

Exploring the relationship between Transformational Leadership and Innovative Behavior: Testing the Moderated Mediation Effect of Psychological Safety

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변혁적 리더십이 혁신행위에 미치는 영향에 관한 연구: 자기효능감의 매개효과와 심리적 안정성의 조절된 매개효과

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Abstract The style of leadership and leader's competence are expected to be an important role in the rapidly changing and uncertain circumstances of the business environment. In particular, rapid change of business environment requires organizations to innovate, and appropriate innovation can have a direct impact on an organization's competitive advantage and sustainability. In this regard, this study focused on transformational leadership as a factor that improves innovative behavior. In addition, the mediating effect of self-efficacy was verified in the process of transformational leadership leading to innovative behavior. Furthermore, the moderated mediating effect of psychological safety was also verified. To verify hypotheses, this study conducted a survey on 307 public officials who work in Chinese public institutions. The result was found that transformational leadership had a positive effect on innovative behavior by mediating effect of self-efficacy. However, contrary to the expectations of this study, the moderated mediation effect of psychological safety was found to be insignificant. The moderating effect of psychological safety showed an insignificant effect. It showed showed the different results from previous studies. In relation to these results, theoretical and practical implications were presented in this study. Overall, this study presented a plan to increase innovative behavior and verified the research model. In addition, the directions of future research for innovative behavior were presented.

Key Words : Transformational leadership, Self-efficacy, Psychological safety, Innovative behavior, Moderated mediation model

요약 리더십 유형과 리더가 지닌 역량은 경영환경의 급속한 변화와 불확실한 상황에서 중요한 역할을 한다. 특히 급속한 변화로 인해 조직 혁신의 중요성이 날로 강조되고 있는 실정이며 적절한 혁신은 조직의 경쟁우위와 지속가능성에 직접적인 영향을 미칠 수 있다. 이와 관련하여 본 연구는 구성원의 혁신행동을 향상시킬 수 있는 요소로 변혁적 리더십에 초점을 맞추었다. 또한 변혁적 리더십이 혁신행동을 이끌어 내는 과정에서 자기효능감의 매개효과를 검증하였다. 더 나아가 심리적 안정성의 조절된 매개효과를 검증하였다. 이를 검증하기 위해 본 연구는 중국 공공기관에 종사하는 공무원 307명을 대상으로 설문을 진행하였으며 수집된 데이터를 실증분석에 활용하였다. 연구 결과에서 변혁적 리더십은 공무원들의 자기효능감을 매개로 혁신행동에 긍정적인 영향을 미치는 것으로 나타났다. 그러나 본 연구의 예상과 다르게 심리적 안정성의 조절된 매개효과는 유의하지 않은 것으로 나타났다. 심리적 안정성의 유의하지 않은 조절효과는 선행연구와의 다른 결과를 보여주었다. 이러한 결과를 통해 본 연구에서 이론적 시사점과 실무적 시사점을 제시하였다. 총체적으로 본 연구는 혁신행위를 증가시키는 방안을 제시하고 이에 관련된 연구모형을 검증하였으며 혁신행위에 대한 향후 연구 방향을 제시하는데 연구의 의의와 목적을 두었다.

키워드 : 변혁적 리더십, 자기효능감, 혁신행위, 심리적 안정성, 조절된 매개모형

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1. Introduction

Organizational innovation is an element necessary for organizations to secure competitiveness and improve sustainability. Organizations demand innovative behavior and make effort to provide opportunities to generate creativity. In addition, in a rapidly changing environment and an uncertain future, they require leadership to shift paradigms [1]. In such environments, organizations not only focus on strategic aspects to ensure competitive advantage, but also require leaders to play a key role. Innovation is especially necessary in a competitive environment. Organizational innovation is most likely to be improved by organizational members' innovative behavior. In addition, the rapid business environment may affect business units, and existing traditional business formats will also have limitations. In this regard, public institutions also need to innovate. In most government organizations, the research on the relationship between leadership and members' innovative behaviors focuses on transformational leadership, while a situation in which organizational change is urgently needed is inflexible, and the promotion of innovative behaviors should be emphasized [2]. In addition, it is not only necessary to master the level of innovative behavior, but also to improve it [3].

Innovative behavior refers to the business behavior of organizational members seeking to fundamentally change task performance methods and procedures by introducing new and beneficial ideas to improve task performance results. Implementing these changes may help improve the performance of their own tasks or groups or organizations [4].

In accordance with the rapidly changing business environment, public institutions need to change and innovate. In particular, the importance of transformational leadership and innovative behavior for public institutions is being emphasized for public officials engaged in public institutions [5]. Therefore, transformational leadership is expected

to be a key element to improve innovative behavior.

Transformational leadership influences organizational members to adapt to a rapidly changing environment and can play a role in fostering members' growth and innovative behavior [6]. In fact, innovative behavior can be seen as an important factor in improving organizational efficiency and performance. The reason is that low levels of innovative behavior do not improve individual needs and can negatively impact organizational performance [7,8].

Therefore, the higher level of transformative leadership of public institutions is expected to lead possibility of success and development of the organization. Recently, public institutions are seeking various ways to promote public officials' innovative thinking and behavior. The public institutions are also trying to find various methods that can be applied to public institutions.

