goals, handle workplace demands, and foster personal development by giving them the skills and information they need to handle digital needs. Employees are more inclined to use digital technologies when they feel capable and supported, which promotes favorable work outcomes, including improved performance, less burnout, and increased job satisfaction. In this regard, digital training is a valuable tool that facilitates increased digital engagement among employees (Al-Rahmi, Alzahrani, Yahaya, Alalwan, & Kamin, 2020; Stuij et al., 2020). Thus, the following hypothesis is put forth:

H1: Digital training have a significant impact on trust in leadership.

H2: Digital communication have a significant impact on trust in leadership.

Trust in leadership and sustainable performance

An employee's ability to embrace vulnerability based on optimistic expectations of the leader's intentions is known as trust in the leader (Ilyas, Abid, & Ashfaq, 2020). If a leader exhibits traits like acceptance, generosity, kindness, and honesty, their followers will trust them (Siyal, 2023). The trusting relationship between a leader and their followers is one of the many traits that make up sustainable performance. Zheng, Mai, Zhou, Ma, and Sun (2022) asserts that honesty provides a very reasonable justification for having faith in someone. A sense of justice or moral rectitude offers a certain level of regularity that might ease people's anxiety. As a result, people will trust a leader who possesses integrity since they will be seen as trustworthy. According to Ilyas et al. (2020) and Legood et al. (2021) trust in a leader is positively impacted by their behavioural honesty. Employees can use digital tools like training and communication as part of their jobs to gain leaders' trust. People will develop improved sustainable performance if they have access to a wide range of digital training possibilities Islam et al. (2021) and efficient digital communication channels (Abdillah, Anita, Hadiyati, & Zakaria, 2021). For instance, digital training raises employee knowledge of the digital workplace, develops new abilities that stimulate creativity, and promotes teamwork, all of which are critical components of a digital workplace. When subordinates think that their leaders possess the information, abilities, and expertise necessary to complete the tasks at hand and know how to succeed in their careers, they will have faith in their competence. Subordinates who have faith in their leaders' goodness believe that they will take good care of them, for example, by lending a helping hand without demanding anything in return (Ilyas et al., 2020). When subordinates feel that their leader understands their needs and wants, cares about their welfare and issues inside the company, and frequently assists them without demanding anything in return, they are more likely to trust their kindness. Employees become more emotionally, cognitively, and physically engaged in their digital work when they have access to and are able to use digital job resources effectively. These increased levels of trust help workers grow and learn how to use digital job resources efficiently to improve sustainable performance (Legood et al., 2021). Employees are more likely to implement novel concepts, procedures, and practices when they have a mentality that is centred on maximising the value of digital resources, or digital leadership competence (Abdillah et al., 2021; Ilyas et al., 2020; Javed, Rawwas, Khandai, Shahid, & Tayyeb, 2018). Consequently, we postulate that:

H3: Trust in leadership have a significant impact on sustainable performance (social, economic, environmental and innovative performance).

Mediating role of trust in leadership

According to Zheng et al. (2022), trust is the readiness to take chances in accordance with the actions of leaders and the anticipation of successful results from their initiative. According to Islam et al. (2021), trust is "the degree to which an individual is confident in and willing to act on the basis of another's words, actions, and decisions." Abdillah et al. (2021) assert that employees' perceptions of leaders' competence, concern, integrity, and empathy have a significant role in fostering trust. Employee trust is crucial to the sustainable performance (Javed et al., 2018). Additionally, when trust is there, employees feel empowered, inspired, and involved in digital training and communication, which helps them implement new changes inside the company. Additionally, trust is a strong motivator for workers, supporting both the process of transformation and sustainable performance. High levels of digital training and communication are developed in an organization with a trustworthy environment (Al-Rahmi et al., 2020). Additionally, trust is crucial for lowering employee anxiety and uncertainty in erratic situations like communication and training. According to the majority of work relationship theories, trust is essential (Bonnes et al., 2020; Nicolás-Agustín et al., 2024). However, there is a lot of disagreement over how to conceptualize trust. According to some academics who adopt unidimensional definitions, trust is a psychological condition that includes a readiness to be vulnerable because of other people's favourable expectations (Majumdarr et al., 2024; Stuij et al., 2020). Nonetheless, there is also

widespread use of multidimensional operationalizations that differentiate between various trust bases. The most often used one explains both affective and cognitive types of trust (Borah et al., 2022). Cognitive trust is the term used to describe logical evaluations of traits like skill and dependability that are based on the results of prior encounters, assessments of resemblance, and the other party's professional credentials. Effective leadership requires trust, which has an impact on followers' actions (Ang et al., 2022). Interpersonal trust, which is based on how leaders and subordinates interact, includes trust in leaders (Sklar, 2021).

