



Relationship between Spiritual Leadership and Innovative Behavior in Chinese Drone Companies: the Mediating Effect of Employee Engagement

SIYA ZHOU^{1*} and Dr. Shu-Chen Yang²

¹International Chinese College, MBA, Rangsit University, Pathum Thani, Thailand

²International Chinese College, Associate Professor, Rangsit University, Pathum Thani, Thailand

*Corresponding author, E-mail: mzhylm@163.com

Abstract

Based on conservation of resource theory, taking employee engagement as mediator, research model of the research on the relationship between spiritual leadership and innovation behavior is established. The purpose of the study is to clarify the relationship between spiritual leadership and innovation behavior of scientific research managers in Chinese drone companies, and whether employee engagement plays an intermediary role in the above relationship. In order to explore the influencing factors of employees' innovation behavior and its internal mechanism, practical and theoretical basis for companies to improve innovation performance is provided. The hypothesis was verified using interviews with executives from 3 drone companies and survey data from 361 scientific research managers in 13 drone companies. The results of the study indicate that: 1. Spiritual leadership has a significant positive impact on innovation behavior and employee engagement; 2. Employee engagement has a significant positive impact on innovation behavior; 3. Employee engagement has a partial mediation effect between spiritual leadership and innovation behavior. This study collected 402 questionnaires in total, including 41 invalid questionnaires and 361 valid questionnaires, with efficiency 89.8%.

Keywords: *Spiritual Leadership; Innovation Behavior; Employee Engagement*

1. Introduction

In the past, the research on the behavior of innovation subjects was mainly concentrated in hospitals, companies, universities, scientific research institutes and other industries. As the undertaker of innovation work, scientific research managers can be said to be regarded as the most important part of companies, but they have not made an in-depth examination of their innovation behavior. (Zhang, 2016). However, individual innovation was the start of organizational innovation. In order to achieve their goals, organizations must rely on employees to innovate their work processes, methods and means. Innovation activities were finally realized through "innovation employees" as behavior carriers (Kim & Koo, 2017). Empirical research shows that leadership has an important relationship with employees' behavior (Fry, et al, 2005; Zhang, 2016). Although some studies have proved that spiritual leadership will have a positive effect on employees' innovation behavior to a certain extent, and employee engagement will also affect employees' innovation behavior. However, at present, the internal mechanism of these variables affecting employees' innovation behavior and the "black box" of their relationship have not been fully opened (Zhang, 2016). There are few literatures on the comprehensive influence of spiritual leadership on employees' innovation behavior, and the research on the relationship between them is also lack of systematicness. In view of this, based on the theory of resource conservation, this study combs the research results of spiritual leadership and takes employee engagement as an intermediary variable to establish a research model of the impact of spiritual leadership on innovation behavior. The purpose of the study is to clarify the relationship between spiritual leadership and innovation behavior of scientific research managers in Chinese drone companies, and whether employee engagement plays an intermediary role in the above relationship. In order to explore the influencing factors of employees' innovation behavior and its internal mechanism, practical and theoretical basis for companies to improve innovation performance is provided.



2. Objectives

1. The purpose of the study is to clarify the relationship between spiritual leadership and innovation behavior of scientific research managers in Chinese drone companies, and whether employee engagement plays an intermediary role in the above relationship.

2. In order to explore the influencing factors of employees' innovation behavior and its internal mechanism, it provides practical and theoretical basis for companies to improve innovation performance.

3. Materials and Methods

3.1 *Spiritual leadership and innovation behavior*

The roles of spiritual leadership in establishing the spiritual survival consciousness of such leaders and followers are to create value consistency at the overall strategic, authorized team and individual levels, and to ultimately promote higher-level organizational commitment, productivity, employee happiness and innovation behaviors (Fry, 2005; Zhang, 2016). According to this, the hypothesis is as follows:

H1: Spiritual leadership has positive influence on innovation behavior

3.2 *Spiritual leadership and employee engagement*

Spiritual leadership touches on the basic needs of leaders and followers for spiritual survival, so they become more organized and productive (Fry, 2003). Spiritual leadership essentially inspires one's self and others, so that they have a sense of survival through calling and membership. This is the act of establishing a value that affects others' strong desire, mobilization and struggles for a common vision that defines the essence of motivation through leadership. People start and persist in their behaviors until they believe that these behaviors will lead to the expected results, goals and higher professionalism (Fry, 2008). According to this, the hypothesis is as follows:

H2: Spiritual leadership has positive influence on employee engagement

3.3 *Employee engagement and innovation behavior*

Employee professionalism brings innovation, as well as better customer service, productivity, lower employee turnover rate, dedicated employees, strong sense of responsibility, willingness to invest extra time in work and pride in work. Employee engagement is one of the key prerequisites for creativity and innovation (Kim & Koo, 2017). Kim and Koo (2017) pointed out that dedicated employees are full of enthusiasm for their work and often devote themselves to their work to generate creativity and innovation. According to this, the hypothesis is as follows:

H3: Employee engagement has a positive effect on innovation behavior

3.4 *The mediating effect of employee engagement between spiritual leadership and innovation behavior*

The meaning of work affects employee engagement by expanding the age of psychological state of responsible individuals. It can be considered that followers' experience meaning of work and experience responsibility for work results are the two most important psychological resources for leaders to enhance followers' engagement (Kahn, 1990). In other words, those employees who think their work has an impact on individuals and the performance of the unit are more likely to be enthusiastic, astute, persistent and dedicated to their work. Similarly, employees who believe that they are responsible for their work and its results are more likely to devote themselves to their work and thus improve the level of job innovation (Aryee, et al, 2012). According to this, the hypothesis is as follows:

H4: Employee engagement has a mediating effect between spiritual leadership and innovation behavior

In conclusion, this study examined the relationship between spiritual leadership and innovation behavior, and the mediating role of employee engagement in the above relationship (Figure 1).

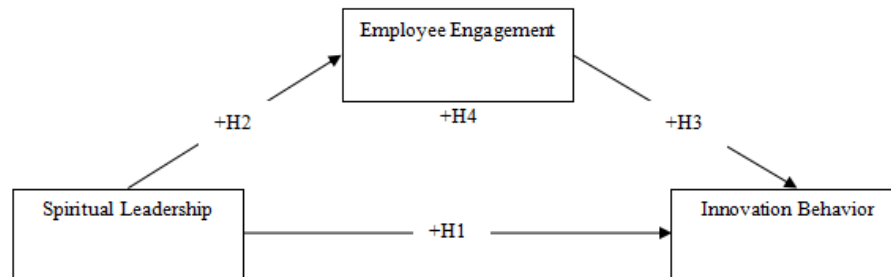


Figure 1 Research Model

DATA SOURCES: This study collates

3.5 Methods, samples and procedures

In this study, the mixed method of quantitative analysis is used as the main method and auxiliary method. Firstly, three leaders' research managers of three drone companies were interviewed by semi-structured interviews. Through the research results of the interview method, the correlation between spiritual leadership, innovation behavior and employee engagement was clarified. Then, various hypotheses were verified by quantitative analysis.

The interviewees in this study are scientific research managers of drone companies. They use purposive sampling to select drone companies such as DJ, ZK and KWT in China. The questionnaire was distributed through the questionnaire satellite electronic questionnaire, taking into account the research ethics, and was started with the consent of these companies and the interviewees. The survey was conducted from December 2019 to February 2020. A total of 402 questionnaires were collected, excluding 41 invalid questionnaires, and the final valid questionnaires were 361, with an effective rate of 89.8%.

3.6 Measurement

Spiritual Leadership Scale: Developed by Fry et al. (2005), Cronbach's α is 0.91. It is divided into three dimensions: vision, hope and belief, and selfless love. There are 4, 3, and 4 questions respectively, totaling 11 questions. It reflects that spiritual leadership is a causal organizational change leadership theory, aiming at creating a learning organization with internal motivation. Spiritual leadership includes values, attitudes and behaviors. It needs to inspire oneself and others internally to have a spiritual sense of survival and appeal to members (Fry, 2005).