Based on the research background presented above, this study aims to reveal the causal relationship between transformational leadership and innovative behavior in public institutions. Most of the previous studies on the impact of transformational leadership on innovative behavior have focused on the IT industry, small and medium-sized enterprises, and private companies. In addition, there are insufficient empirical studies on the effect of transformational leadership on innovative behavior targeting public officials who work in Chinese public institutions. Therefore, this study aimed to identify the importance and role of transformational leadership in Chinese public institutions and verified its impact on public officials' innovative behavior. In addition, as a limitation that exists in previous studies, which only test mediating effect or moderating effect. It is considered to be limitations of research on innovative behavior. Therefore, this study aims to overcome these limitations and present a moderated mediating model and contribute to expanding the research field on innovative behavior. These contents is a necessity and value of this study.

Therefore, the purpose of this study is to emphasize the importance of organizational members' innovative behavior and seek the way to enhance the level of innovative behavior.

This study focuses on transformational leadership as a factor that induces innovative behaviors. Therefore, this study elucidates on the role of transformational leadership and explores the path to induce innovative behaviors. In this regard, identify the mediating role of self-efficacy. In addition, by examining the moderating role of psychological safety on the relationship between self-efficacy and innovative behavior, this study aims to reveal the pathways that lead to innovative behavior. Furthermore, we provide a moderated mediation model related to increasing the level of innovative behavior. In order to test the model, an empirical study was conducted on the public officials in Chinese public institutions. Overall, this study clearly identifies the impact of transformational leadership in Chinese organizations and highlights its importance through its impact on performance. Furthermore, based on the results of the empirical analysis, we will discuss ways to enhance innovative behavior while presenting practical implications.

2. Theoretical Background

2.1 Transformational leadership

Transformational leadership is a kind of leadership that puts forward a long-term vision, stimulates the high-level needs of members to achieve their goals, creates an atmosphere of trust in the relationship between superiors and members, and promotes the organization to achieve higher-than-expected results [9]. A leadership that encourages the enthusiasm and vision of its members. In addition, this type of leadership works by encouraging superiors and members work together to promote the process and morale of motivation [10]. In the organization, transformational leadership improves the cognitive level of members, makes them better aware of the

importance and value of target results, and urges members to transcend their personal interests and live out their desires to ensure that higher-level requirements are met. This is known as the process of sanctification [11].

In the previous research on transactional leadership, in the research on transformative leadership and transactional leadership of organizational members who have been established for more than 5 years, it is also confirmed that transformational leadership has a significant (+) influence on innovative behavior [12]. In addition, the transformational leadership takes local industrial enterprises as the object, and it has been confirmed that when transformational leadership of the directors of local industrial enterprises are recognized by the members, it leads to a positive impact on the innovative behavior of organizational members [13]. A country wide survey of workers found that the subordinate factors of transformational leadership-charisma, individualized consideration, intellectual stimulation, inspirational motivation-all have a positive impact on innovation behavior [6]. Therefore, in considered to be the current study, transformational leadership is defined as a positive variable.

2.2 Self-efficacy

The concept of self-efficacy, it is a belief in the ability to organize and implement behavioral guidelines necessary for managing future situations [14]. According to Bandura (1986), through 'Social Foundation of Thought and Action', each individual has a self system that allows him to control his or her thoughts, emotions, and actions, and this It was said to have a cognitive and emotional structure[15]. In other words, the ego system accepts, regulates, and evaluates behavior through interaction with the external environment, changes the given environment, and influences behavior.

Self-efficacy refers to the specific expectations that people hold about their ability to complete specific tasks [16]. Self-efficacy is based on a belief.

People make decisions about how they feel, think, motivate, and act about themselves, and when these decisions are strong, they affect every aspect of life, including in many ways a person's sense of accomplishment and personal behavior [17].

Self-efficacy was perceived by the members on the relationship between transformational leadership, self-efficacy, and innovative task behavior in Chinese companies for members within the organization. It was confirmed to have an effect [18]. For airline cabin crew, it was verified that the leader's transformational leadership had a positive (+) effect on self-efficacy [19]. In addition, self-efficacy was identified as a result of examining the mediating effect of self-efficacy in the relationship between transformational leadership and job performance by examining the influence relationship between the transformational leadership of the boss who perceived it for family restaurant employees, and charisma and intellectual stimulation, confirmed that self-efficacy plays a significant mediating role in motivational factors [20]. Based on these theories, the self-efficacy is a concept that individual's ability to achieve goals and has confidence to perform task. All areas that affect the efforts that members devote to the organization, self-efficacy is generally regarded as a variable directly related to the individual and organizational performance.

2.3 Psychological safety

One definition of psychological safety offered by refers to the degree to which members are not concerned about the negative effects of their image, position, and work in the organization [21]. Yet another definition of psychological safety refers to the personal subjective feeling that members of an organization can present themselves without the fear of negative consequences for their own image, their status, or their careers [22,23]. In another definition of psychological safety, it refers to the state of being able to speak freely without any restrictions, even if

there may be antipathy or negative consequences [24]. In all of these definitions, it can be understood that psychological safety allows members to freely express their own thoughts, opinions and suggestions. Then, we can define psychological safety as a sense of being able to express oneself and be faithful to oneself without fear that negative consequences could result on one's image, status, or career [21].

As for psychological safety, it was found that employee happiness at work positively modulates psychological safety as job performance based on survey data of 302 employees in the company [25]. Based on the questionnaire data collected from employees working in domestic manufacturing and service companies, it is expected that the indirect effect of supportive leadership leading to creative performance through risk-taking behavior will vary depending on the level of psychological safety, and the moderated mediating effect verified [26]. Through a survey of members in companies (institutions) related to construction, fashion, and education, it was found that there was a positive (+) correlation between the leader's humor use and creativity, and the psychological safety of the members [27].

