

## Will They Be In Crisis or Will They Seize Opportunities: A Empirical Study on Staff Improvisation and Enterprise Innovative Performance

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**Abstract:** The study develops a theoretical model to account for the effect of staff improvisation on innovation performance by theoretical analysis and literature review. Staff improvisation was defined that staff utilize immediately available resource to produce creative results, in non-routine or unexpected ways. In the case of emergency, under time pressure. Results from a sample of 213 Chinese staff support the study hypothesis, and show that staff improvisation positively effected their creative performance. Furthermore, the three sub-dimensions of improvisation, including spontaneity behavior, creativity intention and utilizing available resource, could significantly promoted firm innovation performance. The results of this research offer guidance to managers about encouraging staff improvisation. Moreover, the present paper provides directions for future research on improvisation and innovation performance. Future research is encouraged to investigate mediating and moderating factors between organization improvisation and creative performance.

### Introduction

In this VUCA era of variability, uncertainty, complexity, and ambiguity, unexpected things often happen. So the enterprise, in this high degree of uncertainty and unpredictability environment, had to adopt the coping style that was flexible, impromptu and quick to effectively deal with some exceptions, or to grasp the fleeting opportunities [1]. Therefore, the staff in enterprise, in the face of the dominant and recurrent change, can make the perfect plan and follow the regular procedure to deal with. However, for those unexpected changes and unfrequent changes, the staff has no time to plan ahead and no existing solutions to execute, in this case, who need improvisation to effectively cope with the changes.

As an emerging research topic in the field of management, improvisation plays an important role in the case of resource scarcity and turbulent environment, which is considered to be a organization capability that benefit enterprise to maintain competitive advantage and respond quickly to market change and customer demand, and enhance effectiveness and innovation [2]. Staff improvisation helped organizations to respond quickly facing changes of market environment and customer needs, and to enhance organizational effectiveness [3-4]. Existing research on organizational improvisation suggested that improvisation was a response to rapidly changing environment with flexibility and response sensitivity way [5]. By encouraging employees, enterprises bypass the formal planning system of the organization and rely on individuals to improvise and break conventions to complete tasks [6].

However, until now, empirical studies on the relationship between improvisation and innovation performance had been limited, and the relationship had not been finalized, some studies thought there was positive relationship between improvisation and innovation performance[7-8] , but also studies that suggested there was a slight or even negative correlation between the two [4]. In view of this, one of the purposes of this study is to explore the relationship between R&D staff improvisation and

enterprise innovation performance in Chinese enterprises. Therefore, in-depth study of the influence of group or individual improvisation on innovation performance is not only enriching the theory of organizational improvisation, but also providing a realistic basis for enterprises to enhance their innovative performance and enhance their core competitiveness.

Based on the above questions, this research takes technology services enterprise employee as the research object, through theoretical analysis and related literature review, constructed the connotation and measurement dimension of staff improvisation, then through empirical research, this study found that staff improvisation has a significant influence on innovation performance. And the three dimension of improvisation: spontaneity behavior, creativity behavior and utilizing resource behavior have a significant influence on innovation performance. Therefore companies, especially science and technology service companies can improve innovation performance by encouraging employees to improvise.

## **Literature Review and Research Hypotheses**

### **Definition of Staff Improvisation**

As an emerging and interdisciplinary construct, improvisation was still controversial in its characteristics, and the definition of its connotation had not been agreed. Weick defined improvisation as “Immediately inventing substitutes to old order”(1993b), “Dealing with the unforeseen without prior stipulation”(1998), emphasizing improvisation was emphasized as a just-time behavior, a collection of immediate reactions and intentional creations. Improvisation was the ability to manage unexpected events in an innovative, spontaneous way [9], and that was referred to the creative and spontaneous process of trying to achieve an objective in a new way[8].

In the latest study improvisation was directly defined as creation, adjustment and innovation under time pressure [10], and that was a behavioral ability based on the characteristics of contemporary organizations. This ability led people to utilize resources spontaneously, creatively solve emergencies and achieve desired goals. Improvisation is organizational when it is done by the organization or its members. Miner, et al(2001) emphasized another feature of improvisation, the concentration of resources in the process of creation and execution, Since improvisation is temporary, which requires the organization to immediately respond to changes in the environment. In a limited time, it is difficult for the organization to mobilize the best resources to solve the problem. It can only gather the existing physical, perceptual, and emotional, social resources to solve problems.

