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Unlocking Innovation Through Psychological Capital: The Hidden Mediator Between Transformational Leadership and Innovative Work Behavior

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Abstract

Research aims: This study aims to analyze the impact of transformational leadership on innovative work behavior, with proactive personality and psychological capital serving as mediators. This study examines the personnel of PT Pos Indonesia in the special region of Yogyakarta.

Design/Methodology/Approach: This research employed a quantitative methodology with a cross-sectional design. Data were obtained from 177 participants utilizing a standardized questionnaire. The data were analyzed using the Structural Equation Modeling (SEM) technique with AMOS software, resulting in a final sample of 170 respondents.

Research findings: The findings indicate that transformational leadership and proactive personality significantly influence innovative work behavior. Conversely, psychological capital did not exert a strong direct influence on innovative work behavior. Both proactive personality and psychological capital were found to mediate the association between transformational leadership and innovative work behavior, both independently and sequentially.

Theoretical Contribution/Originality: This study enhances the current literature by validating the mediating effects of proactive personality and psychological capital in the association between transformational leadership and innovative work behavior. The incorporation of these mediators offers novel insights into the mechanisms that propel innovative work behavior.

Practitioners/Policy Implications: In terms of management practice, PT Pos Indonesia and similar organizations are encouraged to adopt transformational leadership styles that empower employees and encourage proactivity. In addition, initiatives should be implemented to enhance employees' psychological capital through a supportive work environment to maximize innovation potential.

Research Limitations/Implications: This study's weakness is the comparatively low Average Variance Extracted (AVE) value, signifying the construct's restricted capacity to account for the variance of its indicators. The hypothesis positing that psychological capital influences innovative work behavior is rejected.

Keywords: Transformational Leadership; Proactive Personality; Psychological Capital; Innovative Work Behavior

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Introduction

The swift advancement of technology has prompted organizations in various sectors to adopt digital transformation to enhance efficiency and

competitiveness (Abbas et al., 2024; Chen & Chen, 2023; Nadkarni & Prügl, 2021; Guerra et al., 2023). Digital transformation necessitates investment in technology alongside a shift in thinking and adaptable work practices, encompassing cloud-based data management and communications via digital platforms (Islam et al., 2023; Eurofound, 2020). Organizations need inventive and adaptable human resources to thrive in a changing environment (Slåtten et al., 2020; Meri et al., 2023).

Because of the Fourth Industrial Revolution, Indonesia needs to embrace digital change as a matter of course (Wahidin & Wati, 2024; Fonna, 2019). Companies must adopt strategies and leadership that foster innovation to respond to the challenges of digital change (Kiron & Spindel, 2019; Lorenzo, 2016). One company facing this challenge is PT Pos Indonesia, a state-owned enterprise with a long-standing history in the courier industry. Despite its legacy, data shows that PT Pos Indonesia ranks low in terms of consumer interest compared to new players such as JNT, Sicepat and Ninja Xpress (Populix, 2023). This situasion reflects the company's limited adaptability to technological disruption and shifting consumer preferences.

Since 2011, PT Pos Indonesia has undertaken digital transformation initiatives; however, these efforts have failed to substantially enhance the company's competitiveness. This signifies the presence of internal challenges, particularly in the area of human resources. Faizal Djoemadi, CEO of PT Pos Indonesia, emphasized that chaning mindsets and enhancing human resource capacities are crucial for for effective transformation (Review, 2023; Tempo, 2022). A clear manifestation of this issue is employees' limited engagement in innovative work behavior – an essential condition for driving digital transformation (Banjarnahor et al., 2023).

Innovative work behavior refers to individuals' capacity to generate novel ideas and apply creativity that enhance organizational success (Hernaus et al., 2023; Scott & Bruce, 1994; Vuong & Hieu, 2023). Jong dan Hartog (2010) There is a link between innovative behavior at work and creative work; as innovative behavior at work rises, so does the firm's innovation. Innovative behavior at work can be caused by a number of things, such as workers' relationship skills (Rahman et al., 2022), motivation (Z. Xu et al., 2023), creativity (Atkočiūnienė & Siudikienė, 2021), human resources, supervisor support, and transformational leadership (Bass & Avolio, 1994; Karimi et al., 2023). In industrial environments, innovative work behavior emerges as a result of effective human resource management that leverages transformational leadership to address competitive pressures (Bak et al., 2021).

Through its ability to energize employees, align efforts toward shared goals, and nurture an innovative environment, transformational leadership makes it easier for new ways of doing things at work to appear (Bak et al., 2021; Bass & Avolio, 1994; Salanova et al., 2022; Robbins & Coulter, 2016; Shafi et al., 2020). By providing motivation, enhancing confidence, and promoting intellectual growth, transformational leadership supports employee risk-taking aimed at achieving organizational outcomes (Hansen & Pihl-Thingvad, 2019). Each engagement with transformational leadership fosters new insights

and inspires enthusiasm for developing innovative solutions to challenges (Sueb & Sopiah, 2023).

Literature indicates that additional elements influencing innovative work behavior include proactive personality and psychological capital (Alshebami, 2021; Ullah et al., 2023). The extent to which individuals initiate change within their environment reflects the strength of their proactive personality (Bateman & Crant, 1993). Initiative, inventive thinking, and the pursuit of creative problem-solving strategies are common traits of individuals with a proactive personality (Putri, 2020). Such individuals are typically highly motivated to drive change and adapt to evolving work environments, encouraging them to demonstrate innovative work behaviors (Oktaria et al., 2021).

Self-efficacy, optimism, hope, and resilience - the key elements of psychological capital are fundamental traits that foster innovative work behavior, enhancing performance and promoting achievement in the face of change (Luthans et al., 2007; Peterson et al., 2011; Ullah et al., 2023). Psychological capital has been shown to encourage creative behavior at work by promoting a positive view of success, making people more resilient when faced with obstacles, and helping to create an environment that is open to new ideas (Alshebami, 2021; Anggraeni & Rachmawati, 2023; Ullah et al., 2023; J. Gao et al., 2022;W. Xu & Zhao, 2020).

Prior studies indicate that transformative leadership influences both proactive personality and psychological capital (Lei et al., 2020; Uçar et al., 2019). The results show that proactive personality and psychological capital play a part in the link between transformational leadership and creative behavior at work. A bold attitude has a big and good effect on psychological capital, according to research (Andri et al., 2019; Emur et al., 2023; Hao et al., 2019). This result supports the idea of a chain mediation that links proactive personality, psychological capital, and the link between changing leadership and creative behavior at work.