2.4 Innovative Behavior

Innovation is a series of activities to introduce, apply, and spread new and useful ideas to improve individual and organizational performance [28].

According to Johnson & Bate (2013), innovative behavior refers to actions that can maximize the innovation potential of members within an organization for the development and implementation of new ideas through creativity [29]. Another definition of innovative behavior offered by Park, Hwan & Song (2011) can be viewed as a business behavior in which members of an organization try to improve the results of their tasks. This is done introducing new and useful ideas to contribute to improving the performance of their own tasks or groups or organ-

izations to radically change task performance methods and procedures [4]. Janssen (2000) offers yet another definition of innovative behavior, which is defined as intentional creation for the benefit of performing the role of an organization or group, and the introduction and application of new ideas within a job role or group or organization [30].

The relationship between transformational leadership and the innovation behavior of organizational members was found to have a positive relationship with those engaged in automobile companies [31]. The effect of transformational leadership on innovative behavior was positive (+) on the members of ICT companies in Seoul and the metropolitan area [32]. Transformational leadership uses rapid charisma, individualized consideration, and intellectual stimulation to motivate members to pursue change and present a vision in an organization. These three sub-dimensions of transformational leadership are currently being researched. The SMEs were found in Busan and Gyeongsangnam-do and it was verified that all members of 15 SMEs had a significant positive effect on innovation behavior [33].

Thus, innovative behavior as activities in which organizational members create, introduce, and apply new ideas that contribute to the improvement of individual business, collective and organizational outcomes.

3. Research Model and Hypotheses

3.1 Transformational leadership and Self-efficacy

Transformational leadership views organizational members to be able to self-manage and develop themselves, and thus increase self-efficacy [34]. This style of leadership motivates members to abandon inflexible ways of doing their work, and motivates members to take on challenges and improve their personal development, which develops the best sense of self-efficacy. This allows the members to perform their duties in the organization with

confidence by themselves [35].

The sense of self-efficacy is interpreted as the sense of self-efficacy of organization members will affect their thinking and feelings, determine how they treat themselves and motivate themselves, and have a positive impact on the sense of self-efficacy of organization members [36]. Transformational leadership reveals the psychological process of influencing organizational members and achieving results, and believes that transformational leadership of superiors has a positive impact on members' self-efficacy [33,37]. Therefore, we suggest that transformational leadership can have a positive effect on self-efficacy.

Hypothesis 1. Transformational leadership will positively influence Self-efficacy.

3.2 Transformational leadership and Innovative Behavior

Transformational leadership strengthens the psychological capital of members and has a positive effect on innovation behavior [38]. The relationship between transformational leadership and the innovation behavior of organizational members was found to have a positive relationship with those engaged in automobile companies [31]. In another study, the effect of transformational leadership on innovative behavior was positive (+) on the members of ICT companies in Seoul and the metropolitan area [32]. A study by Jeong, Jung & Ryu (2015) looked at charisma, individualized consideration, and intellectual stimulation, which are sub-dimensions of transformational leadership [33]. They found that organizations motivated members by pursuing change and presenting a vision in an organization by adapting rapidly to the three sub-dimensions of the leadership. It was confirmed that all members of 15 SMEs had a significant positive (+) effect on innovation behavior [35].

Not only does transformational leadership have a positive effect on innovative behavior, but the leadership also creates a cooperative work atmosphere

by enabling members to better understand the importance of work and to satisfy the practical needs of different employees, allowing leader to use their imaginations. This leadership style further influences the innovation behavior of members [39]. In addition, transformational leadership influences employees, who may already have the qualities of a leader, to actively learn good characteristics, and the employee's individual passive emotions may help identify problems and help employees produce innovative behaviors [40]. Therefore, this study emphasizes that transformational leadership can have a positive effect on the innovation behavior of members.

Hypothesis 2. Transformational leadership will positively influence Innovative Behavior.

3.3 Self-efficacy and Innovative Behavior

People with a sense of self-efficacy have a tendency to take control of their own lives and to perform more challenging and innovative tasks [41]. In performing challenging and innovative tasks the probability of failure is higher than the probability of success. Thus the possibility of success of the result is considered first before innovation behavior. In this process, self-efficacy plays an important role [42]. Members with higher self-efficacy feel that they have more authority over their work and that they have sufficient ability to succeed in innovative behavior [43]. Therefore, self-efficacy can have a positive effect on innovation behavior.

Hypothesis 3. Self-efficacy will positively influence Innovative Behavior.

3.4 The Mediating Effect of Self-efficacy

Transformational leadership encourages members to take on more challenges and responsibilities, and by stimulating and appealing to high level needs, the leadership can motivate members and enhance members' innovative behavior [44]. Thus

by providing a high level need, such as giving a vision for the future, transformational leadership dispels members' fear of carrying out innovative tasks, and convince them that they can accomplish it, which will help to cultivate their own sense of self-efficacy and improve innovative behavior. [45].

