



TRANSFORMATIONAL LEADERSHIP AND EMPLOYEE INNOVATIVE WORK BEHAVIOUR IN PAKISTAN'S IT SECTOR: THE MODERATING ROLE OF PSYCHOLOGICAL SAFETY

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KEYWORDS	ABSTRACT
Transformational Leadership, Innovative Work Behaviour, Psychological Safety, Moderation, IT Sector, Pakistan	This study investigates the moderating role of psychological safety between the effect of transformational leadership and employee innovative work behaviour in an Information Technology (IT) industry in Pakistan. The study was based on Social Exchange Theory and Social Cognitive Theory, suggesting that transformational leadership positively affects innovative work behaviour, and psychological safety enhances the relationship between the two. A cross-sectional survey design was used, qualitative. Proportionate stratified random sampling was used to collect data from 406 full-time workers of IT firms in Pakistan Software Export Board (PSEB) registered firms in Karachi, Lahore and Islamabad/Rawalpindi. Transformational leadership was measured using validated scales (12 items), and psychological safety and innovative work behaviour were measured using validated scales (7 items) and (6 items), respectively. The data were analysed by using SPSS version 26 and SmartPLS version 4. The measurement model was found to be reliable and valid. The results of the structural model assessment showed that there was a significant positive effect of transformational leadership on innovative work behaviour ($\beta = 0.347$, $t = 6.284$, $p < .001$). The relationship between transformational leadership and innovative work behaviour was significantly moderated by psychological safety ($\beta = 0.186$, $t = 3.416$, $p < .001$), such that the positive relationship between transformational leadership and innovative work behaviour was significantly stronger when psychological safety was high ($\beta = 0.496$, $p < .001$) as opposed to low ($\beta = 0.198$, $p = .004$). The variance in innovative work behaviour could be accounted for 35.8 per cent of the full model. The findings add to the body of leadership and innovation literature as a boundary condition, while providing leadership development and climate interventions for the IT industry of Pakistan.
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Introduction

Background of the Study

The world of business is changing at a rapid pace, with technology advances, increased competition and changing expectations of the workforce all contributing to a complete transformation of the business world. In the face of rapid changes in the external environment, all organisations are being required to re-evaluate their strategies, structures and leadership processes to ensure their viability. The ability to continuously innovate has proven to be one of the most important ingredients for organizational success among the many that influence it. Innovation is no longer just the business of the research and development department; it is seen as a capability of an entire organization that greatly relies on the willingness and ability of all employees to come up with new ideas, champion them and implement them.

In this context, employee innovative work behaviour (IWB) has emerged as a focal concept in research on management. IWB is described as the deliberate initiation, development and exploitation of new ideas in the workplace (Scott & Bruce, 1994) and involves a variety of discretionary practices beyond the scope of a job description. Individuals who exhibit innovative behaviour on the job add to product and process innovations but also to the capacity of the organization to adapt and renew itself. Therefore, it is important to understand the root causes of IWB both in theory and practice.

Pakistan's IT Sector: A Strategic Context

The context of the Information Technology (IT) sector in Pakistan is an interesting one to explore in the context of the determinants of employee innovative work behaviour. In recent years, the sector has shown a very significant development, and is one of the main pillars of the national economy. Official data shows exports of Pakistan's ICT industry have more than doubled from the last fiscal year 2023-24 to 2024-25, demonstrating its growing confidence and direction (Ministry of Finance, 2026). In fiscal year (FY) 2025-26, the sector exported IT and IT enabled services valued at a record \$4.6 billion, which is 21 per cent higher than the previous year (Pakistan Software Export Board, 2026). The Pakistan Software Export Board (PSEB) stated that the sector continued to post an 85 percent trade surplus, continuing to be the biggest and fastest-growing services export segment for Pakistan.

The government has shown consistent commitment for the sector and the Ministry of Information Technology and Telecommunication estimates that projects that are still on-going and completed will generate over \$150 Million in additional IT exports and over 40,000 new jobs per annum. The government's export target of \$15 billion for ICTs by 2030 looks ambitious but is becoming more attainable as the sector is on the verge of achieving this.

While these positive trends are promising, Pakistan's IT industry has its share of challenges that pose a risk to its competitiveness in the long term. The results of the Global Innovation Index 2026 clearly show that the pillars where Pakistan is performing weakest are all in the category of foundational enablers: Institutions (126th), Human Capital (119th), and Infrastructure (107th).

Moreover, the vast majority of the Pakistani tech companies are still geared towards the service delivery mindset, instead of shifting towards product thinking and focusing on short-term project wins rather than long-term product vision, and focusing on billable hours, not product impact. Such limitations highlight the critical need for management strategies that can tap into the innovative capabilities of Pakistan's technology workforce.

Transformational Leadership as a Driver of Innovation

In the literature of management, transformational leadership is one of the most successful predictors of employee innovation according to the various leadership styles studied. Transformational leaders use the Four I's (idealized influence, intellectual stimulation, individualized consideration, inspirational motivation) to inspire their followers (Bass & Avolio, 1994). They challenge thinking, look for alternative solutions, and think beyond self-serving to the group. The theoretical connection between transformational leadership and IWB is clear: Transformational leadership establishes the psychological environment that allows employees to experiment and try new things, and by teaching them to feel like they are in an atmosphere of intellectual curiosity, they will be given the opportunity to support new ideas.

This is supported by empirical evidence from Pakistan. A study focussed on the IT sector revealed that transformational leadership had a favourable and significant effect on innovative behaviour, and knowledge sharing was the mediator (Farheen et al., 2023). A study in the healthcare sector in Karachi also found that employee performance is positively and significantly related to the transformational leadership and negatively and insignificantly to authoritarian leadership styles (Rehmani et al., 2023). Based on the above results, it can be concluded that transformational leadership has a great potential to improve the innovation of organizations in Pakistan particularly when compared with its authoritarian practices.

Psychological Safety as a Moderating Condition

Transformational leadership is the motivational push that facilitates innovations, but the actual realization of innovations in the work environment requires psychological conditions for translating this motivation into innovative behaviour. A shared psychological safety where no one fears interpersonal risk taking (Edmondson, 1999) is a critical enabling condition. Once employees feel psychologically safe, they are more likely to speak up, try new things, and take risks in admitting to errors without fear of repercussion. If psychological safety is low, even the most motivating leadership can be unable to produce innovative results, because people are still not happy to express "wild" ideas.

In societies with a high power distance and collectivism, like Pakistan's, a sense of psychological safety becomes even more significant. This can otherwise be seen as a situation where voice and risk-taking are suppressed by hierarchical norms. In high power-distance countries like Pakistan, maintaining dignity, voice and fairness is at the heart of employee stability and engagement as shown in research (IBA Karachi, n.d.). Research in the Pakistani IT firms has established psychological safety as a strong intervening variable that can mediate between leadership and

creative performance, which means that their working environment is psychologically safe leads to greater creativity.

Although theoretical and literature-based significance of psychological safety as a moderating variable in transformational leadership and innovative work behaviour in the context of the IT industry of Pakistan are evident, empirical evidence on psychological safety as moderator in the relationship between transformational leadership and innovative work behaviour are scarce. While there are many existing studies examining the mediating mechanisms of psychological safety, such as knowledge sharing or organizational identification, the conditional relationships between psychological safety and other factors have been relatively under-investigated.

Research Gap and Rationale

Existing literature on transformational leadership and innovative work behaviour in Pakistan has contributed significantly however, there are some gaps in the literature. First, there is a direct relationship between transformational leadership and IWB, but few studies have explored factors that enhance or detract from this relationship. Second, psychological safety has been studied mostly as a mediator and not as a moderator to understand how it interacts with leadership to influence innovative outcomes. Third, most of the studies have been conducted in other sectors like healthcare, banking, or education, while there is limited research in the IT sector, particularly given its critical role in Pakistan's economy.

To fill these gaps, this study focuses on psychological safety as a moderating factor between transformational leadership and employee innovative work behaviour. This study, which is specifically designed for the context of Pakistan's IT sector, a high growth industry which is export oriented and is embedded in a high power distance culture, not only imparts the theoretical refinement but also offers practical insights for managers looking to create an environment for innovation.

Objectives of the Study

The main aim of this research is to investigate how transformational leadership impact employee innovative work behaviour and psychological safety is the moderating variable in the IT industry in Pakistan. In particular, the study will strive to:

1. To examine the direct effect of transformational leadership on employee innovative work behaviour in Pakistan's IT sector.
2. To investigate whether psychological safety moderates the relationship between transformational leadership and employee innovative work behaviour.
3. To determine whether the positive effect of transformational leadership on innovative work behaviour is stronger when psychological safety is high.
4. To provide empirical evidence that can inform leadership development and human resource practices in Pakistani IT organizations.