Transformational leadership, a proactive attitude, and psychological capital have been found to be the three most important factors that affect creative behavior at work. However, different studies have come to different conclusions in the past, especially when it comes to how transformational leadership affects creative behavior at work. Transformational leadership has a big effect on people being creative at work, according to studies (Afsar & Umrani, 2020; Bak et al., 2021; Hansen & Pihl-Thingvad, 2019; Sharifirad, 2013), while others argue that the effect is minimal (Mahardika & Syarifah, 2021; Udin & Shaikh, 2022), this higlighting a research gap.

In addition, this study refers to research Bak et al. (2021), which shares similarities with Bak et al. (2021) in terms of theory, in terms of theory, research object, and using the same cross-sectional method. Then the Bak et al., (2021) article was modified. However, this study updates Bak et al.'s (2021) approach by integrating variables from two articles—specifically, the works of Bak et al. (2021) and Mubarak et al. (2021). This study looks at how transformational leadership affects creative behavior at work, taking into account the role of proactive personality and psychological capital as mediators. This creates a

chain mediation route. This study differentiates itself from prior research by utilizing primary data instead of depending on secondary data sources. This study looks into how transformational leadership affects creative behavior at work, focusing on how proactive personality and psychological capital play a role.

Literature Review and Hypotheses Development

Innovative Work Behavior

Innovative work behavior encompasses several stages including problem identification, idea generation or solution formulation, garnering support for the concept, and implementing the idea (Scott & Bruce, 1994). Jong and Hartog (2010) described it as individual efforts directed towards the creation, implementation, and execution of innovations that improve the organization, including modifications in technology, delivery techniques, or customer service strategies. Innovative work behavior is characterized by the entrepreneurial spirit of individuals inside an organization who generate unique ideas and have the audacity to implement them to effectuate good change (AlEssa & Durugbo, 2022). Afsar and Umrani (2020) added that innovative work behavior involves the conception, advocacy, and implementation of inventive ideas within an organization, encompassing the advancement of new technology, processes, and the application of unique approaches. Based on these perspectives, innovative work behavior can be defined as the activities and attitudes of organizational members aimed at generating, promoting, and executing unique ideas to enhance organization's competitive advantage. Thukral (2021) delineates the characteristics of Innovative Work Behavior, emphasizing a focus on product markets and innovation through the development of relevant new services, the cultivation of a work environment that encourages the generation of novel ideas, the acceptance of risks in new initiatives despite potential failures, and the pursuit of being the first to implement innovations ahead of competitors. Elidemir et al. (2020) highlight that a primary attribute of Innovative Work Behavior is employees' proactive initiative in implementing new processes, products, and markets to enhance organizational performance and competitiveness. Janssen (2000) asserts that Innovative Work Behavior not only involves specific characteristics but also fosters the generation of new ideas, motivates individuals to promote these ideas within the organization, and facilitates their implementation in the workplace.

Transformational Leadership

Transformational leadership is a leadership approach that emphasizes collaboration with followers to identify necessary changes, develop an inspiring vision, and implement those changes (Podsakoff et al., 1990). Leaders who adopt this style build relationships based on trust, admiration, and loyalty, thereby motivating employees to perform at higher levels (Bass & Avolio, 1994). Transformational leadership contributes to inspiring and enabling individuals to attain exceptional outcomes while enhancing their leadership capabilities (Carless et al., 2000). This leadership style fosters a creative work environment, encouraging employees to think innovatively, and explore new ways of

completing tasks (Shafi et al., 2020). In addition, strong and empathic relationships between leaders and subordinates under transformational leadership can increase employee confidence through exemplary behavior (Salanova et al., 2022). Based on these perspectives, transformational leadership entails a robust and trustworthy relationship between leaders and their subordinates, characterized by motivation, inspiration, and the cultivation of a work environment that supports creativity and organizational advancement.

According to Carless et al. (2000), leadership encompasses the capacity to formulate and communicate an inspiring vision, provide individualized attention to nurture human potential, and demonstrate appreciation that fosters self-confidence. These leaders also encourage creativity by viewing mistakes as learning opportunities, serve as role models through actions that reflect their values, build relationships based on trust and respect, and possess the charisma to inspire teams to achieve ambitious goals. The effective implementation of transformational leadership can inspire members to voluntarily go beyond their formal responsibilities, supported by strong relationships and profound respect for their leaders, thereby motivating them to pursue organizational objectives with greater dedication (Bass & Riggio, 2006; Carless et al., 2000; Podsakoff et al., 1990).

Proactive Personality

A proactive personality is a relatively stable disposition of individuals to affect their surroundings (Bateman & Crant, 1993; Parker & Sprigg, 1999). This concept is rooted in an individual's desire to exert control over their surroundings (White, 1959; Langer, 1983) and signifies proactive engagement in modifying the environment, rather than passively succumbing to external pressures. Individuals with a proactive personality tend to adapt actively, initiate change, and demonstrate perseverance in overcoming hurdles until their goals are achieved (Bateman & Crant, 1993). Proactive personality can thus be defined as a consistent individual's inclination to actively initiate change and influence the environment to achieve personal or organizational objectives.

Bateman and Crant (1993) identify several factors that influence proactive personality: (1) neuroticism, indicative of emotional instability; (2) extraversion, encompassing the desire for social engagement; (3) openness, associated with cognitive flexibility and receptiveness to novel concepts; (4) agreeableness, reflecting empathy and compassion; and (5) conscientiousness. Furthermore, Bateman and Crant (1993) delineate the core traits of a proactive personality as: selection, the capacity of individuals to choose their environments; cognitive reconstruction, the process of comprehending and evaluating the environment; generation, the tendency of individuals to inadvertently elicit social responses.

Psychological Capital

Psychological capital is a positive psychological construct encompassing self-efficacy, optimism, hope, and resilience, which significantly contributes to motivation, information processing, and the achievement of individual and organizational success (Lorenz et al.,

2022; Luthans et al., 2007; Peterson et al., 2011). Psychological capital goes beyond human and social capital by offering a competitive advantage through self-development, enhancing organizational resilience during times of change, and substantially improving individual and team performance (Gao et al., 2020; Putra, 2018). Experts assert that psychological capital reflects an individual's capacity to sustain a positive mindset characterized by confidence, optimism, hope, and resilience—traits that can be cultivated to boost performance, adapt to change, and achieve success.

According to Luthans et al. (2007), factors influencing psychological capital include leadership, personality, and human resource development. Leadership affects employees' self-efficacy through supervisory practices and communication styles (Salanova et al., 2022). Personality is shaped by cognitive and affective strengths, with optimism influenced by an individual's tendency to maintain a hopeful outlook on the future. Meanwhile, human resource development enhances psychological capital by preparing employees to effectively face unforeseen challenges (Luthans et al., 2007).

