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The Effect of Entrepreneurial Spiritual Capital on the Performance of Science and Technology Innovation Teams

-- A Moderated Mediation Model

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Abstract: Combined with the research on science and technology innovation teams, we use digital empowerment as the mediating variable and organizational resilience as the moderating variable to establish the moderated mediation model, explore the role mechanism of entrepreneurial spiritual capital on the performance of science and technology innovation team from the perspective of entrepreneurial traits, and carry out an empirical research on a sample of 351 scientific and technological talents in the science and technology innovation team of enterprises. The results show that: entrepreneurial spiritual capital has a significant positive effect on science and technology innovation team performance; digital empowerment mediates between entrepreneurial spiritual capital and science and technology innovation team performance; organizational resilience positively moderates the relationship between digital empowerment and science and technology innovation team performance, and further moderates the mediating role of digital empowerment between entrepreneurial spiritual capital and science and technology innovation team performance.

Keywords: Entrepreneurial Spiritual Capital; STI Team Performance; Digital Empowerment; Organizational Resilience.

1. Introduction

"Innovation occupies a central position in the overall situation of China's modernization. Driving productivity to leap to advanced quality with science and technology innovation is an inevitable requirement for the development of new quality productivity." As one of the important components of the national science and technology innovation system, the science and technology innovation team bears the responsibility of cultivating high-tech talents for national innovation [1]. Science and technology innovation team is a form of micro scientific research organization between the unit and the individual, which can strongly promote more scientific research autonomy and creativity. How to make the science and technology innovation team play a greater role, produce more scientific and technological innovation results, and improve the performance of science and technology innovation team has become a problem that more and more scholars think about and pay attention to.

In this era of increasing "gray rhinoceros" events, we focus on entrepreneurial spiritual capital. Many studies at home and abroad have shown that entrepreneurial spiritual capital can promote innovation [2], and under the inspiration of entrepreneurial spiritual capital, employees will have more trust in the team, and intrinsic motivation will be more easily stimulated, which is conducive to improving team performance. In exploring the black box of the role of entrepreneurial spiritual capital on STI team performances, this paper finds the variable of "digital empowerment", team leaders with entrepreneurial spiritual capital will take the initiative to try and use big data to integrate the digital elements in production in the work process, to realize digital empowerment, so as to improve the performance of STI team. Thus, we introduce digital empowerment as a mediating variable. At the same time, due to the characteristics of volatility, uncertainty, complexity, and ambiguity that the VUCA era possesses, contextual factors such as organizational resilience also affect the role of entrepreneurial spiritual capital on team innovation performance. Teams with organizational resilience can more easily leverage their strengths against risks when facing external environmental crises [3]. Therefore, this paper introduces the concept of organizational resilience and constructs and analyzes the moderated mediation model to explore the effect of entrepreneurial spiritual capital on the performance of science and technology innovation teams.

2. Theoretical Foundation and Research Hypothesis

2.1. Entrepreneurial Spiritual Capital and STI Team Performance

Fry first proposed the concept of entrepreneurial spiritual capital, and he pointed out that entrepreneurial spiritual capital combines vision, hope/faith and altruistic love, workplace spirituality, and spiritual survival [4]. Baker & Watson argued that entrepreneurs with entrepreneurial spiritual capital are able to achieve sustained innovation, and have a more forward-looking and strategic perspective when making decisions.

Schumpeter first proposed the innovation theory, and Han Xuejiao combined the characteristics of STI teams with Stephen Robin's view on teams, and defined STI team as "a team that contributes its own possessed knowledge and capabilities in order to realize technological improvements and accomplish innovative tasks. It is a small group of people whose goal is to develop, innovate and grow".[5] Team innovation performance refers to the application of innovative ideas or steps, such as new thoughts and procedures, to the

team's daily work, including the innovativeness of the team's products, the number of new ideas highlighted by the team, the team's overall technological performance, and the team's ability to adapt to changes [6].