Additionally, traits like competence, kindness, and dependability are the foundation of trust in leaders (Afum et al., 2020). When subordinates believe their leaders possess the functional/technical, interpersonal, judgmental, and business sense skills, this is referred to as trust in leaders' competence. Subordinates' faith in their superiors' dependability is the belief that they will uphold a set of morally righteous standards. When followers feel that their leaders are honest, uphold transparency, strive for fairness in their interactions with others, have a strong sense of justice, and consistently fulfill their commitments, they will have faith in their dependability. Employees that have faith in their leaders are more likely to imagine how their company's digital systems will develop in the future and work together to innovate and improve performance (Kamble, Gunasekaran, & Gawankar, 2020; Mousa & Othman, 2020; Nor-Aishah, Ahmad, & Thurasamy, 2020). These qualities foster employees' capacity to generate innovative solutions by allowing them to apply their technical expertise to generate original concepts and cutting-edge methods (Ilyas et al., 2020). Because trusted leaders are adept at seeing innovative opportunities and assisting their teams in implementing best practices, they are able to manage the quickly changing digital landscape (Jabbour et al., 2020). Consequently, we postulate that:

H4: Digital training and communication have indirect significant impact on sustainable performance (social, economic, environmental and innovative performance) with mediating impact of trust in leadership.

Moderating role of ethical leadership

Ethical leaders are defined as "honest, caring, and principled individuals who make fair and balanced decisions," according to Javed et al. (2018). They also say that these executives provide clear guidelines for how things should be done in the company and show their ethics to their staff. According to Banks, Fischer, Gooty, and Stock (2021), ethical leaders also possess the bravery to convert their moral ideals into ethical action, a quality known as high behavioral consistency. Employee trust in the leader will grow as a result of their perception of this consistency. While pursuing self-interest, ethical leadership also includes staff members in decision-making processes and promotes their welfare and potential for advancement (Joplin et al., 2021). Because of their credibility and reliable actions, they will then be more likely to trust moral leaders. According to Shafique, Ahmad, and Kalyar (2020), ethical leadership predicts both affective trust the emotional connection between people and cognitive trust, which is necessary when information is lacking. According to Joplin et al. (2021) and Kim et al. (2021), faith in their leaders is strongly correlated with their ethical leadership. Employees will be more likely to trust the workplace and the company when they show a readiness to trust the leader and when an ethical leader builds a foundation of trust.

Therefore, it is possible to hypothesize that moral leadership increases employee trust in the leadership. Although ethical leadership has been the subject of extensive research for more than ten years Schwepker Jr and Dimitriou (2021), this research has not adequately taken ethical leadership into account as a setting that can lessen negative organizational phenomena. According to existing psychological studies, however, extremely entitled people will behave differently depending on the kinds of authority figures in their lives (Jabbour et al., 2020; Kamble et al., 2020). Regarding workers with high levels of entitlement, we contend that moral leaders can motivate them to remain involved in the game, thereby reducing the degree to which entitled workers neglect their job duties. As for being moral managers, moral leaders tie rewards and penalties to the moral and immoral actions of their followers in order to clearly convey moral behavior. According to Asadi et al. (2020), ethical leaders were able to differentiate themselves from other leadership styles by demonstrating a "transactional element." Due to the quick changes in the environment, many companies must find new ways to function in order to accomplish their objectives. This includes coming up with plans to deal with new problems pertaining to leadership, organizational structures, and management techniques. Therefore, lower costs and more effective resource allocation can lead to improved economic performance. According to Sarwar et al. (2020), establishing ethical leadership and building trust depend heavily on delivery dependability, quality, and adaptability. In recent years, ethicists, managers, and practitioners have begun to give social performance the necessary attention. This can be attributed in part to heightened awareness of worker health and safety as well as community quality of life (Shahzad et al., 2020). Despite being very few, some empirical research has found that a firm's social performance is improved when its leadership is trusted (Borah et al., 2022; Dey et al., 2022).

H5: Ethical leadership have significant moderating impact on trust in leadership, digital training, and digital communication with sustainable performance (social, economic, environmental and innovative performance).

The conceptual framework (Figure 1) offers a mediation model that fosters IT entrepreneurs' sustainable performance by connecting digital job resources (such digital training and digital communication) to trust in leadership. The framework mainly concentrates on the methods managers can use to take advantage of digital job resources, encouraging ethical leadership and developing trust in leadership, to accomplish their goals.

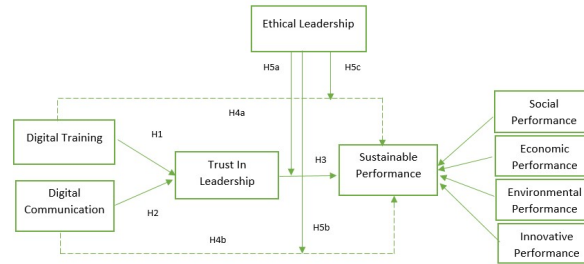


Fig. 1 Conceptual framework

Methodology

Context

The need for IT entrepreneurs has grown by 74% in 2024 and is predicted to reach 12% by 2030 due to the world's rapid shift towards artificial intelligence, technological advancement, autonomy, techniques, and software processing. According to a study, IT entrepreneurs ensure effectiveness in all organizational operations, which leads to higher productivity and more convenience (Murad & Rambely, 2024). They use digital technologies more frequently and trust the leadership more (Nazir, Khan, & Khan, 2024). According to research, professionals with technical expertise are better able to predict an organization's future. As a result, they may lead effectively in digital communication and training (Soomro, Abdelwahed, & Shah, 2024). Prior studies have emphasized the significance of IT entrepreneurs moving into leadership positions (Soomro et al., 2024). In order to help IT entrepreneurs become future digital leaders by improving their sustainable performance, this study focuses on digital job resources.