Direct Effect

Transformational leadership, characterized by its ability to inspire, motivate, and encourage followers to exceed expectations, plays a pivotal role in fostering a work environment conducive to the emergence of innovative behavior (Bass & Avolio, 1994; Carless et al., 2000). Innovative work behavior includes individual efforts to generate, identify, and implement beneficial new ideas across different organizational levels (De Jong & Den Hartog, 2010). Leaders who encourage creativity and new ideas have a big impact on this behavior (Srirahayu et al., 2023). The establishment of a common vision, provision of intellectual stimulation, and delivery of personalized support are considered to foster innovative behavior in the context of transformational leadership. This connection is supported by a lot of real-world data, showing that dynamic leadership leads to more creative work behavior (Karimi et al., 2023; Mahardika & Syarifah, 2021; Sharifirad, 2013). Based on these findings, the following research hypothesis is proposed:

H_1: *Transformational0leadership has a significant positive effect on innovative work behavior.*

The desire to take action and change one's surroundings is called a progressive mentality. (Bateman & Crant, 1993; Fuller & Marler, 2009; Parker & Sprigg, 1999). Individuals who exhibit initiative actively seek opportunities, cultivate innovative ideas, and persistently pursue their implementation through various actions (Li et al., 2010; Parker & Collins, 2010; Seibert et al., 1999). Obstacles are perceived as opportunities for development and the generation of innovative solutions (Parker & Collins, 2010; Parker & Sprigg, 1999). The traits listed are similar to creative work behavior, which is when people come up with and apply new ideas that help the company (De Jong & Den Hartog, 2010; Scott & Bruce, 1994). People who show effort are more likely to try new things at work and help make the workplace a better place to be. Several studies (Mubarak et al., 2021; Oktaria et al.,

2021; Putri, 2020; Ullah et al., 2023) have found a link between being aggressive and being creative at work. Based on these findings, the following research hypothesis is proposed:

H_2: *Proactive personality has a significant positive effect on innovative work behavior.*

Psychological capital is a person's good mental state, which includes high self-efficacy, positivity, hope, and resilience, this makes it easier for them to think in a productive and useful way (Lorenz et al., 2022; Luthans et al., 2007; Peterson et al., 2011). Individuals with strong psychological capital generally demonstrate clear goals, intentional objectives, optimistic expectations, and the resilience required to overcome challenges. These environments promote employees to engage in creative thinking, particularly in challenging circumstances, as individuals are incentivized to pursue inventive solutions. Innovative work behavior, which is coming up with and putting into action new ideas that are good for the company, is encouraged by psychological capital (AlEssa & Durugbo, 2022). Psychological capital is important for encouraging employees at all levels of a business to be innovative and creative. Several studies have shown that psychological capital makes people more likely to be creative at work (Anggraeni & Rachmawati, 2023; Giner et al., 2023; Novitasari et al., 2020). Based on these findings, the following research hypothesis is proposed:

H_3: *Psychological capital has a significant positive effect on innovative work behavior.*

Transformational leadership at work creates a setting that encourages creativity and innovation, this is made possible by good communication and building trusting relationships with followers (Bass & Avolio, 1994; Carless et al., 2000; Jaiswal & Dhar, 2015). This leadership style can foster a proactive personality in employees, marked by a tendency to take initiative and influence the work environment (Bateman & Crant, 1993). Transformational leadership challenges followers beyond expectations, builds trust, and provides inspirational motivation (Shafi et al., 2020). These behaviors encourage employees to be more proactive in facing challenges and in bringing about positive change in the workplace. Transformational leadership promotes the development of a proactive personality, thereby increasing innovation within the organization. Andri et al. (2019); Hao et al. (2019); and Murniasih (2023) all do research that shows innovative leadership makes people more aggressive. Based on these findings, the following research hypothesis is proposed:

H_4: *Transformational leadership has a significant positive effect on proactive personality.*

Transformational leadership encourages and inspires team members to do their best work and go above and beyond what is expected, this helps workers develop a happy attitude that shows in their actions (Bass & Avolio, 1994; Carless et al., 2000; Shafi et al., 2020). This positive outlook is a key part of psychological capital, which is made up of four parts: hope, self-efficacy, positivity, and resilience. Individuals need these things in order

to be motivated to succeed (Lorenz et al., 2022; Luthans et al., 2007). Transformational leadership enhances employees' resilience and hope during challenging situation through individualized consideration and role modeling (Gao et al., 2020), thereby directly impacting the level of psychological capital by fostering a supportive environment for its development (Salanova et al., 2022). The rationale is that by fostering a positive and supportive atmosphere, transformational leadership contributes to the growth of psychological capital, hence augmenting motivation, performance, and innovation across various organizational levels. Numerous studies have shown that transformational leadership positively influences psychological capital (Bak et al., 2021; Gashema & Kadhafi, 2020). Based on these findings, the following research hypothesis is proposed:

H_5: *Transformational leadership has a significant positive effect on psychological capital.*

A proactive personality, characterized by initiative, creativity, and a sense of responsibility for fostering positive change, can affect individuals' cognitive processing, motivation, and efforts toward success (Bateman & Crant, 1993; Fuller & Marler, 2009; Parker & Sprigg, 1999). People who are proactive tend to have a lot of internal drive, which helps them reach their goals and deal with problems, which builds the psychological capital of others (Luthans et al., 2007; Peterson et al., 2011; Lorenz et al., 2022). Psychological capital, as a vital psychological resource not only motivates individuals but also facilitates cognitive information processing, and drives the pursuit of success, which is manifested in individual behaviors through hope, optimism, self-efficacy, and resilience (Luthans et al., 2007; Avey et al., 2011; Lorenz et al., 2022). Consequently, individuals with a proactive personality can improve psychological capital, thereby promoting innovative work behavior and organizational adaptability (De Jong & Den Hartog, 2010; Srirahayu et al., 2023). A lot of study has shown that being aggressive and having psychological capital are related in a good way (Emur et al., 2023; Hao et al., 2019). Based on these findings, the following research hypothesis is proposed:

H_6: *Proactive personality has a significant positive effect on psychological capital.*

The Effect of Mediation

Transformational leadership inspires and motivates employees to exceed expectations and achieve higher collective goals (Bass & Avolio, 1994; Carless et al., 2000). It fosters a work climate that promotes creativity, innovation, and trustworthy, positive connections, thereby encouraging employees to take initiative and proactively address difficulties (Robbins & Coulter, 2016). A proactive personality may emerge when individuals feel supported and maintain good relationships with their leaders, which increases their confidence in expressing ideas and taking action (Bateman & Crant, 1993; Parker & Sprigg, 1999). individuals with proactive traits are more likely to engage in innovative work behaviors, as their inclination to seek opportunities, generate original ideas, and drive organizational innovation is inherently aligned with such behaviors (Jong & Hartog, 2010). One important thing that helps explain how transformational leadership affects creative

behavior at work is an engaged attitude. Previous studies have shown that transformational leadership is linked to proactive personality (Andri et al., 2019; Murniasih, 2023; Uçar et al., 2019), and that proactive personality can lead to creative behavior at work (Ullah et al., 2023; Zuberi & Khattak, 2021). Based on these insights, the following research hypothesis is proposed:

H_7: *Proactive personality mediates the effect of transformational leadership on innovative work behavior.*

Transformational leadership also helps people build psychic capital, which includes confidence in one's own abilities, hope, positivity, and strength (Lorenz et al., 2022; Luthans et al., 2007). A supportive work environment, supported by visionary and inspiring leaders, gives employees the confidence to face challenges, believe in a better future, and remain resilient in the face of difficulties (Lei et al., 2020). This optimistic outlook encourages individuals, to explore novel concepts and pursue inventive solutions (Peterson et al., 2011). This good effect fits with Bandura's social cognitive theory (Bandura, 1997, 2002), which stresses how important self-efficacy and learning from others are in shaping how people act. Psychological capital is an important part of creative leadership because it encourages people to act in new ways at work. Transformational leadership has an effect on psychological capital, as shown by earlier research (Lei et al., 2020). Psychological capital also plays a part in the link between transformational leadership and creative behavior at work (Gashema & Kadhafi, 2020; Salanova et al., 2022). Furthermore, study has studied the effect of psychological capital on new work behavior (Alshebami, 2021; Ullah et al., 2023). Based on these insights, the following research hypothesis is proposed:

H_8: *Psychological Capital mediates the effect of transformational leadership on Innovative Work Behavior.*

Transformational leadership is thought to play a big part in developing a proactive personality, which in turn encourages workers to take the lead, make decisions, and make chances happen (Andri et al., 2019; Murniasih, 2023; Uçar et al., 2019). People who are proactive tend to be goal-oriented and strong when faced with obstacles (Emur et al., 2023; Hao et al., 2019). A proactive personality provides a robust psychological foundation for the development of psychological capital, thereby enhancing employees' courage and motivation to produce innovative ideas and participate actively in organizational change (Lorenz et al., 2022; Peterson et al., 2011). Arcordingly, proactive personality and psychological capital function as a cascading process elucidating the manner in which transformationl leadership impacts innovative work behavior. Transformational leadership and proactive personality are linked (Andri et al., 2019; Murniasih, 2023; Uçar et al., 2019); proactive personality and psychological capital are linked (Emur et al., 2023; Hao et al., 2019); and psychological capital and innovative work behavior are linked (Anggraeni & Rachmawati, 2023; Blasco-Giner et al., 2023; Novitasari et al., 2020). Based on these insights, the following research hypothesis is proposed:

H₉: *Proactive personality and psychological capital play a chain mediating role in the influence of transformational leadership on innovative work behavior.*

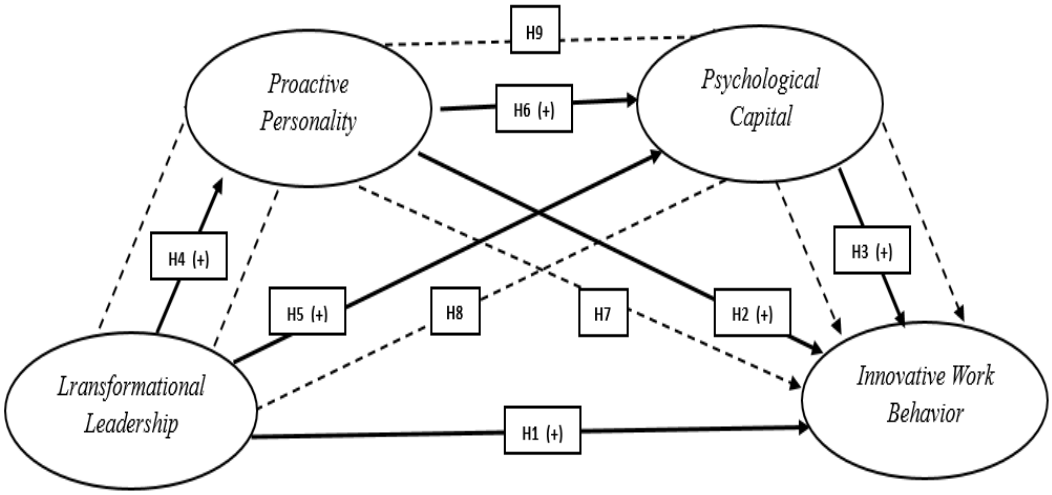

Figure 2 Conceptual model

Research Methods

This study adopts a quantitative method, utilizing numerical data, typically collected through structured inquiries (Sekaran & Bougie, 2018). A causal approach is used in this study to look at how the factors are related. A cross-sectional approach was used to collect data at a single point in time and the path analysis method was used to test the suggested connections (Sekaran & Bougie, 2018).

The population in this study comprises all employees of PT Pos Indonesia in the Special Region of Yogyakarta. The sample in this study represents a subset of the population, namely the entire workforce of PT Pos Indonesia in the Special Region of Yogyakarta. Determination of the sample size refers to Hair et al. (2019) which can be determined based on the complexity of a research model, a research model with 4 latent variables requires a minimum of 100 samples. This reference should not be the sole consideration. The quantity of paths within the model and the overall count of indicators are also essential factors. Hair et al. (2019) For Structural Equation Modeling (SEM), the sample size should be at least five to ten times the number of markers used. This study has 33 factors, so it needs at least 165 responders, which can be found by increasing 33 x 5. The actual sample used was 177 respondents, exceeding the minimum threshold and thus deemed adequate. This surplus is advantageous as it helps mitigate issues related to outliers during data processing. Additionally, the sample size is considered sufficient based on model complexity and statistical power considerations, as it exceeds the minimum requirement of 150 respondents for models involving up to seven latent variables (Hair et al., 2019; Kline, 2016).

The sampling procedure in this study employed a hybrid method combining cluster sampling and quota sampling techniques. Initially, the cluster sampling approach was employed to partition the research area into four clusters based on administrative regions: Yogyakarta City (including Sleman), Bantul Regency, Kulon Progo Regency, and Gunungkidul Regency. Subsequently, a quota sampling approach was implemented by assigning a specific number of respondents to each cluster, as determined by the respective regional offices: Yogyakarta City and Sleman (75 respondents), Bantul Regency (28 respondents), Kulon Progo Regency (24 respondents), and Gunungkidul Regency (50 respondents), totaling 177 respondents. Within each cluster, respondents were selected non-randomly until the assigned quota was met.