Entrepreneurial spiritual capital, as a positive spiritual force, can promote entrepreneurs to carry out continuous innovation. Under the leadership of a team leader who possesses entrepreneurial spiritual capital, members of a science and technology innovation team can feel loved and respected as well as the enhancement of their self-worth. Members have a stronger motivation to complete or even over-deliver their work. In such a working environment, team members have a vision of a better future for themselves and their teams, are in a happy mood, are active in thinking, and are more likely to generate more creative ideas, and team innovation performance can be greatly improved. To summarize, this paper believes that entrepreneurial spiritual capital positively affects the performance of science and technology innovation team.

Based on the above theoretical foundation, this paper puts forward the following hypothesis:

H1: Entrepreneurial spirituality capital positively affects science and technology innovation team performance.

2.2. The Mediating Role of Digital Empowerment

According to the theory of resource integration, enterprises can integrate internal functions that are related to each other but separated through organization and coordination, and even achieve better results than the original [7]. For leaders with entrepreneurial spiritual capital, they will proactively use digital elements to empower all kinds of resources, and use digital technology to optimize and reorganize resources within the team, so that the team's innovation performance can be significantly improved. Gu Jianping et al. also found that team leaders with entrepreneurial capital are enterprising and forward-looking[8]. They can utilize resources efficiently, take the initiative in the face of the opportunities and challenges of the digital economy era, and courageously carry out digital empowerment to find new opportunities for the team.

As the core of the digital economy, data is penetrated into all resources, and digital empowerment greatly improves the current information silo phenomenon [9]. For science and technology innovation teams, digital empowerment makes collaboration within team members more efficient, and the information silo phenomenon is effectively alleviated. Chen Yihua and other scholars believe that digital empowerment includes autonomy, precision and dynamism, which can give enterprises automatic and dynamic control capabilities[10]. Through digital empowerment science and technology innovation team can make more accurate prediction of innovation costs or innovation results, and innovation performance can be effectively improved.

Based on the above theoretical foundation, this paper puts forward the following hypothesis:

H2: Digital empowerment mediates between entrepreneurial spiritual capital and STI team performance.

2.3. The Moderating Role of Organizational Resilience

The term “resilience” originated in the fields of ecology, engineering, and positive psychology, and later scholars introduced the concept of resilience into the field of management and proposed the topic of “organizational resilience” [11]. This paper argues that organizational resilience not only refers to the ability of an organization to recover to its original state in a VUCA environment, but also includes the ability of an organization to find opportunities in adversity. This kind of organization becomes more courageous in the face of setbacks, and dare to transform adversity into opportunities, so as to surpass the current state and achieve long-term growth [12].

This paper argues that organizational resilience positively moderates the relationship between digital empowerment and the performance of science and technology innovation teams. Organizational resilience enables STI teams to quickly recover and catch up with their previous performance levels in the digital economy. By making good predictions about new production and consumption demands in the digital era, and preparing for the emergence of new technologies and the risks and crises they may bring, STI teams can recover and rebound to their original levels as soon as possible, and their performance can be improved in relative terms.

Based on the above theoretical foundation, this paper puts forward the following hypothesis:

H3: Organizational resilience positively moderates the relationship between digital empowerment and STI team performance.

This paper argues that organizational toughness positively moderates the relationship between entrepreneurial spiritual capital and STI team performance. When teams have organizational resilience, entrepreneurial spiritual capital can help STI teams react quickly in adversity, team leaders lead employees to face difficulties from a high level of spirituality, and employees voluntarily share the team's destiny and do their best to tide over the difficulties. In the highly dynamic, complex and competitive external environment of the organization, the entrepreneur's mindset, decision-making ability and spiritual beliefs play a key role in the resilience of the enterprise [13].

Based on the above theoretical analysis, this paper proposes the following hypothesis:

H4: Organizational resilience positively moderates the relationship between entrepreneurial spiritual capital and STI team performance.