In addition to actively improving members' self-efficacy in influencing the mental processes of member performance, transformational leadership can also promote members' innovative behavior by introducing new and useful ideas [34]. This type of leadership enhances members' self-confidence in the face of environmental threats or new situations, enabling members to demonstrate self-efficacy, place higher demands on themselves, and fully grasp and utilize information [46]. In other words, by processing the messages of transformational leadership, as a transformational leader, the individual can make rational judgments and take more actions that are better for the organization. Therefore, this study argues that self-efficacy has a mediating role between transformational leadership and innovative behavior.

Hypothesis 4. Self-efficacy will positively mediate the relationship between Transformational leadership and innovative behavior.

3.5 The Moderated Mediation Effects of Psychological Stability

When employees have psychological stability with their superiors, they feel that their superiors are more unreliable and the help they give can be negatively protected resulting in a high sense of self-efficacy [47]. Psychological stability makes members trust the organization more, does not avoid work-related issues, and forms an atmosphere of self-belief, so members are more likely to take positive actions and improve organizational performance [48].

To build psychological stability of organizational members, it is possible to increase the sense of

self-efficacy between employees and their superiors. Doing this improves employees' attitudes toward work, improves employees' self-efficacy, promotes innovative actions to increase the organization's ability to respond to risks [49]. Therefore, this study suggests that transformational leadership has positive effects on self-efficacy and psychological stability, positive effects on self-efficacy and innovation behaviors, and positive effects on psychological stability and innovation behaviors. Therefore, as organizational members increase their self-efficacy, they believe they are more psychologically stable toward their boss. And as organizational members increase psychological stability, they form trust in their superiors, and the psychological stability of organizational members positively influences the relationship between self-efficacy and innovation behavior. Psychological stability can play a mediating role between self-efficacy and innovative behavior. This study model is as follows Fig. 1.

Hypothesis 5. The mediating influence of self-efficacy on the relationship between transformational leadership and innovative behavior will be moderated by psychological safety.

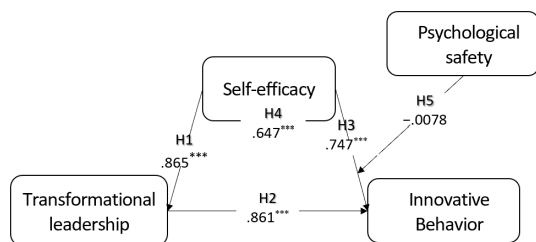


Fig. 1. Research model

3.6 Respondents and Procedures

The survey was conducted among 307 employees of institutions in Shandong Province in the north and Jiangxi Province in the south, China. The results of demographic analysis are summarized as follows. The total number of distributed samples was 307,

which was used for empirical analysis. Regarding the demographic characteristics of this study, there were 249 (77.8%) males and 71 (22.2%) females. Regarding age, 234 (73.1%) people were 20 to 29 years old, 33 (10.3%) people were 30 to 39 years old, 26 (8.1%) people were 40 to 49 years old, and 27 (8.4%) people were 50 or over. Regarding education, 226 (70.6%) were graduates of junior college, 67 (20.9%) people held a bachelor's degree, 19 (5.9%) people held a master's degree, and 8 (2.5%) people held a doctoral degree or higher. Regarding Service Year, 166 (51.9%) people had worked for a year or less, 58 (18.1%) had worked for 1 to 3 years, 19 (5.9%) had worked for 3 to 5 years, 13 (4.1%) had worked for 5 to 7 years, and 64 (20%) had worked for 7 year or more. Regarding position, 96 (30%) were general staff, 16 (5%) were team leaders, 11 (3.4%) were Section Chief, 6 (1.9%) were Division Chief, 2(0.6%) were Directors, 9(2.8%) were Governor, and 180(56.3%) other kinds of people or over.

3.7 Measurement

In this study, transformational leadership as an independent variable is to institutionalize change and manage the process by creating an environment in which the leader can set the direction of the organization and immerse the members of the organization in order to accomplish this goal [50]. In this study, a total of 20 measurement items used in the study of Avolio & Bass (1995) were used to measure transformational leadership. The questions include information about the boss's information and interpersonal process. Sample items included "My supervisor provides feedback on decisions and actions" and "My supervisor cares about the rights of members of my organization[51]."

As a moderating variable, psychological Safety is defined as members freely expressing their thoughts and ideas in the process of performing work and freely exchanging information and opinions without fear of criticism or punishment [22]. In this study, a

total of five measurement items used in the study of Liang, Farh & Farh (2012) were used to measure psychological stability[52]. The items include procedures on consistency, non-bias, accuracy, participation, correctability, and morality. Sample items included “I am honest when doing public work, not for personal gain” and “You can sacrifice individual interests for the sake of the organization.”

Self-efficacy as an mediating variable refers to an individual’s belief that he or she has the ability to successfully perform the behaviors required for a specific job [53]. To measure self-efficacy, a total of 8 measurement items used in the study of Jones (1986) were used. The items included information about employees’ trust and loyalty to their superiors[54]. Sample items included “My new job is entirely within my scope.” and “I think I am asking too much about what I have to do.”

Innovative behavior as a dependent variable is defined as an open will to implement and succeed in new and novel ideas from an organizational point of view [55]. In order to measure the innovation behavior, a total of 6 measurement items used in the study of Scott & Bruce (1994) [56] were used for measurement. The items included information about employees’ trust and loyalty to their superiors. Sample items included “I look for new technology, process, technology and/or product ideas.” and “I have the spirit of innovation.”

All items were measured with a 7-point Likert scale(ranging from 1=strongly Disagree to 7=strongly agree).