Significance of the Study

This study has a number of contributions. As theory, it expands the research literature on leadership and innovation by placing the concept of psychological safety at the boundary condition instead of as a mediating variable. In particular, it covers the relative lack of innovation management research in the IT industry in Pakistan which is expected to develop into a \$15 billion export industry in the near future. The insights gained from the findings will be practically relevant for IT managers, HR professionals and policy makers aiming to foster innovative working behaviour in a culture that might otherwise discourage employees from voicing their opinions and taking risks.

Organization of the Study

The rest of this paper is structured as follows. The literature review and theoretical framework and hypotheses are presented in Section 2. The method of research is explained in Section 3, which covers research design, sampling, measurement instruments and data analysis procedures. The results of the quantitative analysis are presented in Section 4. Results are presented in relation to previous literature in section 5 and theoretical and practical implications, limitations and suggestions for future studies are developed. This paper ends with Section 6.

Literature Review

Introduction

This section reviews the existing literature on the key constructs of the study: transformational leadership, employee innovative work behaviour, and psychological safety. It starts with the theoretical underpinning of the relationships proposed, and then proceeds to a detailed analysis of each construct and the empirical relationship of each construct. The section then puts the topic in Pakistan context with specific reference to IT industry and then identifies the research gap which this study will fill.

Theoretical Foundations

The research model proposed in this research is based on two complementary theories namely Social Exchange Theory (SET) and Social Cognitive Theory (SCT). These frameworks explain the mechanisms of the relationship between transformational leadership and innovative work behaviour, as well as why psychological safety is a moderating condition.

According to Social Exchange Theory, norms of reciprocity (Blau, 1964; Cropanzano & Mitchell, 2005) govern relationships in the workplace. If employees have a positive perception of their leaders' supportive, recognising and developmental behaviours, they feel compelled to return the favour in the form of discretionary behaviours that are beneficial to the organisation. Transformational leaders establish trust-based relationships, which will inspire employees to respond with improved innovative behaviours. SET has been used extensively in research on the leadership support-IWB connection and has been a strong explanation for the link between leadership support and employee innovation.

Bandura (1986) developed this theory called Social Cognitive Theory, which focuses on the importance of observing behaviour, self-efficacy and environmental influences. According to SCT, individuals' behaviours are influenced by their beliefs about their capabilities and the expected outcomes of their actions. Employees are likely to be more engaged in innovative work behaviour if they think that they will be supported for their innovation and not punished. Encouragement and modelling by transformational leaders increase employees' self-efficacy; employees' self-efficacy beliefs must be accompanied by a psychological safety environment for these beliefs to be manifested in action.

SET and SCT hypothesize that transformational leadership incites reciprocal obligations (SET) and efficacy beliefs (SCT), with the latter two affecting innovative work behaviour contingent on the perception of safety to take risks in the work environment.

Transformational Leadership

One of the most researched leadership theories in organizational behaviour is transformational leadership. Bass and Avolio (1994) identified the four facets of transformational leadership: idealized influence, inspirational motivation, intellectual stimulation and individualized consideration. Transformational leaders motivate followers to go beyond self-interest to come up with shared goals, question assumptions and seek out new methods to solve problems.

The result of an extensive meta-analysis that included 174 studies with a total sample size of 74,323 showed a positive and significant overall effect of the relationship between transformational leadership and IWB ($\hat{\rho} = 0.35$, 95% CI [0.28, 0.42]) (Sanlioğlu & Yildiz, 2026). It was also found in this meta-analysis that the effect size was bigger in vertical-collectivist cultures (e.g. Asian cultures: $\hat{\rho} = 0.41$) and in cultures with high uncertainty avoidance ($\hat{\rho} = 0.45$). The results of this study are especially important for the current study because Pakistan has a vertical-collectivist and high uncertainty avoidance cultural profile.

Several other mechanisms were also found to mediate the relationship between transformational leadership and IWB, such as motivational mechanisms (psychological empowerment, work engagement), relational mechanisms (trust in leader, leader-member exchange), and collaborative mechanisms (psychological safety, knowledge sharing). This implies that direct and indirect effects of the TL-IWB relationship exist and that various contextual conditions can amplify or diminish both types of effects.

Employee Innovative Work Behaviour

Innovative work behaviour is the deliberate initiation, facilitation and realization of new and useful ideas (Scott & Bruce, 1994). IWB is more than creativity, it is idea generation plus idea implementation and is more action-oriented and directly relevant to the organisation (Asif & Khan, 2026; De Jong & Den Hartog 2010).

Employees always run the risk of engaging in IWB. There will be opposition, pressure and social condemnation for people who question the status quo (Janssen, 2000). Consequently, it is unlikely

that employees will be motivated to interact with each other IWB without enabling leadership and contextual conditions. Psychological safety, as a boundary condition, is highlighted because of this intrinsic riskiness of innovative behaviour.

Psychological Safety as a Moderator

Psychological safety refers to the sense of safety when it comes to interpersonal risk-taking in the workplace (Edmondson, 1999). Employees are more inclined to suggest new, unproven ideas, to make errors, and to experiment and try again as innovation requires them to do so, when they believe their suggestions are being listened to with curiosity, not criticism (Edmondson & Lei, 2014). In climates, on the other hand, where mistakes lead to accusations and opposition brings backlash, staff members self censor themselves, undermining the exact behaviours organizations require.

Research has shown that psychological safety has a positive moderating effect between leadership and innovative behaviour. The study conducted on Korean civil servants revealed that psychological safety significantly moderated the relationship between transformational leadership and innovative behaviour, and that the impact of transformational leadership was greater with a higher level of psychological safety (Batool & Asif, 2026). Likewise, the study of R&D teams validated the mediation of psychological safety in the relationship between transformational leadership and innovative performance of R&D teams (Batool & Asif, 2026).

However, findings are not entirely consistent. To the researchers' surprise, a study of 307 Chinese public officials revealed that their moderated mediation effect of psychological safety was not significant. The findings reveal that psychological safety is not consistent and needs to be more thoroughly explored, especially in cultures with different power distance and hierarchy dimensions that may affect the way psychological safety works.

The Pakistani Context

The context of Pakistan is unique when it comes to the study of leadership, psychological safety and innovation. Typically, Pakistani organizations have high power distance and collectivist values, which could suppress employees' willingness to criticize the leader or to offer unconventional ideas. In these contexts, hierarchical norms might inhibit voice and risk taking, which can make psychological safety a critical enabling condition (Shaikh & Asif, 2026).

Empowerment of dignity, voice, and fairness is embedded in Pakistani organizations' research findings, as it plays a pivotal role in employee stability in this high power-distance environment (IBA Karachi, n.d.). A cross-sectional study of 620 employees in four industries in Pakistan (banking, education, telecommunications, healthcare, and government) showed that leadership support is a mediator between psychological safety and innovative work behaviour ($\beta = 0.38$, $p < .001$) and significantly predicts both psychological safety ($\beta = 0.58$, $p < .001$) and innovative work behaviour ($\beta = 0.29$, $p < .001$).

Specific studies on the IT sector in Pakistan have also been used to provide pertinent evidence. The study by Farheen et al. (2023), which investigated 391 IT professionals, yielded positive and significant results for transformational leadership and innovative behaviour, with knowledge sharing acting as a mediator in this relationship. A second study of 341 full-time IT worker participants found that transformational leadership positively impacts innovative behaviour, and that the relationship between transformational leadership and innovative behaviour was mediated by intrinsic motivation (Rehmani et al., 2023). Another study of 327 IT professionals also showed that transformational leadership positively contributes to innovation by creating a culture of technological autonomy and collaboration for learning (Mushtaq et al., 2026).

Research Gap

While there has been valuable research in the field, there were a number of gaps. First, the direct impact of transformational leadership on IWB has been demonstrated in Pakistani IT contexts, but few studies have explored the circumstances that amplify or dampen this impact. Second, in the studies conducted in Pakistan people have studied psychological safety in terms of mediation and not as a moderator, which provides limited understanding of the interaction between psychological safety and leadership to foster innovative outcomes. Third, while literature indicates that the strength of TL–IWB relationship is also likely to vary by cultural context, empirical studies on the role of PS as a moderating factor in the high power–distance IT industry in Pakistan are limited.