Instrument

To make it consistent with the goals of the study, the word "digital" was added. With a 4-item scale for digital communication. Sample items include "I assign or enquire about work from friends via digital media" and "Digital media allow me to work with colleagues efficiently". The scale's reliability is reported at 0.886 (Zia et al., 2024). With a 4-item scale for digital training, this scale evaluates attitudes, skills, and behavior associated with using digital tools. Sample items include "Overall, the digital training I receive on the job meets my needs" and "Overall, I am satisfied with the amount of digital training I receive on the job." The scale's reliability is reported at 0.903 (Zia et al., 2024). "When making decisions, my supervisor takes the welfare of the team members into account" is one sample item on a 6-item scale from (Javed et al., 2018) that was used to gauge IT entrepreneurs' trust in leadership. The scale's reliability is 0.921 (Javed et al., 2018). To evaluate ethical leadership, a 5-item scale that was first created by (Javed et al., 2018) to gauge general leadership was modified. "My leader ensures that employees are reprimanded for ethical violations" is an example item. The reliability of this scale is 0.921 (Javed et al., 2018). Finally, responses to the social performance dimension of sustainable performance were evaluated using an adaptation of a 5-item (Afum et al., 2020) measure. Examples include "Improved relationship with the community and stakeholders" and "Encourage the development of employee skills." This scale has a reliability of 0.909 (Afum et al., 2020). The economic performance dimension of sustainable performance was evaluated using an adaptation of a 5-item (Afum et al., 2020) measure. Examples include "Improved profits" and "Sales growth." This scale has a reliability of 0.893 (Afum et al., 2020). The environmental performance dimension of sustainable performance was evaluated using an adaptation of a 6-item (Afum et al., 2020) measure. Examples include "Minimizes the environmental impact of its activities" and "Conduct regular environmental audits." This scale has a reliability of 0.930. The innovative performance dimension of sustainable performance was evaluated using an adaptation of a 6-item (Lu, Lin, & Leung, 2012) measure. Examples include "Mobilizing support for innovative ideas" and "transforming innovative ideas into valuable applications." This scale has a reliability of 0.838 (Lu et al., 2012). A 5-point Likert scale with anchors ranging from 1 (strongly disagree) to 5 (strongly agree) was used to administer each item. The questionnaire was pretested with ten IT entrepreneurs using Zia et al. (2024) principles to guarantee clarity. Before the primary data collection, the instrument was examined by two prominent academicians for validation since we modified items pertaining to digital training and communication to match the study's goals. No issues were brought up. The Appendix has a list of every item.

Sample size

A power analysis was carried out using G*power to ascertain the minimum necessary sample size to ascertain the minimal necessary sample size. According to the power analysis's findings, 80% statistical power for a medium effect size (0.15) at a significance level of

0.05 (5%) required a minimum sample size of 85. Consequently, 85 was the bare minimum sample size needed for this investigation. Notably, the sample size used in this investigation ($N = 250$) was larger than the bare minimum needed.

Sample and data collection

Purposive snowball sampling was used to gather IT entrepreneurs' data (Zia et al., 2024). Anyone who launches, runs, and maintains a company in the Internet and technology sectors is considered an IT entrepreneur. These experts do a variety of tasks, such as helping companies increase customer satisfaction, engage a wider audience, foster innovation, secure capital, and streamline processes. Tech geeks are another term for these professionals. Instead, it focuses on particular responders from any industry, sector, or sub-sector (such as IT entrepreneurs) working in Lahore and Islamabad. Three months, from October 2024 to December 2024, were used to gather the data. Social media platforms like LinkedIn were used to reach potential respondents, such as IT entrepreneurs. LinkedIn is a well-known platform for gathering data (Soomro et al., 2024). LinkedIn was selected for the current study for a number of reasons: First of all, our target audience was made up of a particular kind of professional, regardless of their area or industry. We were able to handpick responders who perfectly matched our participant characteristics thanks to LinkedIn. Using sophisticated technologies supplied by LinkedIn, we filtered those who were in line with the goals and objectives of the study. To find appropriate participants for data gathering, for example, the platform's search feature was used. The questionnaire was intended for people who fulfilled the eligibility requirements, which included being full-time employees, having at least a year of experience with their present company, and being technological specialists. Second, this platform has a wealth of personal information that makes it possible to reach people across borders. Last but not least, it made it easier to contact more replies from the original seeds. Users were approached to fill out the surveys, and they were asked to forward the survey to coworkers who shared their characteristics, particularly those in the technology industry. LinkedIn has been used for data gathering in numerous previous research, which have found it to be more appropriate than other social media sites (Borah et al., 2022; Kim et al., 2021). 255 replies in all were gathered. Two hundred and five ($n=205$) responses remained for data analysis after 50 irrelevant samples were eliminated. Most of the comments that were eliminated were from people who weren't part of our target demographic. Whereas we concentrated on IT entrepreneurs operating in Pakistani cities such as Lahore and Islamabad. Additionally, we eliminated numerous samples ($n=8$) based on their response pattern (e.g., straight-lining) and those with less than a year of experience ($n=17$) during the initial screening. Thus, two hundred and five ($n=205$) were sent for final examination. Table 1 displays the demographic details of the participants.