3.8 Statistical Analysis

The order of the statistical analysis in this study is as follows. First, a demographic analysis was performed. Second, a confirmatory factor analysis (CFA) was conducted. Third, a reliability analysis was conducted to check the reliability of the measurement tool. Fourth, descriptive statistics and correlations between variables were analyzed. Finally, hypothesis testing was conducted. To perform dem-

ographic, reliability, descriptive statistics, correlation, and regression analyses of the moderation effects, the statistical software SPSS ver. 26.0 was used. In addition, CFA and path analyses were performed using AMOS ver. 23.0. Finally, the moderated mediation model was examined using SPSS PROCESS Macro 3.4.1 Model 14.

4. Results

4.1 Confirmatory Factor Analysis and Reliability Analysis

Through confirmatory factor analysis, the applicability of data and different models can be confirmed [57]. CFA was performed using structural equation modeling with AMOS 22.0.

The CFA of Model (four-factor model) showed that the scale was a good fit and construct validity. Next, we conducted convergent validity, and the results were as follows: Standardized regression weights of independent variable transformational leadership ranged from 0.713 to 0.940, mediating variable self-efficacy ranged from 0.730 to 0.927, moderating variable psychological safety ranged from 0.879 to 0.948, and dependent variable innovative behavior ranged from 0.890 to 0.951. This study analyzed the values of average variance extracted (AVE) and composite reliability (C.R). Regarding average variance extracted (AVE), independent variable transformational leadership was .511, mediating variable self-efficacy was .788, moderating variable psychological safety was .722, and dependent variable innovative Behavior was .792; these values were all greater than 0.5. For composite reliability (C.R), independent variable transformational leadership was .971, mediating variable self-efficacy was .947, moderating variable psychological safety was .946, and dependent variable innovative behavior was .964; all of these values were greater than 0.7. The measurement has significant validity if the AVE of variables is higher than 0.5 and CR is higher than 0.7.

Furthermore, we examined three types of model fit indices: the absolute fit index, the incremental fit index, and the parsimonious adjusted index. First, the absolute fit index was $\chi^2(p)=2118.726(.000)$, $\chi^2/df=3.374$, and $GFI=.743$, $RMR=.591$, $RMSEA=.088$. The range of absolute fit index is 0.5-0.9, which is considered to be significant, indicating the convergence validity[58, 59]. Second, the incremental fit index was $IFI=.931$, $NFI=.905$, $TLI=.922$, and $CFI=.931$. The range of incremental fit index is close

to 0.9 to obtain the acceptable range between the hypothetical model and the observed data[60]. Third, the parsimonious adjusted index was $PNFI=.808$, $AGFI=.696$, $AIC=2344.726$, and $PGFI=.808$. The range of the parsimonious adjusted index > 0.5 or 0.6 , which is considered to be acceptable[61].

Reliability analysis refers to the consistency or stability of the results obtained by the questionnaire, which reflects the true degree of the test-

Table 1. The result of confirmatory factor analysis

Variables		Estimate	S.E.	C.R.	ρ	Standardized Regression Weights	AVE	C.R	Cronbach's alpha
Transformational leadership (TL)	TL20	1				0.908	.511	.971	.988
	TL19	1.01	0.030	33.718		0.917			
	TL18	1.056	0.030	34.729		0.940			
	TL17	1.055	0.033	32.041		0.921			
	TL16	1.066	0.034	31.768		0.920			
	TL15	1.033	0.034	30.384		0.920			
	TL14	1.097	0.041	26.930		0.878			
	TL13	1.015	0.036	28.389		0.891			
	TL12	0.934	0.037	24.928	***	0.854			
	TL11	0.953	0.036	26.125	***	0.868			
	TL10	0.920	0.036	25.432	***	0.862			
	TL9	0.930	0.045	20.517	***	0.791			
	TLR8	0.923	0.044	20.917	***	0.813			
	TL7	0.922	0.045	20.616	***	0.792			
	TL6	0.952	0.046	20.739	***	0.794			
	TL5	0.983	0.043	22.866	***	0.827			
TL4	0.974	0.058	16.705	***	0.713				
TL3	0.920	0.050	18.470	***	0.751				
TL2	0.976	0.052	18.887	***	0.760				
TL1	0.949	0.057	16.793	***	0.715				
Self-efficacy (SE)	SE1	1			***	0.894	.788	.947	.974
	SE2	1.013	0.034	29.986	***	0.905			
	SE3	0.955	0.055	17.381	***	0.730			
	SE4	1.014	0.038	26.845	***	0.877			
	SE5	1.013	0.046	21.924	***	0.833			
	SE6	0.989	0.031	31.403	***	0.917			
	SE7	1.020	0.031	32.955	***	0.927			
	SE8	1.021	0.036	28.037	***	0.888			
Psychological safety (PS)	PS1	1				0.923	.722	.946	.962
	PS2	1.051	0.030	34.700	***	0.935			
	PS3	1.089	0.029	37.126	***	0.948			
	PS4	1.018	0.037	27.414	***	0.879			
Innovative Behavior (IB)	IB1	1				0.912	.792	.964	.983
	IB2	0.994	0.024	41.985	***	0.925			
	IB3	1.082	0.029	36.830	***	0.951			
	IB4	1.087	0.032	33.746	***	0.933			
	IB5	1.066	0.033	32.545		0.925			
	IB6	1.036	0.037	28.149		0.890			
Model Fit Index		$\chi^2(p)=2118.726(.000)$, $\chi^2/df=3.374$, $GFI=.743$, $RMR=.591$, $RMSEA=.088$, $IFI=.931$, $CFI=.931$, $TLI=.922$, $NFI=.905$, $AGFI=.696$, $AIC=2344.726$, $PGFI=.629$, $PNFI=.808$							

ed characteristics, while validity means that the measuring tools can measure the accuracy of the aspects to be measured [62]. Therefore, this study also analyzes the Cronbach's α value. Regarding Cronbach's α , independent variable transformational leadership=.988, mediating variable self-efficacy=.974, moderating variable psychological safety=.962, dependent variable innovative behavior=.983; the reliability analysis has significant validity if the Cronbach's α of variables is higher than 0.7.