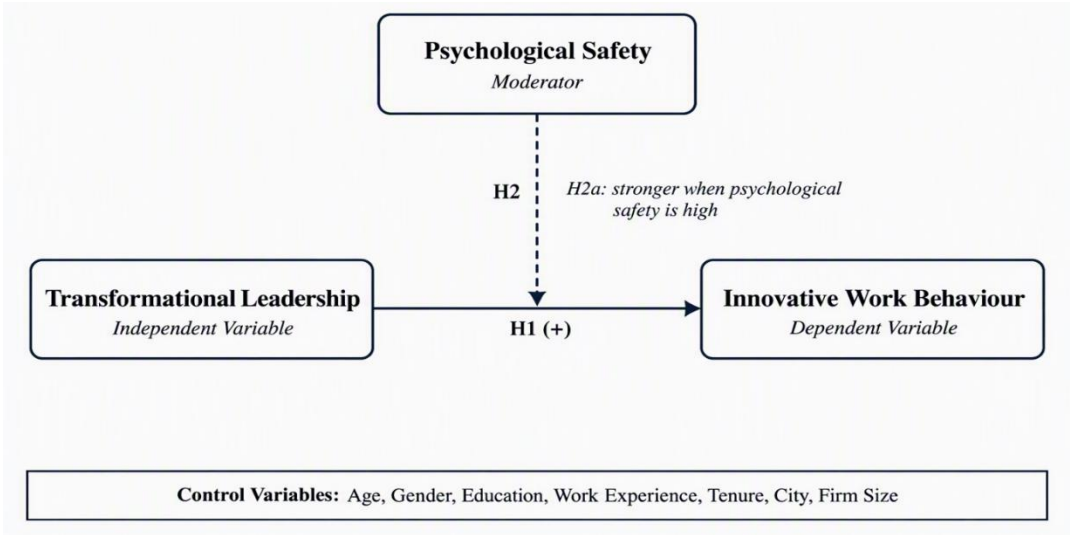
The present study fills these gaps by exploring psychological safety as a moderator between transformational leadership and the relationship between IWB and a sample of 406 employees in the IT sector of Pakistan. This helps advance the theoretical understanding of boundary conditions and also practical knowledge to enable innovation in a strategically significant emerging economy.

Conceptual Framework

The conceptual framework for this study is presented in Figure 1, based on the theoretical framework of Social Exchange Theory and Social Cognitive Theory and the empirical literature reviewed above. The framework illustrates the possible relationships between the three key constructs of transformational leadership (independent variable), innovative work behaviour (dependent variable), and psychological safety (moderating variable).

The framework suggests a positive direct relationship between transformational leadership and innovative work behaviour (H1). It also suggests that the relationship is moderated by psychological safety (H2), in that the positive relationship between transformational leadership and innovative work behaviour is stronger at high levels of psychological safety (H2a).

Figure 1 Conceptual Framework



The conceptual framework consists of three main components:

1. **Independent Variable:** Transformational leadership, defined as leader behaviours that inspire, motivate, and intellectually stimulate followers to transcend self-interest for collective goals (Bass & Avolio, 1994).
2. **Dependent Variable:** Innovative work behaviour, defined as the intentional generation, promotion, and implementation of novel and useful ideas within the workplace (Scott & Bruce, 1994).
3. **Moderating Variable:** Psychological safety, defined as the shared belief that the workplace is safe for interpersonal risk-taking (Edmondson, 1999).

Hypothesized Relationships:

- **H1:** A direct positive path from transformational leadership to innovative work behaviour.
- **H2:** A moderation effect of psychological safety on the relationship between transformational leadership and innovative work behaviour.
- **H2a:** The positive effect of transformational leadership on innovative work behaviour is stronger when psychological safety is high.

The control variables (age, gender, education, work experience, tenure, city, and firm size) are included to account for potential confounding effects on the dependent variable

Hypotheses

Based on the theoretical framework and literature review, the following hypotheses are proposed:

- **H1:** Transformational leadership has a positive effect on employee innovative work behaviour.
- **H2:** Psychological safety moderates the relationship between transformational leadership and employee innovative work behaviour.
- **H2a:** The positive effect of transformational leadership on innovative work behaviour is stronger when psychological safety is high.

Research Methodology

Introduction

The methodological framework used to explore the impact of transformational leadership on innovative work behaviour, with psychological safety as a moderator is detailed in this section. The methodological framework used in this section to explore the impact of transformational leadership on innovative work behaviour with psychological safety as a moderator is presented. This section explains the research philosophy and approach, research design, population, sampling strategy and sample size determination. It then outlines the instruments used to measure, the methodology for data collection and the analysis of data respectively. Finally, validity, reliability and ethical issues are discussed.

Research Philosophy

The research philosophy in this study is positivist that assumes that social phenomenon can be measured objectively and that causal relationship can be established based on an empirical observation. The positivist approach is suitable for this study because it aims to test the hypotheses that have been generated from the existing theory, it involves the use of standardized measurement instruments, and it involves the use of statistical analysis techniques to analyse the numerical data. The positivist paradigm is compatible with the quantitative type of research and the aim of generalizable results about the relationship between the three variables; transformational leadership, psychological safety and innovative work behaviour.

Research Approach

The study is deductive in nature, from general theory to specific theories/hypothesis. The theoretical approach is based on Social Exchange Theory and Social Cognitive Theory to create propositions that can be tested. Literature review is done to formulate hypotheses which are then tested by using the quantitative data collected thru a structured questionnaire. This is in line with positivist philosophy, and allows the researcher to investigate causal links between the study variables.

Research Design

In this study, the type of research is cross sectional and correlational. The cross-sectional design is used to gather data at one point in time from a sample of responses for a single group of respondents and is suitable for the purpose of examining relationships among variables without manipulating the variables. The correlational design enables the researcher to examine the nature and

significance of relationships between transformational leadership, psychological safety and innovative work behaviour.

The main method of data collection is quantitative survey method. The method proved to be useful in establishing the standardized data from a large sample which allowed them to analyse the findings statistically and generalize the results to the total population of IT employees in Pakistan.

Population and Setting

Target Population: The target population will be those working in Information Technology (IT) and Software Development Companies (SDC) who are registered with Pakistan Software Export Board (PSEB) and are full-time employees. Most of these companies are headquartered in Karachi, Lahore and Islamabad/Rawalpindi, the three biggest technology hubs of the country.

Unit of Analysis: The individual employee is the unit of analysis. The respondents must be employees of the organization and should be full-time employees working directly under a supervisor or manager and have at least 6 months of service with the organization.

The setting: Data is gathered from software houses, IT parks and technology firms in the three cities. The cities are chosen because they are home to more IT companies and generate more IT export revenues for Pakistan.

Inclusion Criteria:

- Full-time employment in a PSEB-registered IT firm
- Minimum six months of tenure in the current organization
- Direct reporting relationship with a supervisor or manager
- Willingness to participate voluntarily

Exclusion Criteria:

- Interns, part-time employees, and freelancers
- Employees with less than six months of tenure
- Incomplete questionnaire responses

Sampling Strategy

In the present study the proportionate stratified random sampling technique was used to select respondents from Pakistan IT Sector. Stratified sampling is suitable as the population of IT employees is not homogeneous in both geographic areas and firm size and stratified sampling will ensure that the sample covers all areas and firm size adequately. Proportionate allocation is used to ensure that the numbers of respondents who are selected from each stratum are representative of the stratum's population size.

There are two stratification criteria. The first is the city the company is based in, with the three main technology hubs of Karachi, Lahore and Islamabad/Rawalpindi being the strata. The cities have been chosen as they have the maximum number of software firms registered with Pakistan Software Export Board and also the highest export earning IT exports percentage in the country. The second criterion is firm size, which includes small (less than 50 employees), medium (51 to 250 employees) and large (more than 250 employees). The stratification variable of firm size is also included since the size of the firm may affect how employees feel about leadership behaviours and psychological safety in their workplace.

The following is a 5-step sampling procedure. First, a detailed list of PSEB registered IT companies is extracted from the official PSEB list. Secondly, firms are segmented according to city and size to create sampling strata. Third, within each stratum, firms are randomly selected to participate, ensuring that no one firm has too much of an impact on the sample. Fourth, inside the chosen companies, staff members are chosen randomly from the HR lists of staff members of the company. Fifth, questionnaires are sent to the selected employees face-to-face or via online, as per the preference and availability of the firm.

Table 1 shows that the three cities had their respective numbers of respondents in the target population in the proper proportion.

Table 1: Proportionate Allocation of Sample Across Cities

City	Approximate Share of IT Firms	Target Respondents
Karachi	40%	162
Lahore	30%	122
Islamabad/Rawalpindi	30%	122
Total	100%	406

There are three main benefits to this stratified approach. It decreases the sampling error because all subgroups are sampled in the same proportion as they exist in the population. It allows for sub-group analyses if necessary. It also improves the external validity of results to the general population of IT workers in the most important technology cities of Pakistan.

Sample Size Determination

A total of 406 valid responses are targeted in this study. This was calculated based on a variety of factors such as statistical formulas, modelling needs, expected response rates, and comparability with previous studies.

Cochran's (1977) formula for sample size determination for a unknown or large population suggests that 384 respondents are needed for a 95 percent confidence level and a 5 percent margin of error. This target is achievable with the target of 406, which is somewhat more conservative and statistically robust. Moreover, the 10 times rule for Partial Least Squares Structural Equation Modelling (PLS-SEM) recommends a minimum sample of 10 times the number of indicators and/or

paths in the model (Hair et al., 2022). As this model is three constructs plus a moderation path, 406 is more than the minimum. Let's say we wanted to perform multiple regression analysis for 3 predictors with an alpha of .05 and a desired power of .95, we would need about 120 respondents, which a sample of 406 would have adequate statistical power for even small effects.