3. Study Design

3.1. Research Sample

This study collects data by means of questionnaire surveys in some “specialized, fine, special, new” and “small giant” enterprises in Shanghai, Hangzhou and Nanjing in the Yangtze River Delta region, and the number of valid questionnaires is 351, which are all filled out by the employees of each enterprise.

3.2. Measurement of Variables

The variables designed in the hypotheses of this paper were measured using Likert's five-point scale, with 1-5 representing the range from “not at all consistent” to “fully consistent”. Entrepreneurial spiritual capital was measured using the Spiritual Leadership Scale developed by Fry, which includes three dimensions: vision, hope, and altruistic love, with a Cronbach's α of 0.957. The Digital Empowerment Scale was borrowed from the studies of Zhang Zhengang et al. The Cronbach's α value was 0.927. The organizational resilience scale mainly referred to the measurement scale

developed by Kantur et al.[14]. Organizational resilience is divided into three dimensions: adaptive capacity, resilience, and situational awareness, with a Cronbach's α value of 0.926. The STI Team Performance Scale uses the scale developed by Lovelace et al.in terms of products, ideas, technologies, and capabilities, with a Cronbach's α value of 0.863[15].

4. Data Analysis and Results

4.1. Validation Factor Analysis

In order to verify the discriminant validity of the four factors of entrepreneurial spiritual capital, digital empowerment, organizational resilience, and performance of science and technology innovation team, this paper analyzes the data with the method of validation factor analysis, and the four-factor model fits better than the other models, with $\chi 2/df=1.167$ and RMSEA=0.022.

4.2. Descriptive Statistics

In this paper, descriptive statistics and correlation analysis were conducted to explore the correlation between the variables of entrepreneurial spiritual capital, digital empowerment, organizational resilience and STI team performance, and the results showed that entrepreneurial spiritual capital was significantly positively correlated with digital empowerment ($r=0.376$, $p<0.01$), significantly positively correlated with STI team performance ($r=0.360$, $p<0.01$), and digital empowerment is significantly positively correlated with STI team ($r=0.427$, $p<0.01$), which provides initial support for the correlation hypothesis.

4.3. Hypothesis Testing

4.3.1. Intermediary Effect Test

After controlling for employees' gender, age, length of service and education level, this paper adopts hierarchical regression analysis for hypothesis testing. Entrepreneurial spiritual capital has a significant positive effect on the performance of science and technology innovation team ($\beta=0.356$, $p<0.01$). Meanwhile, entrepreneurial spiritual capital has a significant positive effect on digital empowerment ($\beta=0.381$, $p<0.01$), and digital empowerment has a significant positive effect on STI team performance ($\beta=0.337$, $p<0.01$). Hypothesis 1 was verified.

The Bootstrap 95% CI of the mediation effect did not contain 0 ([0.083, 0.178]), indicating a significant mediation effect. Therefore, digital empowerment plays a partial mediating role in the effect of entrepreneurial spiritual capital on STI team performance, and the mediating effect accounts for 36% of the total effect, which verifies Hypothesis 2.

4.3.2. Moderated Mediation Test

In this paper, Process program model 15 was used to conduct the moderated mediation effect test, and the results indicated that the interaction term of digital empowerment and organizational toughness had a significant predictive effect on STI team performance ($\beta=0.218$, $t=3.847$, $p<0.01$), suggesting that organizational toughness plays a moderating effect in the impact of digital empowerment on STI team performance. The predictive effect of the interaction term of entrepreneurial spiritual capital and organizational resilience on STI team performance was significant ($\beta=0.179$, $t=3.003$, $p<0.01$), indicating that organizational resilience plays a moderating effect in the effect of entrepreneurial spiritual capital on STI team performance, and Hypothesis 4 was verified.