4.2 Descriptive Statistics and Correlation Analysis

Table 2 shows the descriptive statistics and correlation analysis. Descriptive statistics analysis included the mean and standard deviation(SD). The means for independent variable transformational leadership, mediating variable self-efficacy, moderating variable psychological safety, and dependent variable innovative behavior were 5.703, 5.640, 5.614, and 5.593, respectively. In addition, the SDs of independent variable transformational leadership, mediating variable self-efficacy, moderating variable psychological safety, and dependent variable innovative behavior were 1.272, 1.259, 1.320, and 1.309, respectively. To verify the correlation between variables, we conducted a correlation anal-

ysis, and the results are summarized as follows: transformational leadership was positively associated with self-efficacy($r=.874$, $p<0.001$), psychological safety($r=.850$, $p<0.001$), negative associated with innovative behavior($r=-.830$, $p<0.001$). Self-efficacy was positively associated with psychological safety($r=.908$, $p<0.001$), innovative behavior($r=.894$, $p<0.001$). psychological safety negative associated with innovative behavior($r=-.899$, $p<0.001$).

4.3 Hypothesis Test

Table 3 shows the amos analysis result. This study established a total of six hypotheses in this research. First, this study verified the effect of transformational leadership on self-efficacy. Second, this study verified the effect of transformational leadership on innovative behavior. Third, this study verified the effect of self-efficacy on members' innovative behavior. Fourth, this study tested the mediating effect of self-efficacy on the relationship between transformational leadership and innovative behavior. A path analysis was performed using the AMOS 23.0 program to verify these four hypotheses.

Hypothesis 1 established that transformational leadership positively influenced self-efficacy. Transformational leadership had a significant positive influence on self-efficacy (estimate=.865,

Table 2. The result of descriptive statistics and correlation analysis

	mean	S.D	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	.785	.411	-													
2	1.514	.961	-.149***	-												
3	1.397	.722	-.283***	.251***	-											
4	2.185	1.578	-.185***	.747***	.420***	-										
5	.299	.458	-.108	.042	.103	.027	-									
6	.042	.201	.031	.073	.064	.201***	-.138**	-								
7	.032	.177	.007	.227***	.128**	.211***	-.120**	-.039	-							
8	.019	.138	-.041	.022	.281***	.133**	-.092	-.030	-.026	-						
9	.006	.080	.042	.210***	.236***	.145**	-.053	-.017	-.015	-.011	-					
10	.029	.168	-.003	-.033	.360***	.127**	-.114**	-.037	-.032	-.025	-.014	-				
11	5.703	1.272	-.025	-.017	-.117**	-.058	-.041	.003**	.013*	.040*	-.062	-.153***	-			
12	5.640	1.259	-.067	-.034	-.155***	-.046*	-.079	-.004	.054	.045*	-.142**	-.183***	.874***	-		
13	5.614	1.320	-.074	-.092	-.185***	-.097	0.091	.018	.021*	.058	-.161***	-.170***	.850***	.908***	-	
14	5.593	1.309	-.030	-.073	-.161***	-.085	-.081	-.010	-.053	.062	-.150***	-.171***	.830***	.894***	.899***	-

1=Gender dummy, 2=Age, 3=Academic Qualifications, 4=Duty term, 5=Position dummy1, 6=Position dummy2, 7=Position dummy3, 8=Position dummy4, 9=Position dummy5, 10=Position dummy6,11=Transformational leadership, 12=Self-efficacy,13=Psychological safety,14=Innovative Behavior

*** $p<.001$, ** $p<.01$, * $p<.05$

Table 3. The result of mediation

Path			Estimate	S.E.	<i>t</i>	<i>p</i>	LLCI	ULCI
Transformational leadership	→	Self-efficacy	.865	.027	31.451	.000	.8113	.9196
Transformational leadership	→	Innovative Behavior	.861	.033	25.995	.000	.7962	.9266
Self-efficacy	→	Innovative Behavior	.747	.054	13.818	.000	.6414	.8544
Total effect of X on Y								
Transformational leadership → Self-efficacy → Innovative Behavior			.861	.033	25.995	.000	.7962	.9266
Direct effect of X on Y								
Transformational leadership → Innovative Behavior			.214	.053	3.995	.000	.1086	.3195
Indirect effect(s) of X on Y								
			Effect	Boot SE	Boot LLCI	Boot ULCI		
Transformational leadership → Self-efficacy → Innovative Behavior			.647	.777	.490	.796		

$p < .001$). Therefore, Hypothesis 1 was supported, and this result suggests that transformational leadership increases self-efficacy.