Creative Behavior Scale: Developed by Scott and Bruce (1994), Cronbach's α is 0.86. There are 6 items to measure innovation thinking, ideas and ways of innovation behavior. It reflects the generation and implementation of creativity in working environment (Scott & Bruce, 1994).

Employee Engagement Scale: Developed by Schaufeli, et al. (2002), Cronbach's α is 0.88. There are 14 items, which measure the three dimensions of job engagement: vitality, enterprising and dedication. It reflects a positive work-related mental state, including vitality, dedication and concentration (Schaufeli et al, 2002).

In the process of collecting data, this study select gender, age, working time in the current company, annual income and degree as control variables. All the scales are measured by Likert 5 points and evaluated by themselves.

3.7 Reliability and Validity Analysis

This paper conducts the reliability analysis of the scale by using SPSS 23.0 and AMOS 18.0 software. The result in Table 1 shows that the reliability values Cronbach's α of all scales are beyond 0.6, CR beyond 0.6 and AVE beyond 0.5, showing that the scales used in the study are of high reliability and convergent validity, and the measurement of the item is of high stability and internal consistency.

**Table 1** Analysis Table of Reliability and Convergent Validity

No	Variables	Cronbach's α	CR	AVE
1	Spiritual leader	0.901	0.839	0.635
2	Innovation behavior	0.908	0.909	0.627
3	Employee engagement	0.913	0.808	0.585

Remarks: This study is self-collected.

This study conducts discriminant validity analysis of the scale by using SPSS 23.0 software. The result in Table 1 shows that the AVE values of all variables are higher than the related coefficient of other variables and the variables in the study are of distinguishability.

Table 2 Analysis Table of Descriptiveness, Correlation and Discriminant Validity

Variables	M	SD	1	2	3
1. Spiritual leader	3.519	0.837	0.797		
2. Innovation behavior	3.559	0.782	0.379***	0.764	
3. Employee engagement	3.605	0.963	0.471***	0.563***	0.791
AVE			0.635	0.584	0.627

This study conducts fitness analysis of the scales by using AMOS 18.0 software. The fit validity indexes in Table 2 conform to the requirements, showing that samples in this study are of good matching degree with the models.

Table 3 Analysis Table of Model Fit

Statistic value	Preliminary fit criteria	Total model
χ^2		519.783
df		425
χ^2/df	≤ 3.00	1.223
RMSEA	≤ 0.08	0.025
NFI	≥ 0.90	0.924
CFI	≥ 0.90	0.985

Remarks: This study is self-collected

4. Analysis and Results

4.1 Interview

Three leaders were interviewed. Each semi-structured interview lasted for about two hours, focusing on the issues related to business leaders. This study preliminary expounds the association of spiritual leader on work engagement and innovation behavior by means of interview method and further verifies the testing hypotheses by quantitative analysis (regression, medium).

4.2 Analysis of population appropriate characteristic distribution

This study collected 402 questionnaires in total, including 41 invalid questionnaires and 361 valid questionnaires, with efficiency 89.8% as shown in Table 4.

In terms of the variable of gender, the male gender occupies a large proportion (285, 78.9%), showing that the majority of researchers and developers are male. In terms of the variable of age, most researchers and developers are aged 23 - 30 (162, 44.9%), showing that young and middle-aged people are the main power among this group of R&D members. In terms of the variable of employment length in the current company, employees who work for about 5 - 6 years (44.9, 44.9%) occupy a large proportion, followed by those who work for 1 - 4 years (119, 33.0%), showing that the R&D personnel are in position fixedly in their company. In terms of the variable of annual income, most people (155, 42.9%) have their annual income of 100,000 - 150,000 RMB, showing that the researchers and developers have considerable good annual income. In terms of academic degree, most researchers and developers (235, 65.1%) have



gained bachelor's degree, showing that people receiving higher education are the main power among the group of researchers and developers.