Respondents' profile

Table I
Demographic details of respondents

Variables	Category	Frequency	Percentage
Gender	Male	125	60.9
	Female	80	39.1
Age	Below 22	2	0.9
	22-33	111	54.1
	33-44	37	18.0
	44-55	26	12.6
	Above 55	29	14.1
Working Hours	Less than 3 hours	10	4.8
	4-6 hours	45	21.9
	6-8 hours	95	46.3
	8-10 hours	22	10.7
	Above 10 hours	33	16.0
Designations	Operations Manager	48	23.4
	Finance handling	74	36.0
	Managing risk	51	24.8
	Leading Teams	32	15.6

According to Table 1, 39.1% of our respondents were women and 60.9% of our respondents were men. This is in line with the World Economic Forum research, which emphasizes that despite women making up 49% of Pakistan's population, their participation in the country's corporate sector is remarkably low at 24% (Nazir et al., 2024).

Additionally, 54% of study participants were between the ages of 22 and 33. There are two reasons for this majority: First, because of the inequality in Pakistan, where around 63% of people are under 30. In terms of population, Pakistan is one of the world's youngest

nations. Furthermore, according to Murad and Rambely (2024), 41.6% of Pakistan's workforce is under 30. At 40%, millennials those born between 1981 and 1999 make up the largest group of workers worldwide. As a result, the respondents' demographic traits are in good agreement with those of the working and general populations of the nation.

Common bias method

According to Jordan and Troth (2020), Common Method Bias (CMB) occurs "when the estimates of the relationships between two or more constructs are biased because they are measured with the same method." It is more prevalent in self-report surveys and is one of the primary issues that must be addressed in survey research. The current study used both statistical and procedural methods to make sure that common method bias was absent. In order to make sure the questionnaire was understandable to research participants and to identify any potential problems in advance, the survey was first pretested with six respondents. Second, in order to prevent misunderstandings, we gave respondents all the information they needed to complete the questionnaire. Additionally, after gathering all the data, we ran one-factor test. The correlation value was below the 50% cut-off value (33%), suggesting that common technique bias was not an issue in this study, according to the data.

Data Analysis and Results

Partial Least Squares Structural Modelling in SmartPLS 3.0 was used to evaluate the hypotheses (Hair, Sharma, Sarstedt, Ringle, & Liengaard, 2024). For incremental models with a mediation effect, PLS-SEM is highly advised (Hair et al., 2024). The PLS-SEM technique was judged to be the most appropriate way of data analysis because the current study hypothesized a serially mediated model with multiple IVs, mediators, and criteria variables. There were two steps involved. First, the measurement model's discriminant validity, convergent validity, and internal consistency reliability are evaluated. Second, hypothesis testing is used to evaluate the structural model (Hair et al., 2024).

Internal consistency reliability and convergent validity

Convergent validity is described as "the degree to which a measure correlates positively with an alternative measure of the same construct" (Hair et al., 2024). Average Variance Extracted (AVE) values must exceed the 0.50 level in order to be considered convergent (Hair et al., 2024). Since all of the AVE values were higher than the necessary value (0.5), the results validate the construct's convergent validity. The Composite Reliability (CR) rating was also used to gauge internal consistency reliability. The composite dependability value needs to be higher than the 0.70 cutoff point (Hair et al., 2024). Every one of our variable values fell between 0.70 and 0.90. Table 2 displays the factor loadings, AVE, and CR values.

Table II
Internal consistency reliability and convergent validity

Construct	Items	Loading	AVE	CR
Digital Communication	DC1	0.796	0.661	0.886
	DC2	0.744		
	DC3	0.857		
	DC4	0.850		
Digital Training	DT1	0.752	0.651	0.903
	DT2	0.836		
	DT3	0.878		
	DT4	0.763		
	DT5	0.799		
Ethical Leadership	EL1	0.768	0.701	0.921
	EL2	0.862		
	EL3	0.886		
	EL4	0.824		
	EL5	0.840		
Trust in Leadership	TIL1	0.785	0.661	0.921

Cont...