Hypothesis 2 demonstrated that transformational leadership positively influenced innovative behavior. Transformational leadership had a significant positive influence on innovative behavior (estimate = .861, $p < .001$). Therefore, Hypothesis 2 was supported, and this result suggests that transformational leadership increases innovative behavior.

Hypothesis 3 confirmed that self-efficacy positively influenced innovative behavior. Self-efficacy had a significant positive influence on innovative behavior (estimate = .747, $p < .001$). Therefore, Hypothesis 3 was supported, and this result suggests that self-efficacy increases innovative behavior.

Hypothesis 4 established that self-efficacy mediated the relationship between transformational leadership and innovative behavior. The mediating role of self-efficacy was tested using 95% confidence intervals and 5000 bootstrapping resamples. The indirect effect is 0.647. The bootstrapped confidence intervals were Boot LLCI = .490 and Boot ULCI = .796. As 0 was not included between Boot LLCI and Boot ULCI, this shows that the bootstrapped confidence interval is significant. These results indicate that the partial mediation effect of self-efficacy was significant. Thus, Hypothesis 4 is supported. This finding suggests that transforma-

tional leadership increase innovative behavior through self-efficacy.

Finally, Hypothesis 5 states the mediating influence of self-efficacy on the relationship between transformational leadership and innovative behavior will be moderated by psychological safety. The moderated mediation model was examined using SPSS PROCESS Macro 3.4.1 Model 14 and was tested using 95% confidence intervals and 5000 bootstrapping resamples. The conditional indirect effect of self-efficacy and innovative behavior was evaluated by analyzing the index of the moderated relationship at three different moderator levels: -SD, mean (M), and +1 SD. Concerning the -1 SD level, the conditional indirect effect was 0.3541, Boot SE = 0.0822, Boot LLCI = 0.2102, and Boot ULCI = 0.5371. Regarding the level of M, the conditional indirect effect was 0.3438, Boot SE = 0.0863, Boot LLCI = 0.1917, and Boot ULCI = 0.5358. In terms of the +1 SD level, the conditional indirect effect was 0.3336, Boot SE = 0.0916, Boot LLCI = 0.1702, and Boot ULCI = 0.5354. Since 0 was not included between Boot LLCI and Boot ULCI at the level of -1 SD (standard deviation), mean level (M), and mean +1 SD (standard deviation) confidence intervals, it was concluded that statistical significance was confirmed. Furthermore, the index of moderated mediation was -0.0078, Boot SE = 0.0085, Boot LLCI = -0.0253, and Boot ULCI = 0.0082. As 0 was included

Table 4. The moderated mediation effect of task conflict

Dependent Variable: Innovative Behavior					
Moderator	Level	Conditional Indirect Effect	Boot SE	Boot LLCI	Boot ULCI
Psychological safety	-1 SD (-1.3097)	.3541	.0822	.2102	.5371
	M	.3438	.0863	.1917	.5358
	+1 SD (1.3097)	.3336	.0916	.1702	.5354
Index of moderated mediation					
	Index		Boot SE	Boot LLCI	Boot ULCI
	-.0078		.0085	-.0253	.0082

Table 5. Research results

Hypothesis	Content	Result
Hypothesis 1	Hypothesis 1. Transformational leadership will positively influence on self-efficacy.	Support
Hypothesis 2	Hypothesis 2. Transformational leadership will positively influence on innovative Behavior.	Support
Hypothesis 3	Hypothesis 3. Self-efficacy will positively influence on innovative Behavior.	Support
Hypothesis 4	Hypothesis 4. Self-efficacy will positively mediate the relationship between Transformational leadership and innovative behavior.	Support
Hypothesis 5	Hypothesis 5. The mediating influence of Self-efficacy on the relationship between transformational leadership and innovative behavior will be moderated by psychological safety.	Reject

between Boot LLCI and Boot ULCI, the moderated mediation effect of task conflict was not significant. Therefore, Hypothesis 5 is rejected. Table 4 shows a moderated mediation effect on psychological safety. The Research results of this study are shown in Table 5.

5. Conclusion

In order increase organizational members' innovative behavior, we tested the proposed moderated mediation model. The results suggest that the research field of innovative behavior needs to be expanded. Specifically, this study examined the effect of the transformational leadership of the superior within the organization on the innovation behavior for most members working in government organizations. The mediating effect of self-efficacy was verified in the effect of transformational leadership on innovative behavior. Lastly, it was confirmed that the moderating effect of self-efficacy and innovation behavior was not significant for psychological safety.

This study conducted an empirical study and focused on public officials who work in public institutions. Compared to the characteristics of oth-

er organizations, what is different is the work environment and the psychological pressure that public officials have to deal with. The public institutions requires higher responsibility.

In addition, the task of general organizations remains free. However, rules, regulations, and methods are more clearly presented in the work environment of public institutions. Considering these aspects, we focused on transformational leadership that emphasized the aspects in which public officials can demonstrate their abilities more. Increasing organizational effectiveness and efficiency via public officials' innovative behaviors promotes the growth of public institutions.

Based on the results of this study, the results and implications are summarized as follows.

5.1 Theoretical Implications

The main contribution of this study is to explore and determine how change leadership leads to innovative behavior in the organization. The focus is not only on the direct impact of transformational leadership on members' innovative actions. And through the members' sense of self-efficacy, they understand which core variables play a role in the

process of transformational leadership.

First, according to the viewpoint of Bandura & Schunk (1981), transformational leadership put more emphasis on the subordinates' self-efficacy who challenge blueprints and overcome these problems than subordinates sense of incompetence to challenging goals. Therefore, they achieve high level of task[63].