The data utilized in this study are primary data obtained through questionnaires administered directly to respondents. The data encompasses employee perceptions about the research factors. The questionnaire was developed based on validated instruments from prior research and contains items designed to measure the following variables.

Table 1 Variables measurement

Variables	Questionnaire
Innovative Work Behavior	IWB1. I pay attention to neighbouring issues that are not part of my daily work.
	IWB2. I often think about how things can improve.
	IWB3. In my work, I look for new working methods, techniques, or instruments.
	IWB4. I come up with tangible solutions to problems that occur in the office.
	IWB5. I found a new way to complete the task.
	IWB6. I often get my colleagues excited about innovative ideas.
	IWB7. I try to convince my colleagues to support innovative ideas.
	IWB8. I introduced innovative ideas to the workplace.
	IWB9. I contribute to the implementation of new ideas in the office.
	IWB10. I strive to develop new things.
Transformational Leadership	TL1. My boss communicates the company's vision clearly.
	TL2. My manager treats staff as individuals, supporting and encouraging their development.
	TL3. My boss provides encouragement and recognition to staff.
	TL4. My boss fosters trust, engagement and co-operation among staff.
	TL5. My boss encouraged us to solve problems in new ways.
	TL6. My supervisor understands the values he conveys and he practices what he preaches.
	TL7. My boss instils pride and respect in others and inspires me to be highly competent.
Proactive Personality	PP1. No matter what the obstacles, if I believe in something, I will make it happen.
	PP2. I love being a champion for my ideas, even against others' opposition.
	PP3. If I believe in an idea, no obstacle will prevent me from making it happen.
	PP4. I am excellent at identifying opportunities.

Table 1 Variables measurement (cont')

Variables	Questionnaire
Psychological Capital	PSCP1. If I find myself in trouble, I can think of many ways to get out of it.
	PSCP2. Right now, I see myself as quite successful.
	PSCP3. I can think of many ways to achieve my current goal.
	PSCP4. I am confident that I can handle unexpected events efficiently.
	PSCP5. I can solve most problems if I have the necessary effort.
	PSCP6. I can stay calm when facing difficulties because I can rely on my ability to overcome problems
	PSCP7. I consider myself capable of persevering, I am not easily discouraged by failure.
	PSCP8. After experiencing serious life difficulties, I tend to bounce back quickly.
	PSCP9. I believe that overcoming stress strengthens me.
	PSCP10. I look forward to life in the future.
	PSCP11. The future holds many good things for me.
	PSCP12. Overall, I hope more good things happen to me than bad.

The measurement items for innovative work behavior were based on the research of Jong and Hartog (2010) and encompass four distinct dimensions: concept exploration, idea development, idea championing, and idea implementation. The indicators associated with transformational leadership were derived from Carless et al. (2000) and encompass seven specific elements: vision, staff development, supportive leadership, empowerment, inventive or lateral thinking, leading by example, and charismatic leadership. The proactive personality questionnaire items were derived from Parker and Sprigg (1999) and consist of four indicators: finding opportunities, demonstrating initiative, taking action, and enduring in the face of hurdles to accomplish transformative results. The psychological capital construct was evaluated using items adapted from Lorenz et al. (2022), encompassing four dimensions: self-efficacy, optimism, hope, and resilience. Each item was assessed using a five-point Likert scale.

The data gathered from the questionnaire was analyzed using the AMOS 24 tool, which includes normality and outlier tests as critical elements of the initial data evaluation process. A Confirmatory Factor Analysis (CFA) was conducted to assess the validity of the measurement model. The assessment of model validity included an analysis of goodness-of-fit indices, convergent validity—comprising factor loadings, Average Variance Extracted (AVE), and Composite Reliability (CR)—and discriminant validity, evaluated using the Heterotrait-Monotrait (HTMT) ratio, in accordance with the guidelines set forth by Hair et al. (2019). Subsequently, path analysis was performed employing the estimands approach as proposed by Collier (2020).

Results and Discussion

Confirmatory Factor Analysis (CFA)

The CFA test was conducted based on predetermined measures constructs, which were categorized into exogenous construct models, endogenous construct models, and full construct models. The CFA was analyzed using a holistic approach as the applied statistical tests are inherently interconnected. The CFA was performed on data that had been screened for normality assumptions and outlier. From the initial dataset of 177 respondents, only 170 cases met the criteria for normality and outlier-free data and were thus eligible for CFA. The CFA results from both exogenous and endogenous constructs that passed the validity tests were then integrated into a full measurement model, with the removal of invalid indicators, specifically IWB1, IWB6, PSCP2, PSCP9, and PSCP12. The resulting final CFA model is illustrated in Figure 3.

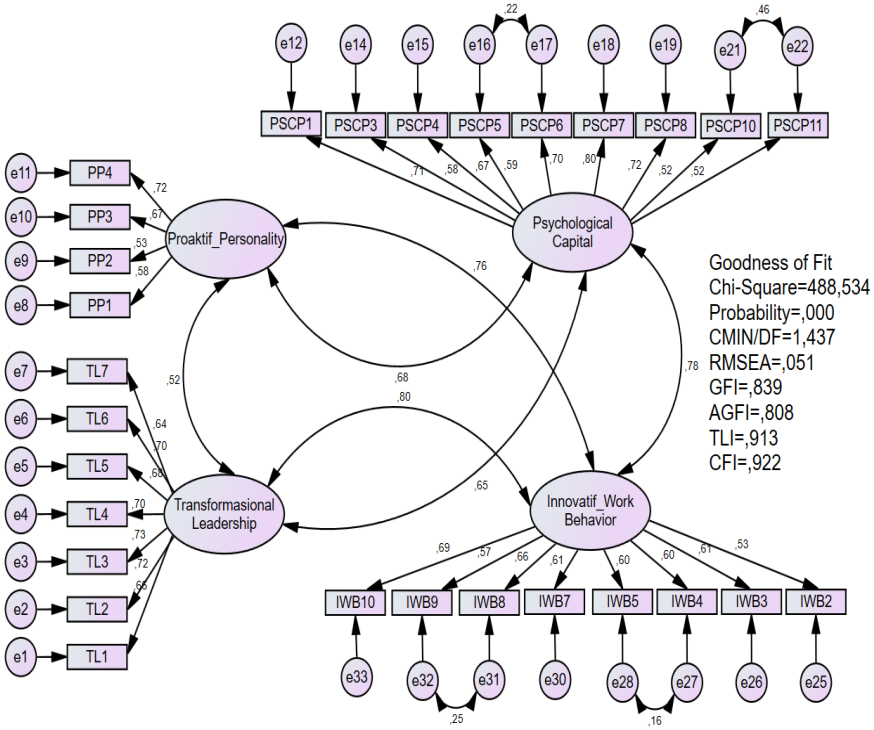

Figure 3 CFA full model

The comprehensive CFA model facilitates the assessment of convergent validity which includes analysis encompassing loading factors, Average Variance Extracted (AVE), and Composite Reliability (CR), as illustrated in Table 2.