Construct	Items	Loading	AVE	CR
	TIL2	0.827		
	TIL3	0.796		
	TIL4	0.801		
	TIL5	0.827		
	TIL6	0.840		
Sustainable Performance			0.590	0.947
Social Performance	SP1	0.836	0.667	0.909
	SP2	0.850		
	SP3	0.863		
	SP4	0.802		
	SP5	0.724		
Economic Performance	EP1	0.818	0.627	0.893
	EP2	0.823		
	EP3	0.839		
	EP4	0.779		
	EP5	0.789		
Environmental Performance	EnP1	0.872	0.689	0.930
	EnP2	0.876		
	EnP3	0.841		
	EnP4	0.831		
	EnP5	0.723		
	EnP6	0.828		
Innovative Performance	IP1	0.881	0.634	0.838
	IP2	0.765		
	IP3	0.735		

Discriminant validity

According to Hair et al. (2024), discriminant validity is "the extent to which a construct is truly distinct from other constructs by empirical standards." Using the Fornell and Larcker criterion, we examined at the DV. The correlation between the constructs and their AVE score is compared using this criterion. According to Fornell and Larcker (1981), the correlation value for a construct must be less than the square root of its AVE. The value obtained for DV is displayed in table 3.

Table III
Discriminant validity

	DC	DT	EL	EP	EnP	IP	SP	SoP	TIL
DC	0.813								
DT	0.611	0.807							
EL	0.636	0.652	0.837						
EP	0.663	0.681	0.750	0.792					
EnP	0.678	0.675	0.556	0.623	0.830				
IP	0.570	0.666	0.521	0.518	0.615	0.796			
SP	0.746	0.784	0.781	0.720	0.848	0.706	0.700		
SoP	0.627	0.687	0.814	0.629	0.587	0.523	0.608	0.817	
TIL	-0.523	-0.613	-0.745	-0.649	-0.593	-0.434	-0.697	-0.647	0.813

Note: "DC=Digital Communication, DT= Digital Training, EL= Ethical Leadership, EP= Economic Performance, EnP= Environmental Performance, IP= Innovative Performance, SoP= Social Performance, SP= Sustainable Performance, TIL= Trust in Leadership"

Multi-collinearity

Multi-collinearity is meant by "high correlation between two or more independent variables" (Hair et al., 2024). By examining the variance inflation factor of the questionnaire's items, multi-collinearity is examined. The VIF value is calculated so that multi-collinearity is present when it is more than ten. (Hair et al., 2024) state that 5.0 is another cut of value for this metric when calculating the VIF value. Our VIF study revealed that every value was below the 5.0 threshold value recommended by Hair et al. (2024). Consequently, it suggested that multi-collinearity was not present in our research.

Structural model (Hypotheses testing)

Table 4 displays the findings of the hypothesis test (Figure 2). We postulated that trust in leadership is positively impacted by digital training. Results show that this relationship is significant (H1: $\beta=-0.237, p=0.001, t=3.429$). Further, it was hypothesised that digital communication has a positive direct impact on the trust in leadership of IT entrepreneurs, while results have supported this hypothesis with a significance level of less than 0.01 (H2: $\beta=-0.468, p=0.000, t=9.083$). Further, it was hypothesized that trust in leadership has a positive direct impact on the sustainable performance of IT entrepreneurs, while results have supported this hypothesis with a significance level of less than 0.01 (H3: $\beta=0.315, p=0.000, t=4.276$). All R^2 values were above the cut-off values, indicating that the model has an appropriate predictive potential for sustainable performance (1.000) and trust in leadership (0.411) overall (Hair et al., 2024).

Table IV
Results of structural model assessment (Direct effect)

Hypothesis	Beta	STDEV	T Value	P Value	Decision
H1: Digital training→ Trust in Leadership	-0.468	0.052	9.083	.000	Supported
H2: Digital communication → Trust in Leadership	-0.237	0.069	3.429	.001	Supported
H3: Trust in Leadership→ Sustainable Performance	0.315	0.059	4.276	.000	Supported

Mediation hypothesis (indirect effect)

In order to analyse the mediation effect, we used the Hair et al. (2024), which holds that no mediation occurs when the indirect effect is zero. Table 5 and Figure 2 present the findings. It was postulated that trust in leadership acts as a mediator between digital communication and sustainable performance (H4a). This link is significant, according to the results (H4a: $\beta=0.218, p=0.001, t=3.287$). It was hypothesized that trust in leadership acts as a mediator between digital training and sustainable performance (H4b). This link is significant, according to the results (H4b: $\beta=0.376, p=0.001, t=4.484$).