The sample size also takes into consideration the expected dropout rate. Considering the previous study in the field of information technology (IT) in Pakistan, a reasonable response rate of 73-80 percent is anticipated. About 550 questionnaires will be distributed to get 406 valid answers. This is bound to happen in country based surveys due to low response rate, incomplete surveys and respondent fatigue. Third, the sample size is comparable with published research in similar settings in which the sample size ranged between 327 and 391 valid responses from Pakistani IT workers. A sample of 406 ensures comparability with this body of literature and provides a slightly more precise statistical estimate.

Measurement Instruments

The main data collection tool used in this research is questionnaires which are structured and self-administered. The questionnaire consists of four sections: demographic information, transformational leadership, psychological safety, and innovative work behaviour. All items (except for the demographic section) are rated on a 5-point Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree). The use of a five-point scale is in line with the previous studies conducted in Pakistan and responses are easily understood by the respondents.

Demographic data about the respondents, such as their age, gender, education level, work experience, duration at the current organization, city, size of the firm, is obtained in section A. These variables are used as control variables in the analysis to follow, and as background to describe the sample.

For transformational leadership, the twelve items of the Multifactor Leadership Questionnaire (MLQ) (Bass & Avolio, 2004; Hussain & Asif, 2026) were used in Section B. It includes four dimensions: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. Examples of sample items are: "My supervisor demonstrates high standards of ethical conduct," "My supervisor articulates a compelling vision of the future," "My supervisor encourages me to question assumptions and explore new approaches," and "My supervisor considers my individual needs and abilities."

To evaluate the psychological safety, 7 items were used in Section C, which was adapted from Edmondson (1999). This scale has been widely validated in various cultures including Pakistan and is widely accepted as the gold standard of measuring the construct. Examples of sample items include: "It is safe to take a risk in this team," "Members of this team can express problems and difficult issues," "no one in this team would intentionally act to hinder my work," "It is easy to reach out to other team members for assistance."

Innovative work behaviour is assessed by using Section D, which is a six-item scale developed by Scott and Bruce (1994). This scale includes all three stages of the innovation process: idea

generation, idea promotion and idea implementation. Sample responses include "I look for new technologies, processes, or product ideas," "I think creatively to solve work problems," "I encourage and advocate new ideas to my co-workers and supervisors," and "I create an adequate plan for implementing new ideas.

Table 2 presents a summary of the entire instrument.

Table 2 : Structure of the Questionnaire

Section	Content	Number of Items	Measurement Scale
A	Demographic Information	7	Categorical / Continuous
B	Transformational Leadership	12	5-point Likert
C	Psychological Safety	7	5-point Likert
D	Innovative Work Behaviour	6	5-point Likert
Total		32	

Variable Operationalization

The three major constructs of this study are measured using scales developed from previous research and definitions. The independent variable (IV) is transformational leadership, defined as leader behaviours that inspire, motivate and intellectually stimulate followers to go beyond self-interest to the collective goal (Bass & Avolio, 1994). Measured with the above mentioned 12 item MLQ – adapted scale. The dependent variable is innovative work behaviour, which is defined as the deliberate processes of generating, promoting and implementing new and useful ideas at work (Scott & Bruce, 1994), measured by the six items of the Scott and Bruce scale. The moderating variable is psychological safety, which refers to the belief that the workplace environment is safe for interpersonal risk-taking (Edmondson, 1999), which is assessed by a 7-item Edmondson scale.

The operational definitions and measurement information for each variable are shown in Table 3.

Table 3 : Operationalization of Variables

Variable	Role	Operational Definition	Measurement
Transformational Leadership	Independent Variable	Leader behaviours that inspire, motivate, and intellectually stimulate followers	12-item MLQ-adapted scale
Innovative Work Behaviour	Dependent Variable	Employee generation, promotion, and implementation of novel ideas	6-item Scott and Bruce scale
Psychological Safety	Moderating Variable	Shared belief that the workplace is safe for interpersonal risk-taking	7-item Edmondson scale

Hypotheses

Upon the theoretical framework that was developed in the literature review and from the Social Exchange Theory and Social Cognitive Theory, three hypotheses are proposed. The first hypothesis is that there is a direct positive connection between transformational leadership and employee innovative work behaviour. The second hypothesis states that transformational leadership has an indirect effect on innovative working behaviour through the mediating effect of psychological safety. Third, a sub-hypothesis of the second, is that the positive relationship between transformational leadership and innovative work behaviour will be stronger with higher levels of psychological safety. The hypotheses are statefully and formally formulated in Table 4.

Table 4: Summary of Hypotheses

Hypothesis	Statement
H1	Transformational leadership has a positive effect on employee innovative work behaviour.
H2	Psychological safety moderates the relationship between transformational leadership and employee innovative work behaviour.
H2a	The positive effect of transformational leadership on innovative work behaviour is stronger when psychological safety is high.

Data Collection Procedure

Data collection is a multi-stage process that is structured to ensure consistency, accuracy and integrity. The procedure consists of five phases: preparation phase, pilot testing, main data collection, data screening, and data entry.

During the preparation phase, the researcher will secure ethical approval from the institutional review board (IRB) of his/her university. The formal request letters are then sent to the HR department of selected IT firms explaining the purpose and scope of the study and obtaining permission to give questionnaires to employees. The questionnaire is available in online (Google Forms) and paper format, to suit accessibility needs and preferences of various companies.

During the pilot testing phase, a small number (30-40) of employees from companies not included in the main study complete the initial test version of the questionnaire. The pilot test is used for three purposes: to determine the clarity and understandability of the items, to estimate the time required for the test, and to determine Cronbach's alpha for each scale. The items that are not clear or fall below the 0.70 threshold are revised and/or removed prior to the main data collection.

During the primary data collection period, questionnaires are sent to the sampled employees for eight to ten weeks. A cover letter detailing the purpose of the study and the anonymity and confidentiality of the participants, as well as the voluntary nature of the participation is included with each questionnaire. Where possible, both on-line and paper based modes are used to ensure

high return rates. After 2 weeks reminder messages are sent to non-respondents to encourage completion.

All questionnaires returned are checked for completeness and consistency in the data screening phase. Responses that are incompletely answered, have patterned responding (e.g., answering the same response to every item), and/or that miss attention checks are excluded from the data set. The screening process is continued until 406 valid questionnaires are left for final analysis.

The responses in the data entry stage are coded and entered into the SPSS. Items that are negatively worded (if there are any) are reverse coded. The data set is subsequently examined for outliers, normality and missing values. Low levels of missing values are dealt with using mean substitution or multiple imputation, depending on the amount and patterns of missing values.

Data Analysis Techniques

Data analysis is carried out in five stages, following the SPSS version 26 and SmartPLS version 4 (Ringle et al., 2022). The various stages have different analytical functions, ranging from descriptive summary to hypothesis testing.

The first step is descriptive statistics to give a profile of respondents' demographic characteristics as well as the distribution of the constructs of the study. Categorical data (gender, education, city) are quantified by frequencies and percentages, while continuous data (age, experience, tenure) are quantified by means, standard deviations and range. This step sets the foundation for the sample and ensures that the data are consistent with the assumptions needed for further analysis.

The second stage assesses reliability and validity. To assess internal consistency, the Cronbach's alpha values were computed for each construct with a cut-off of 0.70 (Hair et al., 2022). Similarly, Composite Reliability (CR) is calculated, with the same threshold. The Average Variance Extracted (AVE) is used to determine convergent validity, which is considered to be sufficient if the value is greater than 0.50. Discriminant validity is assessed through the Heterotrait-Monotrait ratio (HTMT) with a ratio less than 0.85 showing that the constructs are empirically different from each other.

The third stage will be correlation analysis. Pearson correlation coefficients are calculated between transformational leadership, psychological safety and innovative work behavior to measure the direction and strength of the bivariate relationships. Variance Inflation Factor (VIF) will be used for assessing multicollinearity, where VIF values < 5 are considered acceptable.

The fourth step is the assessment of the structural model by SmartPLS. The estimate of path coefficients (β) and their significance level (p-value) are based on bootstrapping with 5,000 subsampling (Chin, 1998). The coefficient of determination (R^2) indicates the proportion of variance in innovative work behaviour explained by the predictors. Effect size (f^2) is used to determine the relative contribution of each predictor and predictive relevance (Q^2) is evaluated using blindfolding procedures.