Table 2 Result of test convergent validity

Variables	Code	Threshold	Loading Factor	Description	AVE	CR
Innovative Work Behavior (Y)	IWB2	>0.50	0.532	VALID	0.37	0.82
	IWB3		0.613	VALID		
	IWB4		0.599	VALID		
	IWB5		0.602	VALID		
	IWB7		0.613	VALID		
	IWB8		0.66	VALID		
	IWB9		0.571	VALID		
	IWB10		0.689	VALID		
Transformational Leadership (X)	TL1	>0.50	0.657	VALID	0.47	0.86
	TL2		0.724	VALID		
	TL3		0.731	VALID		
	TL4		0.699	VALID		
	TL5		0.677	VALID		
	TL6		0.696	VALID		
	TL7		0.645	VALID		
Proactive Personality (Z1)	PP1	>0.50	0.581	VALID	0.39	0.72
	PP2		0.531	VALID		
	PP3		0.674	VALID		
	PP4		0.715	VALID		
Psychological Capital (Z2)	PSYCP1	>0.50	0.708	VALID	0.42	0.86
	PSYCP3		0.579	VALID		
	PSYCP4		0.669	VALID		
	PSYCP5		0.594	VALID		
	PSYCP6		0.698	VALID		
	PSYCP7		0.803	VALID		
	PSYCP8		0.72	VALID		
	PSYCP10		0.522	VALID		
	PSYCP11		0.522	VALID		
Goodness of fit Chi-square (x2) = 488.534, CMIN/DF = 1.437, RMSEA = 0.051, GFI = 0.839, AGFI = 0.808, TLI = 0.913, CFI = 0.922						

The threshold for evaluating Average Variance Extracted (AVE) in each latent variable, as indicated in Table 2, is typically set at ≥0.50 (Hair et al., 2019). A latent variables is considered to exhibit convergent validity when the AVE value is ≥0.50. However, in Table 2, there is no AVE value that exceeds the threshold set by (Hair et al., 2019). Therefore, a thorough evaluation is needed before drawing conclusions. Hair et al. (2019) emphasized that AVE is not the sole criterion measure when evaluating the feasibility of a construct. A thorough assessment of the measurement model should incorporate multiple indicators, including factor loadings, goodness-of-fit indices, and composite reliability (CR). Despite the sub-threshold AVE value in this study convergent validity may still be deemed acceptable if supported by other measurement criteria. All indicators in Table 2 exhibit factor loadings exceeding 0.50, which indicates a substantial contribution of each indicator to its respective latent variable (Bagozzi & Yi, 2012; Hair et al., 2019).

Moreover, an AVE value below 0.50 remains acceptable in this study model, particularly considering that the resulting model integrates the two previously established models. In

addition, the goodness of fit test results shows a fairly good overall level of fit. The chi-square value obtained is 488.534, which is classified as a marginal fit because it is close to the cut-off value <426.312. The CMIN/DF of 1.437 indicates a good fit fit as it falls below the recommended maximum of 2.00. furthermore the RMSEA of 0.051 is also classified as a good fit because it meets the criteria of ≤0.08. The GFI and AGFI indices, at 0.839 and 0.808 respectively, are deemed a marginal match since they fall within the 0.80-0.90 range. Simultaneously, both TLI and CFI are 0.913, indicating a favorable fit as they above the threshold value of ≥0.90. The goodness of fit test results suggest that the model satisfies the four primary criteria that demonstrate its alignment with empirical data (Hair et al., 2019).

Moreover, convergent validity can be further supported by examining the composite reliability (CR) value. As presented in Table 2 within the reliability testing section, all latent variables exceed the recommended CR threshold of 0.70: Innovative Work Behavior (0.826), Transformational Leadership (0.864), Proactive Personality (0.721), and Psychological Capital (0.867). Hair et al. (2019) stated that a CR value >0.70 indicates strong internal consistency and contributes positively to construct validity. In line with these findings, Huang et al. (2013) argued that in explanatory research, an AVE value bove 0.40 can still be considered acceptable. Furthermore, Fornell and Larcker (1981) emphasized that even if the AVE falls below 0.50 convergent validity may still be adequate provided the CR exceeds 0.60. Based on this evidence, the validity of the measurement model in this study remains defensible when assessed through a comprehensive evaluation of multiple indicators.

In addition to convergent validity, it is necessary to assess discriminant validity, which serves as a critical component in evaluating the construct validity of the measurement model. Discriminant validity he degree to which a construct is truly distinct from other constructs within the model, both conceptually and empirically (Hair et al., 2019). Unlike reliability, which measures internal consistency, discriminant validity ensures that constructs do not overlap excessively. One of the most robust and widely accepted techniques for testing discriminant validity is the Heterotrait-Monotrait Ratio of Correlations (HTMT). The results of the HTMT discriminant validity test are presented in Table 3.

Table 3 Result of test discriminant validity (HTMT)

	Transformational Leadership	Proactive Personality	Psychological Capital	Innovative Work Behavior
Transformational Leadership				
Proactive Personality	0. 523			
Psychological Capital	0. 645	0. 670		
Innovative Work Behavior	0. 787	0. 751	0. 759	

Table 3 presents the HTMT ratios for each construct. The threshold used to assess discriminant validity with HTMT is <0.85 (Kline, 2016). A concept has strong discriminant validity when the HTMT score is less than 0.85. Table 3 indicates that all HTMT values remain below the established threshold. Thus, it can be concluded that all constructs in this study demonstrate strong discriminant validity, indicating that the latent constructs

in this investigation are conceptually and empirically distinct and accurately reflects the intended construct. Given that all prerequisites for conducting path analysis—including reliability, convergent validity, and discriminant validity—have been satisfied, the analysis proceeds to the path analysis stage.