Table 4 Population Characteristic Distribution Table

Population variable	Group	n	%
Gender	Male	285	78.9%
	Female	76	21.1%
Age	Aged 22 years and below	40	11.1%
	Aged 23 - 30 years	162	44.9%
	Aged 31 - 40 years	94	26.0%
	Aged 41 - 50 years	51	14.1%
	Aged 51 years and above	14	3.9%
Employment length	Aged 11 months and below	18	5.0%
	1 - 4 years	119	33.0%
	5 - 6 years	162	44.9%
	7 - 9 years	29	8.0%
Annual income	10 years and above	33	9.1%
	90,000 Yuan and below	79	21.9%
	100,000 - 150,000	155	42.9%
	160,000 - 200,000	51	14.1%
Academic degree	210,000 and above	76	21.1%
	Associate bachelor /bachelor of engineering and below	47	13.0%
	Bachelor	235	65.1%
	Master	65	18.0%
	Doctor	14	3.9%

Data source: N=361

4.3 Regression and Mediation Analysis

Table 5 is the regressive analysis result. This study takes the gender, age, employment length, annual income and academic degree as the control variables of all regressions. M2 reveals the regressive analysis of spiritual leader on innovation behavior, and the result shows that the spiritual leader has a positive impact on the innovation behavior significantly ($\beta = 0.440^{***}$, $R^2 = 0.396$). Therefore, hypothesis H1 is verified. M4 reveals the regressive analysis of spiritual leader on employee engagement, and the result shows that the spiritual leader has a positive impact on the employee engagement significantly ($\beta = 0.355^{***}$, $R^2 = 0.324$). Therefore, hypothesis H2 is verified. M6 reveals the regressive analysis of employee engagement on innovation behavior, and the result shows that the employee engagement has a positive impact on the innovation behavior significantly ($\beta = 0.462^{***}$, $R^2 = 0.375$). Therefore, hypothesis H3 is verified. M7 reveals the regressive analysis of spiritual leader and employee engagement on innovation behavior, and the result shows that spiritual leader and employee engagement have a positive impact on innovation behavior significantly ($\beta = 0.328^{***}$, $\beta = 0.318^{***}$, $R^2 = 0.465$). Therefore, hypothesis H4 is established partially.

Table 5 Regression and Mediation Analysis Table

	Innovation Behavior		Employee Engagement		Innovation Behavior	
	M1	M2	M3	M4	M5	M6
Gender	-0.037	-0.010	-0.020	0.001	-0.028	-0.010
Age	0.131*	0.142**	0.278***	0.287***	0.003	0.051
Employment length	0.203**	0.188**	0.102	0.090	0.156**	0.160**
Annual income	0.179**	0.157**	0.130*	0.112*	0.119*	0.121*
Academic degree	0.060	0.042	0.048	0.034	0.037	0.031
Spiritual leader		0.440***		0.355***		0.328***
Employee engagement					0.462***	0.318***

[1779]



	Innovation Behavior		Employee Engagement		Innovation Behavior	
	M1	M2	M3	M4	M5	M6
R^2	0.204	0.396	0.200	0.324	0.375	0.465
$Adj R^2$	0.193	0.386	0.189	0.313	0.364	0.454
ΔR^2		0.192		0.124	0.171	0.068
F	18.228***	38.691***	17.758***	28.327***	35.387***	43.743***

Remarks: This study is self-collected

5. Discussion

5.1 Research enlightenment

This study has several implications for research literature, human resources practitioners and policy makers. In the research literature, this study shows that spiritual leadership is an important factor in employees' innovation behavior. Although its influence scope is limited, the literature should recognize that spiritual leadership is an influencing factor of employees' innovation. In this way, employee innovation literature can be based on a large number of literature on the impact of spiritual leadership on employee outcomes and their findings on the intermediary role (engagement) of the relationship between spiritual leadership and employee outcomes (Aryee et al, 2012; Kim & Koo, 2017).