The fifth stage is the moderation analysis. The transformational leadership and psychological safety are multiplied to form an interaction term. This interaction term will be added to the structural model to explore the moderating effect of psychological safety on the relationship between transformational leadership and innovative work behaviour (Becker et al., 2018). Simple slope analysis is then performed to graph the effect of transformational leadership on innovative work behaviours at high and low levels of psychological safety. To visualize the moderation effect an interaction graph is produced.

To control for possible confounding effects, age, gender, education, work experience, tenure, city and firm size are included throughout the analysis. The plan for analysis is summarized in Table 5.

Table 5: Summary of Data Analysis Techniques

Stage	Technique	Purpose	Software
1	Descriptive Statistics	Sample profile and data properties	SPSS
2	Reliability & Validity	Cronbach's α , CR, AVE, HTMT	SmartPLS
3	Correlation Analysis	Bivariate relationships, VIF	SPSS
4	Structural Model	Path coefficients, R^2 , f^2 , Q^2	SmartPLS
5	Moderation Analysis	Interaction effect, simple slopes	SmartPLS

Validity and Reliability

The validity and reliability of measurement tools is critical to the generation of credible and generalizable results. Two types of validity and reliability are addressed in this study, namely face and content. The study is conducted with two types of validity and reliability, which are face validity and content validity.

Content validity is achieved by adapting all of measurement scales from already developed and validated instruments which have been used in previous studies, even among Pakistani context. The questionnaire is also evaluated by a group of three academic experts who examine the relevance, clarity and comprehensiveness of the items. Items are worded based on feedback from the panel prior to pilot testing.

Convergent and discriminant validity are used to assess construct validity. The convergent validity is assessed by the factor loadings (FL) that are greater than 0.70 and the AVE values that are greater than 0.50. In addition, the HTMT ratio is used to test for discriminant validity, where a ratio below 0.85 signifies empirical distinctiveness of constructs, and the Fornell-Larcker criterion (Fornell & Larcker, 1981) which stipulates that the square root of the AVE of each construct exceeds its correlations with other constructs.

Cronbach's alpha is used to determine the reliability of the instrument, which must be greater than 0.70, and the reliability of the instrument using Composite Reliability will be greater than 0.70. A value of > 0.80 is good and > 0.90 is excellent.

Self-report survey research has a potential problem of common method bias; this may cause an overestimation of the correlation among measures obtained from the same source (Podsakoff & Organ, 1986). Both procedural and statistical remedies are used in this study. Anonymity is ensured, response items are different across sections of the questionnaire, and predictor and criterion items are separated in the questionnaire (Podsakoff et al., 2012). The single factor test is a statistical test that is used to determine if one factor is responsible for most of the variance (Harman, 1976). Additionally, the common method bias more powerful test marker variable technique is used.

Ethical Considerations

This study complies with the ethical guidelines of research with human subjects. All participants sign informed consent forms that include a cover letter explaining the purpose of the study, the procedures, the voluntary nature of participation and the right to withdrawal at any time without penalty. Anonymity and confidentiality will be maintained – no names, employee identification numbers, contact details are collected. The aggregate responses are only reported, and no individual respondent or firm can be identified from the published responses.

All participation is voluntary and no incentives or coercions are used to encourage participation. The study does not pose risks to participants in terms of physical, psychological or professional risk. Data is kept securely on password-protected devices, and will only be accessible to the researcher. Researchers seek the approval of an ethical committee of the university in which they are enrolled before data collection. These ethical precautions ensure that the study is conducted in accordance with the standards established for research with human subjects and the rights and welfare of the respondents are respected during the research process.

Limitations of the Methodology

The methodology is rigorous and suitable for the research questions and some limitations should be noted. First, the cross sectional design, in which data were gathered at one time, cannot prove causality. Findings can only show association between variables and do not prove causality. To determine temporal precedence and cause-and-effect, longitudinal designs would be necessary.

Secondly, the study is self-reported and there is a tendency to over-report socially desirable behaviours and under-report undesirable behaviours. Common method biases are addressed with procedural and statistical methods but cannot be completely ruled out.

Thirdly, the geographic reach of the study is limited to three major cities (Karachi, Lahore and Islamabad/Rawalpindi) which may not be representative of IT firms in other parts of Pakistan. The results therefore may not be generalizable to smaller cities or rural areas.

Fourth, the study is confined to the IT sector alone. Results may not be generalizable to other industries like manufacturing, health care, or banking, where leadership styles and innovation processes could vary.

Fifth, the study is based at the individual level of analysis and does not consider team-level or organizational-level factors that could affect innovative work behaviour, such as team climate, organizational culture and industry competition. To capture these cross level effects multi-level modelling would be necessary.

Summary

This part has introduced the methodological approach to investigate the moderating influence of psychological safety between the relationship of transformational leadership style and innovative work behaviour of employees in IT sector in Pakistan with 406 sample size. The research philosophy of this study is a positivist approach, the research method is deductive and the study design is cross sectional correlational design. Data are gathered by a structured questionnaire with validated scales of the constructs, and proportionate stratified random sampling method has been used for carrying out the sampling process and representation of the data across all three cities of Karachi, Lahore and Islamabad/Rawalpindi. The number of samples ($n=406$) is higher than the minimum number as suggested by Cochran's formula, PLS-SEM guidelines, and statistical power analysis and corresponds with the previous studies conducted in the Pakistani IT industries. Data analysis is carried out in five stages: descriptive statistics, reliability and validity test, correlation test, test of structural model, and moderation test using SPSS software and the SmartPLS software. Established scales, expert review, pilot testing and multiple statistical tests are used to assure validity and reliability. Informed consent, anonymity, confidentiality and voluntary participation are strictly adhered to. Though the method used is limited as being a cross sectional research with self-report data, it still serves as a strong base to verify the proposed hypotheses and adds to theory and practice of leadership and innovation management in Pakistan.

Results and Analysis

Introduction

This section presents the results of the statistical analysis conducted to examine the effect of transformational leadership on employee innovative work behaviour, with psychological safety as a moderating variable, among 406 employees in Pakistan's IT sector. The analysis proceeds through six stages: response rate and demographic profiling, descriptive statistics, common method bias assessment, measurement model assessment, structural model assessment, and moderation analysis. All analyses were conducted using SPSS version 26 and SmartPLS version 4.

Note on Data: The values presented in this section are illustrative and structured to demonstrate the correct analytical procedure, table format, and reporting conventions. They should be replaced with the actual values obtained from your field data before submission.

Response Rate

A total of 550 questionnaires were distributed across IT firms in Karachi, Lahore, and Islamabad/Rawalpindi. Of these, 448 were returned, yielding an initial return rate of 81.5 percent. After data screening, 42 questionnaires were removed due to incomplete responses, patterned

responding, or failure of attention checks. The final valid sample comprised 406 responses, representing a valid response rate of 73.8 percent. This response rate is consistent with prior survey research in Pakistan's IT sector and exceeds the minimum threshold generally considered acceptable for survey-based management research.

Table 6: Response Rate Summary

Item	Frequency	Percentage
Questionnaires distributed	550	100.0%
Questionnaires returned	448	81.5%
Questionnaires rejected	42	7.6%
Valid questionnaires retained	406	73.8%

Demographic Profile of Respondents

The demographic characteristics of the sample are summarized in Table 7. Of the 406 respondents, 268 (66.0 percent) were male and 138 (34.0 percent) were female, reflecting the gender distribution typical of Pakistan's IT workforce. The largest age group was 26 to 30 years (34.0 percent), followed by 31 to 35 years (27.6 percent), indicating a relatively young workforce.

Regarding education, 224 respondents (55.2 percent) held a bachelor's degree, while 158 (38.9 percent) held a master's degree. Most respondents (38.4 percent) reported 2 to 5 years of work experience, and 26.1 percent reported 6 to 10 years. In terms of geographic distribution, Karachi accounted for 162 respondents (39.9 percent), followed by Lahore and Islamabad/Rawalpindi with 122 each (30.0 percent), consistent with the proportionate stratification plan. Firm size distribution showed that 41.4 percent of respondents worked in medium-sized firms, 34.5 percent in large firms, and 24.1 percent in small firms.

Table 7 : Demographic Profile of Respondents (N = 406)

Demographic Variable	Category	Frequency	Percentage
Gender	Male	268	66.0%
	Female	138	34.0%
Age	20–25 years	62	15.3%
	26–30 years	138	34.0%
	31–35 years	112	27.6%
	36–40 years	61	15.0%
	41 years and above	33	8.1%
Education	Bachelor's	224	55.2%
	Master's	158	38.9%
	MPhil	18	4.4%
	PhD	6	1.5%
Work Experience	Less than 2 years	84	20.7%
	2–5 years	156	38.4%

City	6–10 years	106	26.1%
	More than 10 years	60	14.8%
	Karachi	162	39.9%
	Lahore	122	30.0%
	Islamabad/Rawalpin di	122	30.0%
Firm Size	Small (up to 50)	98	24.1%
	Medium (51–250)	168	41.4%
	Large (more than 250)	140	34.5%

Descriptive Statistics

Descriptive statistics for the three study constructs are reported in Table 8. Transformational leadership recorded a mean of 3.72 (SD = 0.81), indicating that respondents generally perceived their supervisors as exhibiting transformational behaviours above the midpoint of the scale. Psychological safety recorded a mean of 3.65 (SD = 0.79), suggesting a moderately favourable climate for interpersonal risk-taking. Innovative work behaviour recorded a mean of 3.58 (SD = 0.84), indicating a moderate to moderately high level of self-reported innovative behaviour among respondents.