Path Analysis

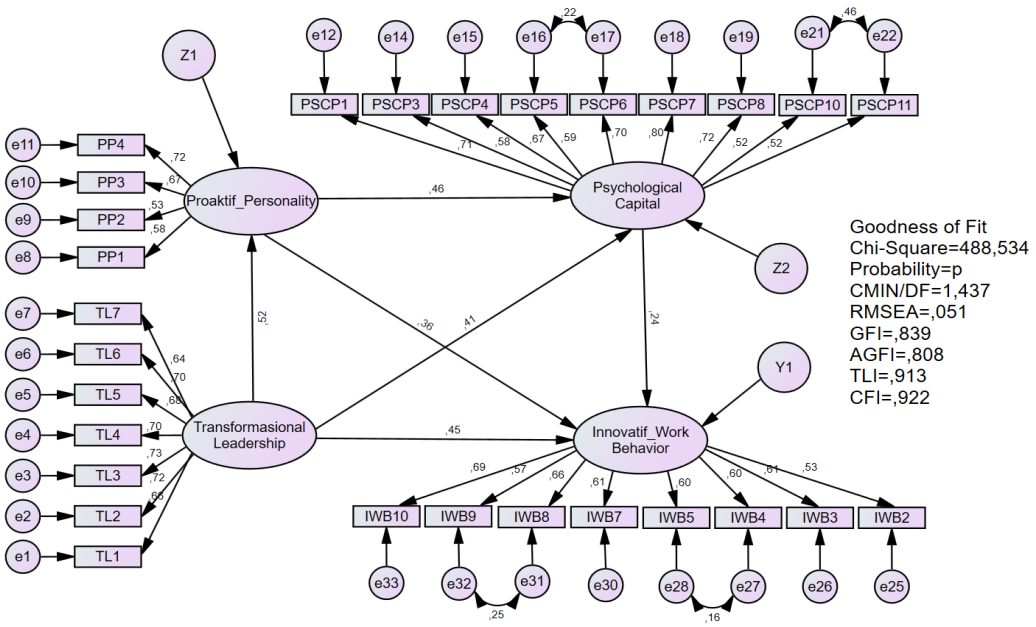

Figure 4 Structural model analysis

Table 4 Result of significant

Parameter	Estimate	P Value	Description
Hypothesis 1 TL -> IWB	0.414	0.001	Significant
Hypothesis 2 PP -> IWB	0.327	0.009	Significant
Hypothesis 3 PSYCP -> IWB	0.212	0.053	Not significant
Hypothesis 4 TL -> PP	0.525	0.001	Significant
Hypothesis 5 TL -> PSCP	0.425	0.001	Significant
Hypothesis 6 PP -> PSYCP	0.474	0.001	Significant
Hypothesis 7 TL -> PP -> IWB	0.172	0.006	Significant
Hypothesis 8 TL -> PSYCP -> IWB	0.09	0.034	Significant
Hypothesis 9 TL -> PP -> PSYCP -> IWB	0.053	0.03	Significant

This section delineates the results of hypothesis testing and interprets their implications in relation to established theory and prior research. The analysis was conducted using AMOS with a significance level of $p < 0.05$, following methodological guidelines suggested by Byrne, (2016); Collier, (2020); Hair, Black, et al., (2019); Kline, (2023); Baron & Kenny, (1986). The study reveral both direct relationships among variables and mediating effects, thereby offering a thorough comprehension of the elements influencing creative behavior in the workplace. Based on the statistical analysis, hypothesis H1, H2, H4, H5, H6, H7, H8, and H9 are approved, however H3 is not supported, as elaborated below:

The first hypothesis (H1) posits that transformational leadership has a positive and significant effect on innovative work behavior. The analysis yielded an estimatevalue of 0.414 and p-value of 0.001. This finding supports the theory described by Podsakoff et al. (1990) and Bass and Avolio (1994), which asserts that that transformational leadership motivates individuals to exceed their expectations by fostering an environment that promotes creativity and innovation. This aligns with the theory of Scott and Bruce (1994) that intellectual stimulus provided by leaders can trigger creativity and try new methods. This outcome aligns with prior studies (Karimi et al., 2023; Mahardika & Syarifah, 2021; Sharifirad, 2013). Empirically, this result underscores the critical role of leadership in facilitating the emergence of innovative ideas within organizations. Thus, transformational leadership is affirmed as a key driver of innovative work behavior.

The second hypothesis (H2) posits that proactive personality has a positive and significant effect on innovative work behavior, with an estimated coefficient of 0.327 and a p-value of 0.009. This finding supports Bateman and Crant's (1993) theory, which argues that proactive individuals not only respond to the environment, but also drive change through personal initiative. Theoretical support is further provided by Scott and Bruce (1994) who highlight that proactive traits enable individuals to explore and implement novel ideas effectively. This results is consistent with previous empirical studies (Mubarak et al., 2021; Oktaria et al., 2021; Putri, 2020; Ullah et al., 2023). Furthermore, Crant (2000) and Kim and Shin (2020) emphasiz that individuals exhibiting proactive characteristics tend to be more adaptive, creative, and solution-oriented when confronting workplace challenges. Consequently, proactive personality is identified as a critical factor fostering the development of sustainable innovation within organizations.

The third hypothesis (H3) posits that psychological capital does not have a significant effect on innovative work behavior as indicated by an estimated coefficient of 0.212 and a p-value of 0.053. While the elements of psychological capital theoretically promote innovative work behavior, this findings of this study diverge from those theoretical expectations by Luthans et al. (2007), as psychological capital focuses on individual development (Luthans et al., 2007), whereas innovative work behavior focuses on organizational outcomes (Scott & Bruce, 1994). However, Luthans et al. (2007) also acknowledge contextual variables, such as leadership, organizational culture, and work environment, which may affect the role of psychological capital on creativity. Supporting this perspectives Rego et al. (2012) and Newman et al. (2014) found that, psychological capital in public organisations characterized by rigid hierarchies and routine administrative functions, psychological capital alone may not suffice to foster innovation. According to (Bakker & Demerouti, 2007) in the JD-R model, psychological capital can enhance innovative work behavior when supported by working conditions that support innovation. Oldham & Cummings (1996) state that innovative behavior flourishes in environments effering challenge, managerial support and autonomy. In public institutions, which tend to be less flexible, high psychological capital does not automatically lead to high innovative work behavior. Ryan and Deci's (2002) self-determination theory posits that innovation is more probable when people possess autonomy, competence, and social connectivity. Therefore, in contexts lacking these

psychological and environmental enablers, the influence of psychological capital on innovation may be constrained.

This result contrasts whit prior research findings that have established a positive relationship between psychological capital and innovative work behavior (Anggraeni & Rachmawati, 2023; Blasco-Giner et al., 2023; Novitasari et al., 2020). However, it is consistent with other studies suggesting that psychological capital does not exert a significant influence on innovative work behavior (Zhu & Wang, 2011). Furthermore, this research is also supported by recent research, namely Karimi et al. (2023) and Pan et al. (2024). Although they do not explicitly state that psychological capital has no impact on innovative work behavior, their studies indicated that hope, optimism, resilience, and self-efficacy do not influence innovative work behavior. Consequently, fostering a supportive work culture, facilitating the exploration of ideas, and promoting leadership that endorses autonomy are essential for psychological capital to effectively enhance creative behavior. The fourth hypothesis (H4) posits that transformational leadership has a positive and significant effect on proactive personality with an estimated coefficient of 0.525 and a p-value of 0.001. This discovery corroborates the theory of Podsakoff et al. (1990) transformational leaders may motivate staff to transcend selfish interests and concentrate on self-improvement. This can be done by providing intellectual stimulus to individuals in generating opportunities, taking initiative, and persisting in facing challenges, which is reinforced by Bateman and Crant (1993) who state that A proactive personality may be cultivated in a supportive work environment. This outcome is consistent with previous studies (Andri et al., 2019; Murniasih, 2023; Uçar et al., 2019). Therefore, this study opens new avenues for research on how proactive personality typically regarded as innate or stable can be influenced by contextual factors such as leadership style.