Table V
Results of structural model assessment (Mediation)

Hypothesis	Beta	STDEV	T Value	P Value	Decision
H4a: DT→TIL→SP	0.218	0.043	3.287	.001	Supported
H4b: DC→TIL→SP	0.376	0.051	4.484	.001	Supported

Note: "DC=Digital Communication, DT= Digital Training, SP= Sustainable Performance, TIL= Trust in Leadership"

Moderation hypothesis (indirect effect)

Hair et al. (2024), which maintains that no moderation takes place when the indirect effect is zero, was employed to assess the moderation effect. The results are shown in Figure 2 and Table 6. It was postulated that ethical leadership acts as a moderator between trust in leadership and sustainable performance (H5a). This link is significant, according to the results (H5a: $\beta=0.218, p=0.016, t=5.376$). It was hypothesized that ethical leadership acts as a moderator between digital communication and sustainable performance (H5b). This link is significant, according to the results (H5b: $\beta=0.294, p=0.011, t=4.654$). It was hypothesized that ethical leadership acts as a moderator between digital training and sustainable performance (H5c). This link is significant, according to the results (H5c: $\beta=0.176, p=0.028, t=2.233$).

Table VI
Results of structural model assessment (Mediation)

Hypothesis	Beta	STDEV	T Value	P Value	Decision
H5a: TIL*EL→SP	0.304	0.063	5.376	.016	Supported
H5b: DC*EL→SP	0.294	0.052	4.654	.011	Supported
H5c: DT*EL→SP	0.176	0.049	2.233	.028	Supported

Note: "DC=Digital Communication, DT= Digital Training, SP= Sustainable Performance, TIL= Trust in Leadership"

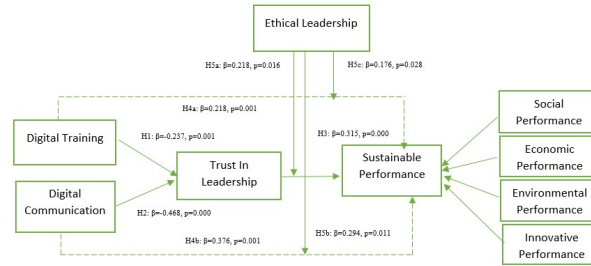


Fig. 2 Results of hypotheses testing

Discussion and Implications

The current study postulated that digital training boosts IT entrepreneurs' trust in their leadership (H1). Surprisingly, the findings validate our prediction, showing that digital training does, in fact, considerably increase IT entrepreneurs' trust in leadership. Training has historically been viewed as essential for digital training and communication when it facilitates upskilling, increases efficiency, and eases the burden on IT entrepreneurs (Murad & Rambely, 2024). However, Ang et al. (2022), noted that rather than being a worthwhile investment, training is frequently a statutory necessity. In a similar vein, Nicolás-Agustín et al. (2024) defined it as more of a duty. Regular training may be seen as unnecessary by IT entrepreneurs, who believe it increases their effort without providing any real advantages.

Furthermore, the use of newly acquired knowledge in the workplace determines how effective training is. According to (Stuij et al., 2020), employees are likely to forget 75% of the material after six days if this application is not used. Organisational support and resources are necessary for learning transfer, but they are frequently lacking in local organisations, especially in developing nations dealing with economic difficulties (Bonnes et al., 2020). These limitations may restrict access to essential resources and specialised training, impeding organisational objectives. Given these factors, it makes sense that training had a major effect on IT entrepreneurs' trust in leadership.

As expected, the findings show that among IT entrepreneurs, digital communication increases trust in leadership (H2), implying that it facilitates collaboration, boosts information retrieval for staff members, and advances their professional careers. These results are consistent with previous research linking digital communication to increased leader trust (Abdillah et al., 2021). Prior research has demonstrated the importance of communication channels in creating cross-organizational integrated teams and enabling prompt information exchange (Siyal, 2023; Zheng et al., 2022). Consequently, this facilitates the completion of tasks and increases trust in the current information systems. The significance of digital communication in fostering employees' feedback to leaders is thus supported by this data. It was found that advancement requires a greater degree of morality, honesty, and integrity. Managerial strategies in businesses must guarantee moral behaviour in the workplace to lessen employees' bad feelings, since they result in lower performance-related consequences (social, economic, environmental and innovative performance).

Furthermore, the results imply that the growth of IT entrepreneurs' sustainable performance is fostered by trust in leaders (H3). Employees who invest more time and energy in digital platforms and technologies learn more about the importance of digital tools and sustainable performance. They can use digital resources more effectively and efficiently because of this awareness. According to Ilyas et al. (2020), trust frequently entails taking chances, trying new things, and investigating creative concepts qualities that are closely associated with digital leadership. As a result, over time, digital leadership skills are likely to be developed through trust in leadership.

Additionally, the data show no indirect correlation between innovative work practices among IT entrepreneurs and digital training, as mediated by sustainable performance and trust in leadership (H4a). This result is somewhat explained by the fact that there is no correlation between digital training and leadership trust (H1), indicating that digital training does increase these entrepreneurs' trust in their leaders (Abdillah et al., 2021). Therefore, it seems that digital training has little effect on leaders' performance, either directly or indirectly. Although this finding does not support our hypothesis (H4a), it is consistent with previous research.