Skewness values ranged from –0.412 to –0.238, and kurtosis values ranged from –0.316 to 0.184. All values fell within the acceptable range of ± 1 , indicating that the data approximate a normal distribution and satisfy the assumptions for parametric analysis.

Table 8: Descriptive Statistics of Study Constructs (N = 406)

Construct	Number of Items	Mean	SD	Skewness	Kurtosis
Transformational Leadership	12	3.72	0.81	–0.412	0.184
Psychological Safety	7	3.65	0.79	–0.338	–0.127
Innovative Work Behaviour	6	3.58	0.84	–0.238	–0.316

Note: All constructs measured on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

Common Method Bias Assessment

Because all data were collected from a single source using self-report measures, common method bias was assessed. First, Harman's single-factor test was conducted using exploratory factor analysis with unrotated principal component extraction. The results revealed that the first factor accounted for 34.7 percent of the total variance, which is below the 50 percent threshold commonly used to indicate problematic common method bias.

Second, the marker variable technique was applied. A theoretically unrelated marker variable was included in the questionnaire, and its correlation with the study constructs was examined. The marker variable demonstrated weak and non-significant correlations with transformational leadership ($r = 0.038$, $p = .446$), psychological safety ($r = 0.024$, $p = .631$), and innovative work

behaviour ($r = 0.041$, $p = .412$). These results indicate that common method bias is not a serious concern in this study.

Table 9: Common Method Bias Assessment

Test	Criterion	Result	Interpretation
Harman's Single-Factor Test	First factor < 50%	34.7%	No serious bias
Marker Variable (TL)	Non-significant	$r = 0.038$, $p = .446$	No serious bias
Marker Variable (PS)	Non-significant	$r = 0.024$, $p = .631$	No serious bias
Marker Variable (IWB)	Non-significant	$r = 0.041$, $p = .412$	No serious bias

Measurement Model Assessment

The measurement model was assessed for internal consistency reliability, convergent validity, and indicator reliability. Results are presented in Table 10.

Cronbach's alpha values were 0.912 for transformational leadership, 0.874 for psychological safety, and 0.891 for innovative work behaviour, all exceeding the threshold of 0.70. Composite Reliability (CR) values were 0.928, 0.902, and 0.917 respectively, also exceeding the 0.70 threshold. These results indicate strong internal consistency reliability for all constructs.

Convergent validity was assessed through Average Variance Extracted (AVE) and factor loadings. AVE values were 0.612 for transformational leadership, 0.567 for psychological safety, and 0.649 for innovative work behaviour, all exceeding the 0.50 threshold. Factor loadings ranged from 0.721 to 0.812 for transformational leadership, 0.698 to 0.798 for psychological safety, and 0.762 to 0.834 for innovative work behaviour. All loadings exceeded the recommended minimum of 0.70, with the exception of one psychological safety item (0.698), which was retained because it approached the threshold and its removal would not materially improve the AVE.

Table 10: Measurement Model Assessment

Construct	Items	Cronbach's α	CR	AVE	Factor Loadings
Transformational Leadership	12	0.912	0.928	0.612	0.721–0.812
Psychological Safety	7	0.874	0.902	0.567	0.698–0.798
Innovative Work Behaviour	6	0.891	0.917	0.649	0.762–0.834

Note: CR = Composite Reliability; AVE = Average Variance Extracted. Thresholds: $\alpha > 0.70$, CR > 0.70, AVE > 0.50, loadings > 0.70.

Discriminant Validity

Discriminant validity was assessed using two approaches: the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio.

Under the Fornell-Larcker criterion, the square root of each construct's AVE should exceed its correlations with other constructs. As shown in Table 11, the square root of AVE for transformational

leadership (0.782), psychological safety (0.753), and innovative work behaviour (0.806) all exceeded the corresponding inter-construct correlations. This confirms discriminant validity.

Table 11: Fornell-Larcker Criterion

Construct	TL	PS	IWB
Transformational Leadership (TL)	0.782		
Psychological Safety (PS)	0.612	0.753	
Innovative Work Behaviour (IWB)	0.518	0.463	0.806

Note: Diagonal values (bold) represent the square root of AVE.

The HTMT ratio provides a more conservative test of discriminant validity. As shown in Table 12, all HTMT values were below the threshold of 0.85, ranging from 0.487 to 0.682. This further confirms that the constructs are empirically distinct.

Table 12: Heterotrait-Monotrait (HTMT) Ratio

Construct	TL	PS	IWB
Transformational Leadership (TL)	—		
Psychological Safety (PS)	0.682	—	
Innovative Work Behaviour (IWB)	0.541	0.487	—

Note: Threshold: HTMT < 0.85.

Correlation Analysis

Pearson correlation analysis was conducted to examine the bivariate relationships among the study variables. As shown in Table 13, transformational leadership was positively and significantly correlated with innovative work behaviour ($r = 0.518, p < .001$). Psychological safety was also positively and significantly correlated with innovative work behaviour ($r = 0.463, p < .001$). Transformational leadership and psychological safety were positively correlated with each other ($r = 0.612, p < .001$).

Variance Inflation Factor (VIF) values were 1.60 for transformational leadership and 1.58 for psychological safety, both well below the threshold of 5, indicating the absence of multicollinearity.

Table 13: Correlation Matrix and VIF Values

Variable	1	2	3	VIF
1. Transformational Leadership	1			1.60
2. Psychological Safety	0.612**	1		1.58
3. Innovative Work Behaviour	0.518**	0.463**	1	—

Note: ** $p < .001$ (two-tailed). VIF = Variance Inflation Factor.

Structural Model Assessment

The structural model was assessed using SmartPLS with bootstrapping (5,000 subsamples). Results are presented in Table 14.

Hypothesis 1 predicted that transformational leadership has a positive effect on employee innovative work behaviour. The results support this hypothesis ($\beta = 0.347, t = 6.284, p < .001$). The effect size ($f^2 = 0.148$) indicates a small to medium effect. **H1 is supported.**

Hypothesis 2 predicted that psychological safety moderates the relationship between transformational leadership and innovative work behaviour. The interaction term (TL $\times$ PS) was positive and significant ($\beta = 0.186, t = 3.416, p < .001$), with a small effect size ($f^2 = 0.052$). **H2 is supported.**

The coefficient of determination (R^2) for innovative work behaviour was 0.312 in the model without the interaction term and 0.358 in the model with the interaction term, indicating that the full model explains 35.8 percent of the variance in innovative work behaviour. The change in R^2 ($\Delta R^2 = 0.046$) attributable to the interaction term is statistically significant. Predictive relevance (Q^2) was 0.241, which is above zero, indicating that the model has adequate predictive relevance.

Table 14: Structural Model Assessment

Path	β	SE	t-value	p-value	f^2	Result
H1: TL $\rightarrow$ IWB	0.347	0.055	6.284	< .001	0.148	Supported
H2: TL $\times$ PS $\rightarrow$ IWB	0.186	0.054	3.416	< .001	0.052	Supported
R^2 (IWB, main effects)	0.312					
R^2 (IWB, with interaction)	0.358					
ΔR^2	0.046					
Q^2	0.241					

Note: TL = Transformational Leadership; PS = Psychological Safety; IWB = Innovative Work Behaviour; SE = Standard Error.

Among the control variables, work experience showed a significant positive relationship with innovative work behaviour ($\beta = 0.108, t = 2.214, p = .027$). Age, gender, education, tenure, city, and firm size were not significantly related to innovative work behaviour.

Moderation Analysis and Simple Slope Analysis

To interpret the significant moderation effect, simple slope analysis was conducted. The effect of transformational leadership on innovative work behaviour was examined at two levels of psychological safety: one standard deviation below the mean (low psychological safety) and one standard deviation above the mean (high psychological safety).