As far as the influence of human resources practice is concerned, this study shows that Professionalism can be used as the main medium factor of spiritual leadership and innovation behavior. Spiritual leadership can give employees more meaning to their work to a certain extent. Employees will be more enthusiastic, alert, persistent and dedicated to their work, and will be more willing to take the initiative in workplace innovation. Human resource managers who aim at encouraging employees to innovate should pay attention to the structural changes of work content. Providing spiritual leadership to employees may partially enhance this positive impact because it is related to more dedicated employees and promotes them to put forward and implement new innovation ideas in their work.

5.2 Research limitations and future prospects

This study has certain limitations. Firstly, there are several limitations in this study that need to be solved. The required data are collected in a single time and come from 16 different companies. Podsakoff, et al. (2003) argue that this may increase the risk of common source/method bias. On this issue, this study tries to alleviate this prejudice by controlling some population structures. However, the mean value, standard deviation and significance between research variables of the research results are normal. Obviously, deviation is not a serious defect in this study.

Secondly, the sample selection scope is only implemented in various companies in Beijing, Tianjin and other regions due to factors such as capital and time, and there are still less than 30 companies. The applicability of the research may not be widely representative, as the data of joint ventures and foreign-funded companies in developed provinces, special zones and other countries cannot be obtained. Future research can fully consider these factors and expand the scope of data selection and types of companies. In addition, from the perspective of the research population, the measurement criteria of spiritual leadership and innovation behavior selected in this study are limited to a few people (Zhang, 2016), so this study may not be popularized in other backgrounds.

An interesting branch and research approach is found in the study, which is to explore the relationship between bounden duty orientation and innovation behavior, as well as the opposite theory of engagement-emotional exhaustion as a medium at the same time. In addition, considering the moderating mediating mechanism of optimism in the above-mentioned relationship will be interesting and innovative. As shown in Figure 2:

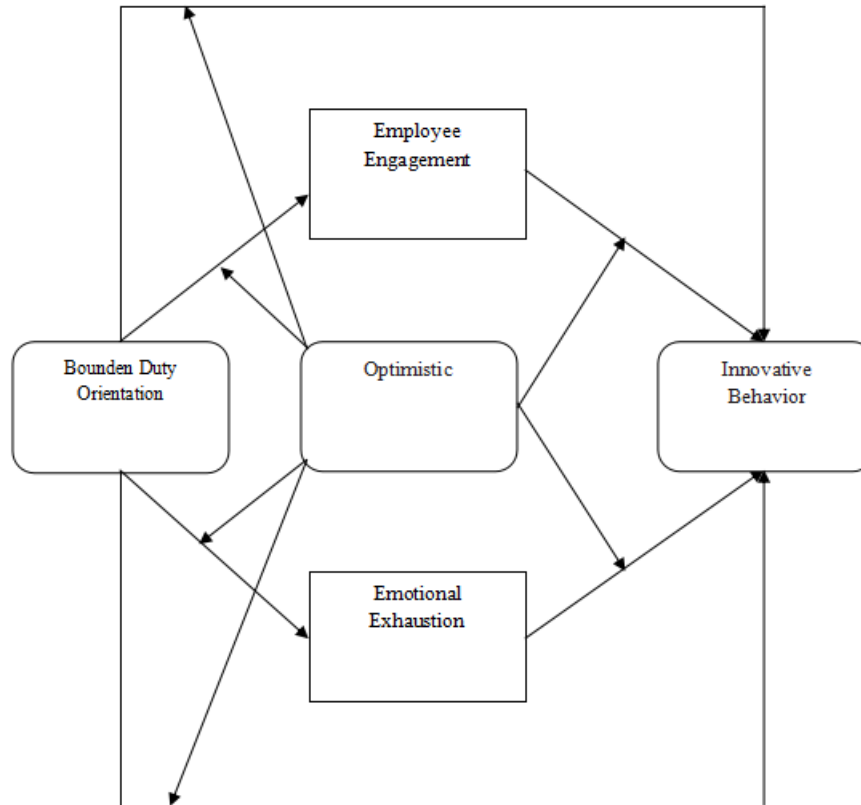


Figure 2 Future Prospects: Research on the Relationship between Bounden Duty Orientation and Innovation Behavior: Moderated Mediators
 DATA SOURCES: This study collates

6. Conclusion

6.1 Research conclusions

Research shows that spiritual leadership has a positive impact on innovation behavior, which is consistent with previous studies (Zhang, 2016). This study represents the new important development. By showing how to establish spiritual leadership, it has a positive impact on employees' innovation behavior. In more detail, as expected in the hypothesis of this study, the study clearly proves the positive contribution of individual spiritual leaders to the effectiveness of individual employees' innovation behaviors, and the performance of spiritual leaders in inspiring followers will exceed expectations (Zhang, 2016).