The findings demonstrate how trust in leadership acts as a mediator between digital communication and sustainable performance among IT entrepreneurs (H4b). This implies that ethical leadership development and trust-building are facilitated by efficient digital communication, which in turn improves long-term performance. According to Sarwar et al. (2020), digital communication serves as an organizational resource by giving staff members a network and social support for productive cooperation on digital activities. Effective communication and digital leadership skills have been linked to increased employee engagement and creative work practices, according to earlier research (Banks et al., 2021; Dey et al., 2022). Therefore, the study's conclusions make sense and are corroborated by previous research.

According to Ilyas et al. (2020), employees perceive digital training as repetitious and of little value once a system has evolved, making it less effective. This remark is especially pertinent to the current study, which focuses on technology workers in reputable companies. These people may view these programs as merely formalities rather than real chances for skill development because they are already

proficient in digital technologies. Thus, it seems reasonable that digital training has not been able to improve IT entrepreneur's sustainable performance (social, economic, environmental and innovative performance). The findings show that trust in leadership and sustainable performance are significantly moderated by ethical leadership, indicating that team leaders' ethical concerns affect digital communication and training. The p -value falls inside the range of significance, while the t -value exceeds the cutoff value. As a result, H5a, H5b, and H5c are statistically significant hypotheses. As a result, the results of the investigation make sense and are backed by previous research.

Theoretical implications

Several original additions to the literature are presented in this study. First, it explores a topic rarely addressed in earlier studies: the mediating role of trust in leadership in the relationship between digital job resources and sustainable performance (Kamble et al., 2020). In particular, this study is one of the first to clarify the intricate connections between ethical leadership, trust in leadership, digital job resources (including training and communication), and sustainable performance (social, economic, environmental and innovative performance). This effort clarifies the mechanisms underlying these correlations and opens the door for further study. This study also questions conventional wisdom regarding the relationship between trust and ethical leadership. Although it is widely accepted that trust is influenced by leadership, this study not only re frames the relationship between trust and leadership, but it also places it in the framework of ethical leadership areas that have not received enough attention in previous studies. Prior research has mostly concentrated on the effects of organisational traits and staff behaviours on sustainable performance (Sarwar et al., 2020). As a result, this study presents a novel viewpoint on the relationship between trust in leadership and sustainable performance, offering insightful information for future theoretical advancement. Put another way, workers are likely to view the degree of moral leadership as a useful indicator of how genuine the moral principles of their company are.

Managerial implications

The study's conclusions have a number of ramifications for professionals who want to encourage IT businesses to perform sustainably. First, the study indicates that trust in IT entrepreneurs' leadership and sustainable performance are strongly impacted by digital communication. Therefore, managers should create an atmosphere that encourages candid discussion and open communication among staff members, utilizing intuitive digital channels to make information sharing and teamwork easy (Bonnes et al., 2020). Second, in order to improve digital maturity, managers should find and nurture digital leadership potential within their teams (Mousa & Othman, 2020). A culture where digital leadership is fostered, appreciated, and rewarded can be developed by encouraging staff members to share their knowledge and use digital communication tools proactively. Thirdly, managers should use digital communication to disseminate innovative concepts and best practices while establishing sustainability as a fundamental organizational value. It is essential to comprehend how good communication contributes to the focus on sustainable performance (Sarwar et al., 2020). Employee trust can be increased by encouraging them to express their thoughts on digital platforms, which will result in long-term performance (Nor-Aishah et al., 2020). By implementing these tactics, practitioners can take advantage of digital communication's advantages, enhancing IT entrepreneurs' sustainable performance and ethical leadership.

Fourth, we provide a number of suggestions for managers who want to get the intended results from their training interventions, even though the results imply that training does not immediately boost trust in leadership. First and foremost, managers ought to offer staff individualized digital training based on their unique abilities and requirements. For example, businesses should make sure that IT entrepreneurs benefit from the training program. To this aim, determining the areas in which IT entrepreneurs need to improve their skills can be accomplished through the implementation of a systematic training needs analysis. Managers should create a training strategy based on the findings of the training analysis. This plan should include specific, quantifiable goals, pertinent, needs-based content, and efficient delivery techniques. This strategy guarantees that the training program is properly given and in line with the objectives of the company as well as the needs of the employees. Second, managers ought to assess how well training initiatives are working. This will assist them in assessing the program's effectiveness and pinpointing areas that can benefit from more training. To make daily tasks easier, managers should also supply easily available and practical digital resources, like applications and instruments. They can preserve staff enthusiasm and involvement by doing this. Beyond official training sessions, managers should also promote ethical leadership. This could entail encouraging the use of digital tools and platforms, offering chances for research and experimentation, and developing a performance that is sustainable. As a result, this creates a work atmosphere that encourages trust in leadership and sustainability, which benefits IT entrepreneurs by improving ethical leadership and fostering sustained success.