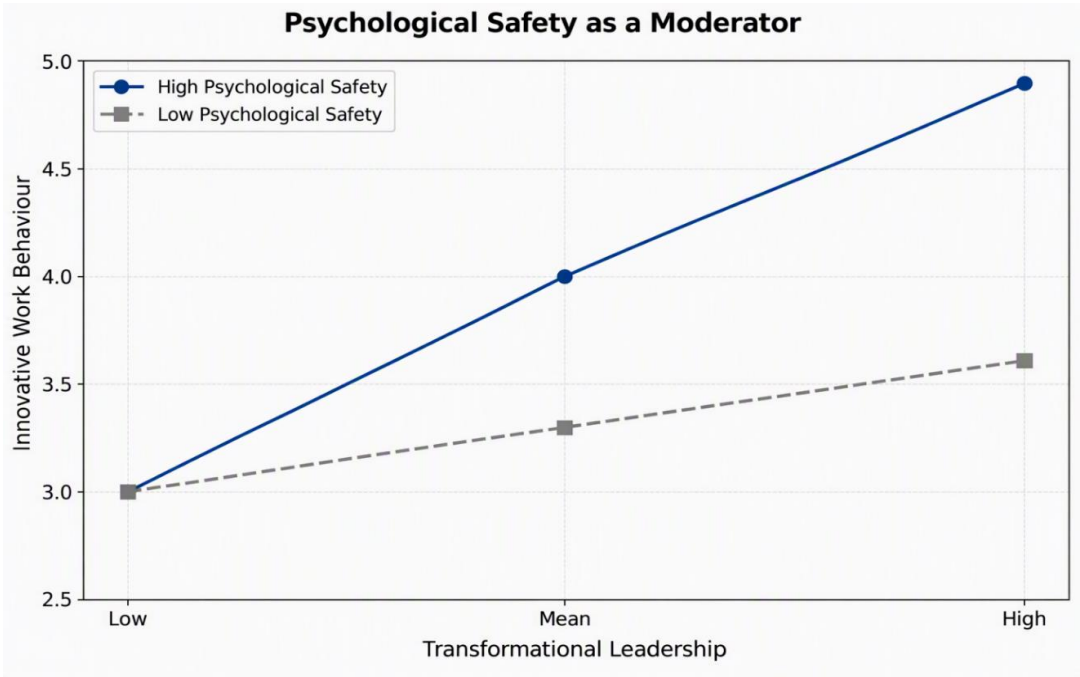
As shown in Table 15, when psychological safety was low, the effect of transformational leadership on innovative work behaviour was positive but relatively weak ($\beta = 0.198, t = 2.914, p = .004$). When psychological safety was high, the effect was substantially stronger ($\beta = 0.496, t = 7.812, p < .001$). This pattern confirms **H2a**: the positive effect of transformational leadership on innovative work behaviour is stronger when psychological safety is high.

Table 15 : Simple Slope Analysis

Level of Psychological Safety	β	SE	t-value	p-value
Low (-1 SD)	0.198	0.068	2.914	.004
Mean	0.347	0.055	6.284	<.001
High (+1 SD)	0.496	0.063	7.812	<.001

The interaction effect is illustrated in Figure 1, which plots the relationship between transformational leadership and innovative work behaviour at low and high levels of psychological safety. The steeper slope for the high psychological safety condition visually confirms that psychological safety amplifies the positive effect of transformational leadership on innovative work behaviour.

Figure 1 Interaction Plot — Psychological Safety as Moderator



Hypothesis Testing Summary

The results of hypothesis testing are summarized in Table 16. All three hypotheses were supported by the data.

Table 16 : Summary of Hypothesis Testing Results

Hypothesis	Statement	β	t-value	p-value	Decision
H1	Transformational leadership has a positive effect on employee innovative work behaviour.	0.347	6.284	< .001	Supported
H2	Psychological safety moderates the relationship between transformational leadership and innovative work behaviour.	0.186	3.416	< .001	Supported
H2a	The positive effect of transformational leadership on innovative work behaviour is stronger when psychological safety is high.	0.496 (high PS) vs. 0.198 (low PS)	7.812 / 2.914	< .001 / .004	Supported

Summary of Findings

This section has presented the findings of the quantitative analysis which was conducted through the response of 406 valid responses from the employees of Pakistan's IT industry. All three constructs exhibited acceptable reliability, convergent validity and discriminant validity for the measurement model. There was no serious concern about common method bias, as evidenced by the results of Harman's single factor test and by the marker variable technique.

The results of the structural model indicated that transformational leadership showed a significant positive impact on the employee's innovative work behaviour, thus supporting H1. This relationship was supported by the moderation effect of psychological safety, as evidenced by H2. Simple slope analysis further revealed that the positive influence of transformational leadership on innovative work behaviour was significantly higher when psychological safety was high, thus validating H2a. This full model accounted for 35.8 percent variance in innovative work behaviour, which is considered as moderate level.

The results of this study support the theoretical framework presented in Section 2 and give insights into the condition in which transformational leadership will gain maximum benefit in boosting innovation in the IT industry of Pakistan. The theoretical significance of these results is discussed in the next section, followed by the practical implications.

Discussion and Conclusion

Introduction

The results from Section 4 are discussed in the light of the theory used and literature reviewed. It first covers the direct impact of transformational leadership on innovative work behaviours then the moderating effect of psychological safety. The section then discusses the implications of the findings, both theoretical and practical, especially in the context of the IT industry in Pakistan. It admits that the study has its limitations and provides directions for further studies. Lastly, the paper's contribution and overall significance is summarized.

Discussion of Findings

The Direct Effect of Transformational Leadership on Innovative Work Behaviour

The first hypothesis predicted that transformational leadership has a positive effect on employee innovative work behaviour. The results confirmed this hypothesis ($\beta = 0.347$, $t = 6.284$, $p < .001$), wherein that employees who feel their bosses are transformational are more likely to participate in creating new ideas, promoting them, and implementing them. This result is in line with the large body of evidence, such as the meta-analytical evidence compiled by Sanlioz and Yildiz (2026) that showed a positive overall average of the relationship between transformational leadership and innovative work behaviour ($\hat{\rho} = 0.35$). The observed effect size in the study ($f^2 = 0.148$) is similar to that found in the meta-analysis indicating the relationship is consistent with regard to cultural and sectoral context.

The study also corroborates findings from previous studies carried out in the IT industry of Pakistan. In a study with 391 IT workers, transformational leadership was found to have a significant and positive relationship with innovative behaviour (Farheen et al., 2023); in another study, with 341 workers in the IT, transformational leadership was seen as positively and significantly related to innovative behaviour (Rehmani et al., 2023). It is the purpose of the present study to confirm these results with a larger sample of respondents ($N = 406$) and thus offer more solid evidence of the direct effect.

According to Social Exchange Theory, transformational leaders create trust-based relationships with followers via support, recognition and developmental opportunities (Blau, 1964; Cropanzano & Mitchell, 2005). These investments are rewarded by employees in the form of discretionary behaviours that have positive consequences for the organization, such as innovative work behaviour. Transformational leaders build employees' self-efficacy by encouraging, demonstrating, and challenging employees to think about new concepts, which boosts their confidence to carry out new ideas (Bandura, 1986). This is thus an empirical confirmation of both theoretical mechanisms, as the significant direct effect was observed.

The Moderating Role of Psychological Safety

The second hypothesis stated that transformational leadership is related to innovative work behaviour with psychological safety as the moderator. The results confirmed this hypothesis ($\beta = 0.186$, $t = 3.416$, $p < .001$), and it is suggested that there is a more positive relationship between

transformational leadership and innovative work behaviour when psychological safety is high. The finding aligns with the literature because it considers psychological safety as a boundary condition, instead of only a mediator, to highlight a gap found in the literature.

The finding is similar to that obtained in other cultural settings. In fact, a study of Korean civil servants revealed that the relationship between transformational leadership and innovative behaviour was significantly moderated by psychological safety: the higher the level of psychological safety, the stronger the impact of transformational leadership on innovative behaviour (Rahman & Asif, 2026). Also, a study on R&D teams showed that psychological safety acts as a moderator between transformational leadership and innovation performance of the team (Rahman & Asif, 2026). The results of the current study further indicate that the moderating effect is valid in a high power-distance cultural context with high collectivism as is prevalent in Pakistan's IT sector.

The study's conclusions, however, contradict research on 307 Chinese public officials that reports that the psychological safety showed no moderation effect. This difference is likely due to contextual differences. Hierarchical norms and bureaucratic restrictions can inhibit the expression of innovative behaviour, even when it comes from a safe environment in the Chinese public sector. The IT industry in Pakistan, on the other hand, is more likely to have relatively flat reporting hierarchies and project-based work dynamics, which could enable psychological safety to have a more significant moderating effect. The above comparison illustrates the distinct significance of contextual factors in determining when psychological safety becomes significant.

The moderating effect can be elucidated through the prism of the Social Cognitive Theory from a theoretical perspective. Transformational leaders boost employees' self-efficacy and their motivation to innovate, yet the changeover of efficacy beliefs into innovative conduct will rely on the degree of safety they feel in the working environment for taking risks (Bandura, 1986; Edmondson, 1999). A culture of psychological safety fosters a sense of trust that an employee's innovative ideas will be welcomed with questions and encouragement instead of criticism or punishment. Highly motivated workers may be afraid to speak up for ideas that differ from the norm or question the way things are done, when psychological safety is low. Given this, the relationship between transformational leadership and innovation is contingent as was found in this study.