Research shows that spiritual leadership has a positive impact on engagement, which is consistent with previous studies (Fry, 2008). The empirical study of this study shows that spiritual leadership and work engagement have a positive impact. Therefore, it is recommended that leaders work in their environment. It is necessary to have relatively high caring behaviors, including deployment in communication with their followers, showing higher vision expectations, creating hopes and opportunities to improve their beliefs and arrange the development of followers (subordinate employees), and participating in positive relationships with subordinate work.

Research shows that employee engagement has a positive impact on innovation behavior, which is consistent with previous studies (Kim & Koo, 2017). Engagement can be flexibly developed to improve the capabilities of a given individual. Luthans (2002) believed that employees with high engagement may become more confident or have a very positive spirit for achieving their goals. This positive impact may be higher, so they show better innovation behaviors.



Research shows that engagement has a mediating effect between spiritual leadership and innovation behavior, which is the same as previous similar studies (Aryee et al, 2012). The conclusion of this study can prove that engagement can well mediate the relationship between spiritual leadership and innovation behavior. This may indicate that spiritual leaders are satisfied with their work. Whether they are experiencing changes or not, spiritual leadership can provide more work autonomy, belief ability, professionalism, happiness, etc. for employees who are facing challenges in difficult situations (Fry, 2008).

7. References

- Aryee, S., Walumbwa, F. O., Zhou, Q., & Hartnell, C. A. (2012). Transformational leadership, innovation behavior, and task performance: Test of mediation and moderation processes. *Human Performance*, 25(1), 1-25.
- Fry, L. W. (2005). Editorial: introduction to the leadership quarterly special issue: toward a paradigm of spiritual leadership. *Leadership Quarterly*, 16(5), 619-622.
- Fry, L. W. (2008). Maximizing the triple bottom line through spiritual leadership. *Organizational Dynamics*, 37(1), 86-96.
- Fry, L. W., Vitucci, S., & Cedillo, M. (2005). Spiritual leadership and army transformation: Theory, measurement, and establishing a baseline. *The Leadership Quarterly*, 16(5), 835-862.
- Fry, L.W. (2003). Toward a theory of spiritual leadership. *The Leadership Quarterly*, 14(6), 693-727.
- Kahn, W. A. (1990). An exercise of authority. *Organizational Behavior Teaching Review*, 14(2), 28-42.
- Kim, M., & Koo, D. (2017). Linking LMX, engagement, innovation behavior, and job performance in hotel employees. *International Journal of Contemporary Hospitality Management*, 29(12), 3044-3062. Retrieved from <https://doi.org/10.1108/IJCHM-06-2016-0319>
- Luthans, F. (2002). Positive organizational behavior: Developing and managing psychological strengths. *The Academy of Management Executive*, 16(1), 57-75.
- Podsakoff, P. M. Mackenzie, S. B. Podsakoff, N. P. & Lee, J. Y. (2003). The mismeasure of man (agement) and its implications for leadership research. *The Leadership Quarterly*, 14(6), 615-656.
- Schaufeli, W. B., Martinez, I. M., Pinto, A. M., Salanova, M., & Bakker, A. B. (2002). Burnout and engagement in university students: A cross-national study. *Journal of Cross-Cultural Psychology*, 33(5), 464-481.
- Zhang, S. (2016). *Research on the influence of spiritual leadership on employee innovation behavior, moderating effect of core self-evaluation*. A thesis for the degree of Master Degree. Nanjing Normal University.