5. Conclusion and Discussion

5.1. Research Conclusion

Based on the resource integration theory, this study constructs and verifies the influence mechanism of entrepreneurial spiritual capital on the performance of science and technology innovation team, and mainly draws the following conclusions: firstly, entrepreneurial spiritual capital positively influences the performance of science and technology innovation team. Secondly, digital empowerment plays a partial mediating role between entrepreneurial spiritual capital and STI team performance. Thirdly, organizational resilience moderates the impact of digital empowerment and STI team performance.

5.2. Management Implications

Firstly, this paper emphasizes that science and technology innovation teams should pay attention to the development of entrepreneurial spirituality capital, enhance leadership in terms of team leadership spirit, and promote the performance of science and technology innovation teams to be improved. Secondly, this paper guides people to pay attention to the construction of organizational resilience. Currently, the number of crisis events has increased by chance, and organizational resilience can help the team quickly recover to the original state or even exceed the original state when facing a crisis, and achieve qualitative transcendence. In the internet era, opportunities and crises exist side by side, and science and technology innovation teams should improve their organizational resilience level to cope with unpredictable difficulties. Finally, this paper reveals that STI teams should improve the level of digital empowerment. As an innovation-based STI team, the team should pay attention to and enhance its ability to discover, analyze and utilize digital resources for empowerment. Only by utilizing and identifying various types of digital resources can the team be better empowered and promote the performance of science and innovation teams.

References

[1] Xiao Lizhe, Han Xuejiao, Li Yonghua. Research on the impact of cultural freedom on the performance of science and technology innovation team[J]. Science and Management,2020, 22 (05):65-72.

[2] Baker, C., & Miles-Watson, J. (2010). Faith and Traditional Capitals: Defining the Public Scope of Spiritual and Religious Capital--A Literature Review. Implicit Religion, 13(1).

[3] Hamel G, Välikangas L. The quest for resilience[J]. Harvard Business Review,2003, 81(9): 52-63, 131.

[4] Fry, L. W. (2003). Toward a theory of spiritual leadership. The leadership quarterly, 14(6), 693-727.

[5] Xuejiao Han. Research on the Relationship between Cultural Freedom and Performance of Science and Technology Innovation Teams[D]. Harbin Institute of Technology,2021.

[6] Gu Jianping, Deng Ronglin. How does entrepreneurial spiritual capital affect team innovation performance? --A Perspective Based on Entrepreneurial Orientation of Unicorn Firms[J]. Nanjing Social Science,2020, No.387(01):37-46.

[7] SUN Lanlan, XIU Xiaoyuan. Research on internal control based on management theory[J]. Finance and accounting newsletter,2014(12):74-76.

[8] LI Yan,GU Jianping. Research on the impact of entrepreneurial spiritual capital on employees' innovative behavior[J]. East China Economic Management,2019,33(08):143-151.

[9] Jian Li,Lexin Zhao,Nengzhi Yao,et al. Digital economy and corporate innovation catering behavior: an empirical study of the distortionary effects of information mitigation policies[J]. Research on Quantitative and Technical Economics,2024,41 (07): 134-154.

[10] CHEN Yi-Hua,ZHANG Zhen-Gang,HUANG Lu. Mechanism and path of digital-enabled business model innovation in manufacturing enterprises[J]. Journal of Management,2021,18 (05): 731-740.

[11] Li P,Zhu JZ. Organizational resilience: a review of recent literature[J]. Foreign Economics and Management,2021, 43 (03): 25-41.

[12] Jie Zou. A study of the impact of positive-thought leadership on the resilience of organizational members[D]. Chongqing University, 2022.

[13] Morrish S. C., Jones R.. Post- disaster business recovery: An entrepreneurial marketing perspective[J].Journal of Business Re-search,2020(113):83 ~ 92 .

[14] Kantur D, Say A I. Measuring organizational resilience: A scale development[J]. Journal of Business Economics and Finance, 2015, 4(3).

[15] Lovelace K, Shapiro D L, Weingart L R.Maximizing cross functional new product teams' innovativeness and constrain tadherence:A conflict communication sperspective [J]. Academy of Management Journal,2001,44:779-793.