Limitations and future directions

There are various limitations on this study. First, the study concentrates on IT entrepreneurs or workers who use technology on a daily basis to do their jobs. Because of this, the research does not differentiate between employees and industry-specific experts, which may

result in different findings depending on the industry. Certain the notable differences in how technology is integrated into organisational systems across industries, it is conceivable that outcomes particular to a certain industry could vary. In order to find any discrepancies, future research could examine several industries and assess the findings independently for each.

Second, as our main goal was to examine several determinants (digital resources) of ethical leadership, trust in leadership, and sustainable performance, the results of this study are based on data gathered through survey research. The quantitative method has drawbacks like any other research strategy, especially when it comes to examining or discovering new predictors. A qualitative technique employing in-depth interviews or focus groups may be more advantageous to further develop the theory, given that trust in leadership is one of the less well-established constructs in the body of existing literature. Crucially, an experimental approach is necessary to better understand why digital training is ineffective for IT entrepreneurs. Therefore, to identify new determinants of trust in leadership and to comprehend the rationales behind important interactions, future study could think about developing a more exploratory method.

Thirdly, this study was carried out at a single moment in time using a cross-sectional approach. This method may not account for the long-term impacts of companies offering digital job resources, despite its benefits in terms of participant tracking and time management. As a result, a longitudinal research may be better suitable for tracking observable results over time. Thirdly, self-reported questionnaires are used in the study. Employees may therefore embellish results in order to project a favourable self-image. We have used a number of statistical and procedural techniques to reduce frequent approach bias. Future researchers are urged to gather information from various sources in spite of these attempts in order to get better answers and a range of viewpoints on a particular construct. For example, our respondents' demographics show that the data is biased towards men, with the majority of them being IT entrepreneurs. The absence of a specific scale to gauge how staff members feel about digital training is another problem.

An existing scale was modified for the digital setting in our investigation. Future research should be carefully planned to acquire data that ensures low measurement bias, taking these shortcomings into account.

Similarly, this study has shortcomings in terms of gender representation. Because of the gender imbalance in Pakistan's workforce, our sample was primarily male, with only 39% of participants being female. This gender gap could affect the results and limit how widely the findings can be generalized to other genders. For a more thorough understanding, future research should employ a balanced sampling technique that includes equal representation from both genders. Examining how digital technologies affect sustainable performance, especially for women, may be worthwhile. Comparing gender-based results would be particularly useful in determining if digital tools may assist female entrepreneurs in becoming digital leaders in the tech sector, as this would yield more profound insights. Additionally, the current study solely looked at digital communication and training as model predictors. Employees' sustainable performance may be influenced by a number of non-digital organisational (such as management style and organisational culture) and individual (such as personality attributes) elements. Future studies might look at combining digital and non-digital elements to verify their importance in forecasting the sustainable performance of IT entrepreneurs.

Finally, future studies should think about looking at a different moderator in the connection between leadership trust and digital job resources (such digital training and communication). Examining the moderating effect may provide important information about whether its existence in an organization strengthens or weakens the connection between leadership trust and digital job resources. Our comprehension of the intricate relationships among digital resources, leadership trust, and sustainable performance will be improved as a result.

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Appendix

Instrument

Digital Communication

- I greet and ask about colleagues and acquaintances with polite words.
- I use digital media as one channel for working with other people.
- I assign or enquire about work from friends via digital media.
- Digital media allows me to work with colleagues efficiently.

Digital Training

- My organization provides digital training opportunities.
- Digital training and development are encouraged and rewarded in my organization.
- Overall, the digital training I receive is applicable to my job.
- Overall, the digital training I receive on the job meets my needs.
- Overall, I am satisfied with the amount of digital training I receive on the job.

Trust in leadership

- My team supervisor is sincere in his/her relationships with subordinates.
- I trust my supervisor because he/she is a person of integrity.
- I trust my supervisor because he/she keeps the promises he/she makes.

- I feel that I can trust the determination of my supervisor in all circumstances.
- I trust my supervisor because he/she has not disappointed me so far.
- When making decisions, my supervisor takes the welfare of the team members into account.

Ethical Leadership

- My leader ensures that employees are reprimanded for ethical violations.
- My leader conducts their own life in an ethical manner.
- My leader has an interest in their employees and their mental health.
- My leader pay attention to individuals.
- My leader promotes dialogue about contentious issues.

Sustainable Performance

Social Performance

- Improved living quality of surrounding community.
- Improved workers' occupational health and safety.
- Improve job satisfaction levels of employees.
- Improved relationship with the community and stakeholders.
- Encourage development of employee skills.

Economic Performance

- Improved profits
- Sales growth
- Return on investment
- Return on equity
- Return on asset

Environmental Performance

- Reduction in air emission/wastewater/solid waste.
- Decrease in consumption of hazardous/harmful/toxic materials.
- Decrease in frequency for environmental accidents.
- Improvement in the compliance to environmental standards.
- Minimizes the environmental impact of its activities.
- Conduct regular environmental audits.

Innovative Performance

- Creating new ideas for difficult issues.
- Mobilizing support for innovative ideas.
- Transforming innovative ideas into useful applications.