It was verified that transformational leadership of organizational members had a positive effect on self-efficacy. This shows that the higher the transformational leadership, the higher the self-efficacy of the members toward their superiors. Therefore, the results suggest that members' self-efficacy has a positive effect on innovation behavior, and when members' self-efficacy is high, their innovation behavior becomes more active.

Second, it was confirmed that self-efficacy had a positive effect on the innovation behavior of organizational members. This indicates that the higher the level of self-efficacy towards the superior, the more innovative actions can be induced by the organizational members. Therefore, it suggests that transformational leadership can improve individual and organizational performance by improving the self-efficacy of members

Third, the previous researches have demonstrated transformational leadership improved innovative behavior. In addition, this research suggests that if transformational leadership interacts with the self-efficacy, it will lead to higher level of innovative behavior. It is expected to be a high level of self-efficacy is more likely to challenge and achieve higher-level tasks, and it brings confidence to perform, especially for tasks related to innovation. Therefore, it suggests that the interaction between transformational leadership and self-efficacy, which aims for higher performance, can lead to a higher level of innovative behavior.

Finally, psychological safety showed a negative moderating effect on the relationship between self-efficacy and innovation behavior of organiza-

tional officials. Self-efficacy is a kind of psychological belief of members when trying to achieve a certain goal, which will affect people's emotional way of thinking, choice and behavior, and self-efficacy, as an important psychological cognition, will mobilize employees' emotion and positivity. affect their efforts and positive behavior[64]. Individuals with high self-efficacy are more motivated to choose difficult tasks, and they will set higher goals for themselves and stick to them[65]. The prediction of this study was that when the leader has a high trust relationship with the members, members can effectively control their thoughts, emotions, and behaviors at work, and when the members' psychological stability toward their boss is high, the members can provide ideas on how to improve the environment and procedures. This suggests that the higher one's self-efficacy, the higher the level of psychological stability in the organization, the higher the innovation behavior. So, Hypothesis 5 results are not in line with the expectations of this study.

5.2 Practical Implication

First, organizations in China have emphasized the importance of change since the 20th century. Leaders have a long-term view, a constructive vision, ideas and opinions for the future. They can be effective in eliciting activity in the work of members, enhancing personal achievement, psychological stability. Transformational leadership serves to motivate organizational members to achieve higher levels of tasks and performance. In order to achieve such tasks and performance, the importance of transformational leadership will need to be recognized both leader and organization. In addition, it is important to provide opportunities that enhance creativity and self-efficacy.

Organizational members with high self-efficacy can arouse interest in their work and create confidence to a higher level of task. Ultimately, it suggests that self-efficacy has a role in improving organizational performance via strengthening in-

novative behavior.

Second, self-efficacy as a mediating variable has been proved to have a significant impact on both individual and organizational performance. It suggests that it will not only improve their ability to their tasks and leads to organizational commitment, but also improve organizational development and innovation. In addition, the positive attitude and behavior is the beginning of initiating and implementing actions to solve the problems in the organization. With the increasing importance of human resources, most of enterprises have also begun to reform the internal aging problem and begin to pay more attention to the promotion of innovative behavior. According to this, the importance of self-efficacy is emphasized in this study. Therefore, this study implicates that leaders and organizations need to improve organizational members' self-efficacy via utilizing education or programs that enhance self-efficacy. Since their self-efficacy can be utilized in various performance aspects, organizational sustainability can be secured by developing organizational performance through high self-efficacy.

Third, transformational leadership is a key variable that can enhance members' self-efficacy. Higher levels of self-efficacy can play an important role in achieving higher levels of performance. Therefore, the leader should support or motivate his subordinates when performing tasks in order to increase their self-efficacy.

5.3 Limitations and direction of future research

The limitations of this study and future research directions are presented as follows. First, the survey subjects of this study focused only on public officials in Chinese public institutions. A study was conducted on the impact of CEO's consultant capabilities on corporate innovation and management performance for executives and employees of small and medium-sized companies in the Seoul metropolitan area[66]. In future studies, empirical studies

should be conducted targeting other types of companies and countries. Furthermore, it will be necessary to clarify any differences from the results of this study.

Second, in order to pursue generalization of research results, it will be necessary to diversify the information of data collection. Therefore, in order to pursue more effective research results, it will be necessary to conduct research through data collection methods such as interviews in addition to the survey method used in this study in order to derive more reliable and valid research results.

Third, this study is a cross-sectional study and the results of the study were derived through the primary measurement. In future studies longitudinal studies that characterize measurements according to time gaps should be conducted in order to increase the accuracy of the research results.

Finally, this study focused only on self-efficacy as a key factor that can lead to innovative behavior. In Lee, Kim & Cho (2021), in order to present and verify charismatic leadership theory at the entire group level, charismatic leader behavior, voluntary acceptance of leaders by subordinates, collectivity performance, and group innovation behavior were studied at the entire group level[61]. In future studies, it is necessary to explore the parameters in terms of individuals and organizations and research to verify the parameters will be required.

Furthermore, in order to expand the scope of innovation behavior research, a controlled mediation model or a modulated moderation effect model should be presented and researched to verify it.

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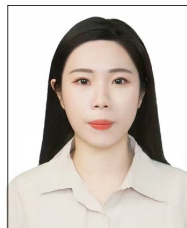
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