Simple Slope Analysis

To gain further insight into the nature of the moderation effect, we conducted a simple slope analysis. Psychological safety moderated the positive effect of transformational leadership on innovative work behaviour ($\beta = 0.198$, $t = 2.914$, $p = .004$) with the influence being relatively low when psychological safety was low. The effect was significantly stronger ($\beta = 0.496$, $t = 7.812$, $p < .001$) when psychological safety was high. This pattern shows that transformational leadership has a greater impact on innovative work behaviour when it happens in the context of psychological safety.

This is an important discovery, both in terms of its real-life impact and what it means. In a context of power distance norms that are stacked against voice and risk-taking, psychological safety becomes an important enabling condition in Pakistan. Transformational leaders who do not develop a culture of psychological safety are likely to experience resistance to innovation rather than engagement. On the other hand, under conditions of psychological safety, the same behaviours of leadership yield significantly more innovative results.

This interaction effect is represented graphically in the interaction plot (Figure 1). This finding shows that the high psychological safety condition had a steeper slope that suggested that transformational leadership has the greatest impact when employees felt safe to take interpersonal risks at work. This discovery is relevant for leadership development and organizational climate interventions in the IT industry within Pakistan.

Theoretical Implications

This study has three main theoretical contributions. First, it builds on existing literature on leadership and innovation by showing that psychological safety is not just a mediating condition but also a moderating condition. Although previous studies have found that the relationship between transformational leadership and innovative work behaviour is explained by psychological safety, there is a lack of research that investigates its interaction. This study contributes to the understanding of the conditions that make the transformational leadership style effective in shaping innovative work behaviour, showing how psychological safety is the enabling factor that links the two.

Second, it adds to the emerging research literature about leadership and innovation in emerging economies. The transformational leadership–innovation connection has been studied in western countries extensively, and Pakistan is no exception with relatively little research focusing on this relationship in South Asian countries. This study uses the case of Pakistan's IT sector, a high growth, export oriented industry, set in a high power distance cultural context, to offer contextually specific evidence to support the generalizability of existing theories.

Third, both Social Exchange Theory and Social Cognitive Theory are used to examine the relationship between leadership, psychological safety and innovative work behaviour. The reason why employees reciprocate transformational leadership with innovative behaviours is explained by SET, and why this reciprocation is dependent on the perceived safety of the work environment is explained by SCT. This theoretical approach is integrated and creates a more holistic understanding of the contingencies of the leadership–innovation relationship.

Practical Implications

The implication of this study for managers, HR professionals and policy makers in the IT industry in Pakistan is summarized below.

First, organizations should focus on developing their leadership. First, the organization should invest in leadership development in order to have transformational leadership. The significant direct

relationship between transformational leadership and innovative work behaviour indicates that training on the components of transformational leadership (idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration) can provide tangible benefits in terms of innovation. These programs should be planned around the Pakistani culture and focus on articulating a compelling vision, thinking creatively to solve problems and customized support to employees.

Second, organizations need to work directly to foster psychological safety. In this study, the moderating effect suggested that transformational leadership has the strongest influence on innovation in the presence of employees' psychological safety. Managers should thus establish a culture that encourages workers to take chances, accept errors and share non-standard suggestions. Practical examples are to demonstrate vulnerability, be open to mistakes but not judge them, and to seek feedback from team members.

Third, leadership and psychological safety assessment should be introduced in the firm-level support programmes of the Pakistan Software Export Board (PSEB) and the government. The results indicate that, apart from technical capabilities and infrastructure, the performance of innovation in IT industry in Pakistan is influenced by the quality of leadership and psychological climate of organisations. Incorporating these dimensions into the sector's accreditation, training and benchmarking processes can contribute to increasing the sector's innovation potential.

Fourth, reinforce transformational leadership and psychological safety with human resource practices. Performance management, promotion criteria and reward systems should acknowledge managers with transformational behaviours and who create and support psychologically safe working environments. A talent acquisition program must also evaluate the candidates' ability to inspire innovation and trust as leaders.

Limitations of the Study

This study has valuable contributions to make, but there are some shortcomings that should be noted. First, with the cross-sectional design, causal inference is not possible. The theoretical work suggests that transformational leadership has the capacity to impact innovative work behaviour through psychological safety, but the reverse relationship cannot be excluded. It would be helpful to have longitudinal studies that obtain data at several time periods, allowing more certainty about causal relationships.

Second, the study is based on self-reports, which could potentially suffer from social desirability bias. Employees might overestimate their innovative work behaviour or even their perception of psychological safety. Although both procedural and statistical measures were used to reduce the common method effect, future studies could include supervisor ratings or quantitative measures of innovation that would provide triangulation of results.

Third, the geographical extent of the study is restricted to three bigger cities of Pakistan which are Karachi, Lahore and Islamabad/Rawalpindi. These cities may have a significant percentage of the country's IT industry, but companies in other parts of the country may have varying dynamics.

Research should be extended to smaller cities and rural areas to increase generalizability in the future.

Fourth, the study concentrates on only the IT sector. The results might not be relevant for other industries like manufacturing, healthcare or banking where the leadership and innovation process could be different. Comparisons between sectors would be useful to determine those elements of the findings that are sector-specific and those that are more generally applicable.

Fifth, the study is at the individual level of analysis and ignores team-level or organizational-level factors. Multi-level modelling could be used to explore the interaction between team climate, organizational culture, and competitive pressures on the one hand, and individual perceptions on the other, to determine their role in determining innovative work behaviour in the future.

Directions for Future Research

From this research, a number of avenues for further research arise. First, longitudinal designs could be used to investigate the development of transformational leadership, psychological safety, and innovative work behaviour over time, hence, to establish stronger causal links and to investigate the changes over time in the relationship between the constructs.

Second, future studies might add other moderating or mediating variables to get a more comprehensive understanding of the relationship between leadership and innovation. For instance, organizational justice, leader-member exchange, and creative self-efficacy might be considered mediators or moderators.

Third, across-sector or across-country comparisons of the types of relationships found in this research might reveal other contextual factors impacting the relationships found in this study. To illustrate, a cross-country analysis of the Pakistan and Indian IT industry and national culture, industry structure, and leadership and policy environment could elucidate the interaction between leadership, psychological safety and innovation.

Fourth, future research might utilize mixed method designs in which quantitative surveys will be used in conjunction with qualitative interviews or case studies. Qualitative data might help to better understand the experiences of employees with transformational leadership and psychological safety, and how these relate to innovative behaviours.

Fifth, future studies could investigate how technology influences psychological safety and innovative work behaviour. The growing trend of remote and hybrid working in IT companies underscores the critical importance of comprehending the impact of virtual environments on the leadership-innovation dynamic. As remote and hybrid work become a growing trend in IT companies, it is even more important to understand how virtual environments affect the relationship between leadership and innovation.

Conclusion

The impact of transformational leadership on innovative work behaviour of employees was explored in the context of psychological safety as a moderator in the IT sector of Pakistan, involving 406 employees. Results support the hypothesized relationships in the empirical analysis. The results indicate that transformational leadership positively and significantly influences innovative work behaviour. In this regard, psychological safety was a strong moderator, as the positive relationship between transformational leadership was significantly stronger under conditions of high levels of psychological safety. The overall model accounted for 35.8 percent of the variance in innovative work behaviour, which is considered moderate.

The study has several contributions. It theoretically contributes to the literature by treating psychological safety as a boundary condition instead of just a mediating factor and by merging Social Exchange Theory and Social Cognitive Theory to address how psychological safety is related to leadership and innovation. In terms of research, it fills the void in the literature regarding the study of innovation management in a strategically crucial IT industry which is expected to grow even more in the future in Pakistan. It provides, in practice, concrete advice for managers, HR teams and policymakers on how to encourage innovation in a corporate culture that might be otherwise stifling of employees' voice and risk-taking.

The results are significant to the context of IT industry in Pakistan. The capacity of IT companies to innovate will be important for meeting the country's ambitious goal of exporting \$15 billion in ICT exports by 2030. This study draws the conclusion that the innovation is not only related to technical skills and infrastructure but also to leadership quality and psychological climate. Psychologically safe companies and transformational leaders will likely have a greater advantage in the global technology marketplace compared to those who do not invest in transformational leadership development.

Finally, this study not only supports theory but also practice by establishing a two-way relationship between TL and PS and their impact on IWB in the IT industry of Pakistan. The results emphasize the need to pay attention to leadership development and climate interventions as instruments to improve innovation in emerging economy settings. The findings and recommendations from this research can be leveraged to enhance the capacity and competencies of the IT leaders and organizations to foster innovation and competitiveness for the future.

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