The fifth hypothesis (H5) posits that transformational leadership has a positive and significant influence on psychological capital with an estimate coefficient of 0.425 and a p-value of 0.001. This finding aligns with the theory of Luthans et al. (2007) which states psychological capital can develop through interactions with leaders who provide support, trust, and positive motivation to employees. Theoretical support is also reinforced by Podsakoff et al. (1990), Bass and Avolio (1994), who argue transformational leadership creates a strong emotional connection, which encourages employees to be more optimistic, resilient, confident, and hopeful in facing challenges (Avey et al., 2011). This outcome aligns with previous studies (Bak et al., 2021; Gashema & Kadhafi, 2020; Lei et al.), which show that transformational leadership style can enhance psychological capital through an empowering approach and build a positive work climate. It not only affects the psychological well-being of workers but also contributes to improve performance.

The sixth hypothesis (H6) posits that proactive personality has a positive and significant effect on psychological capital with an estimate coefficient of 0.525 and a p-value of 0.001. This finding is in line with Bateman and Crant's (1993) theory, which states that proactive individuals tend to manage emotions more effectively and focus on solutions rather than problems, thereby helping to build resilience and optimism. Theoretical support is also reinforced by Luthans et al. (2007) who mentioned that psychological

capital can be influenced by proactive traits as these individuals actively create conditions that support the development of psychological capital. This outcome aligns with previous studies (Emur et al., 2023; Hao et al., 2019; Andri et al. 2019). A proactive personality is directly related to Psychological Capital related to surviving problems. Therefore, fostering or possessing a proactive personality greatly supports employees in maintaining positive thinking referred to as psychological capital which is essential for navigating the complexity of modern work environments.

The seventh hypothesis (H7) posits that transformational leadership affects Innovative Work Behavior indirectly through proactive personality as a mediator with an estimate of 0.172 and a p-value of 0.006. Bass and Riggio's (2006) theory states that transformational leadership can shape individuals through empowerment, motivation, and communication of a clear vision, as well as encouragement of innovative thinking or initiative. Leaders who promote problem solving in new ways create conditions that foster the development of proactive traits, which in turn enhance empoyees' ability to recognise opportunities and generate creative solutions (Bateman & Crant, 1993). This outcome aligns with previous studies (Murniasih, 2023; Ullah et al., 2023; Zuberi & Khattak, 2021). Consequently, Proactive Personality serves as a crucial mechanism linking the influence of Transformational Leadership to the enhancement of innovative behavior in the workplace.

The eighth hypothesis (H8) posits that transformational leadership affects innovative work behavior indirectly through psychological capital as a mediator with an estimate of 0.172 and a p-value 0.006. Theoretically, transformational leadership may cultivate employees' psychological capital, including self-efficacy, hope, resilience, and optimism, by offering a clear vision, emotional support, and intellectual challenge (Bass & Avolio, 1994; Luthans et al., 2007). This outcome aligns with prior studies (Gashema & Kadhafi, 2020; Salanova et al., 2022). Although the direct relationship between psychological capital and Innovative work behavior is not significant the mediation model reveals significant findings. This supports the views of Hayes (2009) and Zhao et al. (2010) that mediation can still occur even if the direct effect is not significant, as long as the indirect path is significant. Therefore, in a rigid work environment such as the public sector, efforts to encourage innovation do not simply rely on individual psychological strength, but require the active role of transformational leaders in creating working conditions that allow psychological capital to develop into innovative behavior.

The ninth hypothesis (H9) posits that proactive personality and psychological capital act as serial mediation in the relationship between transformational leadership and innovative work behavior with an estimate of 0.053 and a p-value 0.03. Theoretically, transformational leadership facilitates the development of proactive personality through intellectual stimulus, emotional support, and the delivery of clear vision delivery (Andri et al., 2019; Carless et al., 2000; Murniasih, 2023), enabling employees to be more sensitive to opportunities, take initiative, and remain resilient in the face of challenges (Bateman & Crant, 1993). This proactive nature becomes the foundation for building psychological capital, as emphasised by Hao et al. (2019), This combination ultimately enhances employees' confidence and optimism in dealing with challenges (Luthans et al., 2007;

Alshebami, 2021; W. Xu & Zhao, 2020). Thereby encouraging the emergence of workplace innovation or innovative work behavior (Anggraeni & Rachmawati, 2023; Blasco-Giner et al., 2023). Thus, these findings suggest that the integration of proactive personality and strong psychological capital increases the likelihood of employees taking risks and generating innovative solutions.

Conclusion

This research emphasizes the significant influence of transformational leadership in fostering innovative work behavior through the pathways of psychological capital and proactive personality pathways. The results show that innovation is determined not only by individual abilities, but also by leadership dynamics that shape employees' proactive character and mental readiness of employees. These findings confirm that proactive personality and psychological capital are not merely static individual traits but can be developed through an empowering leadership approach. The interaction of the two factors serves as a crucial mechanism that connects the leader's vision with creative activities at the operational level.

Practically, organizations need to create a work ecosystem that emphasizes not only targets but also room for psychological growth among employees. Transformational leadership that encourages initiative, confidence, and optimism has proven to be key to the success of sustainable innovation. HR and innovation management units should collaborate to integrate innovation into employee management strategy, for example by including indicators of innovative behavior in performance appraisal and promotion systems, and encouraging cross-functional collaboration to seed new ideas more broadly. Given that PT Pos Indonesia is a public organization with a relatively rigid structure, work flexibility, granting autonomy in decision-making, and reducing unnecessary bureaucracy should be considered. Innovation will be difficult to grow if the organizational structure does not support the implementation of new ideas.

The study is limited by a relatively low Average Variance Extracted (AVE) value and the rejection of hypothesis H3. In the future, it will be beneficial to increase the sample size, particularly within the public sector, to address the relatively low AVE value. in addition, expanding the sample coverage to the private sector or more flexible organizations can provide a richer comparative understanding so that it becomes a comparison of hypotheses tested in the public sector and in the private sector. To addressthe rejected hypothesis in the public sector, moderation tests involving transformational leadership and proactive personality are needed to identify variables that may explain why psychological capital does not affect innovative work behavior.

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