Based on literature research and the research results of organizational improvisation, this paper considered that staff improvisation includes three dimensions: spontaneity behavior, creativity behavior, and utilizing available resource behavior. Spontaneity highlights the simultaneity of planning and implementation, it is often not deliberate, but act immediately, needless to wait for all the conditions to be complete or carefully analyse. The process of improvisation emphasizes not only quick, but a certain novelty and uniqueness. There are a revision, reorganization, and a new design of the previous scheme in activities. In a word, it is not in accordance with the inherent ways and thinking patterns to think and act. Utilizing available resource behavior emphasizes that it should be carried out within the existing resources, using existing resources to respond quickly and using existing resources to create instead of seeking other completely new source.

### **Innovation Performance**

Innovation performance had been relatively mature as a branch of performance in the management field. The concept and dimensions of innovation performance had already achieved certain results. Innovation performance had always been concerned as a focus by entrepreneurs and researchers, as a most important part of corporate performance. Schumpeter believed that innovation included not only the application of new products, new materials and new technologies, but also the opening up of new markets and the emergence of new organizational forms. Cordero (1990) proposed that innovation performance should be divided into three parts: technology, marketing, and overall performance. However, some scholars believed that it was difficult to accurately measure innovation

performance, because of the immature research on innovation performance and the underdevelopment of science and technology.

The innovation performance was defined separately from narrow and broad perspectives [11]. In a narrow sense, innovation performance referred to the result of introducing innovation into market evaluation mechanism. In the narrower sense, innovation performance included three aspects of the invention, technology and innovation performance in the process of new concepts, forming innovative technology and importing the market. In summary, innovation performance as a result of corporate innovation activities was a relatively broad construct. At present, it is generally recognized that enterprise technological innovation activities are the most objective measure of an enterprise's innovation performance in terms of its operational efficiency and effectiveness. In the future empirical measurement process, in order to better express the impact of improvisation on corporate innovation performance. This study defined innovation performance as the improvement of corporate operating performance caused by corporate innovation activities.

### **Staff Improvisation and Innovation Performance**

By combing the literature of empirical research on improvisation, it is found that improvisation has an important impact on innovation performance, but the relationship between the two is not clear. The study of the impact of improvisation on the development cycle and success of new products, showed that there was a significant positive correlation between the the R&D team improvisation in the process of new product development and the speed of new product launch and the success of new product launch (Samra, Y. M.,et al,2008). The improvisation can shorten product development time, which in turn improves new product development performance and product characteristics[12]. Therefore, the following hypotheses were proposed:

H1: Staff improvisation has a significant influence on innovation performance .

H2: Staff spontaneity behavior has a significant influence on innovation performance.

H3: Staff creativity behavior has a significant influence on innovation performance.

H4: Staff utilizing resource has a significant influence on innovation performance.

### **Method**

#### **Measurement**

This study mainly referenced the mature measuring items about individual improvisation and firm innovation performance, which are widely cited and proved to be mature with high reliability and validity by researchers in literature.

#### **Innovation Performance**

Innovation performance of staff was measured by theirs subjective cognition. The scale was constructed using Bell (2005), Ritter and Gemunden (2004), with 5 items. Such as, "we often take the lead in using of new technology in In the industry", "Our products have a very good market response in improvement and innovation", etc.

#### **Staff Improvisation**

The items of improvisation scale was designed referring to the scales developed by Crossan & Vera (2005), and Cao Guangming (2013), There were three sub-scales: spontaneous behavior, creative behavior, and utilizing available resource behavior, and 9 items in all. such as "we can implement thinking while dealing with certain issues", "we can take risks when proposing new ideas for completing tasks", etc.

#### **Control variables**

Control variables include some basic information about the employee, such as gender, age, education level, tenure, etc.

## Sample

The samples in this study are mainly from employees engaging in technology service companies. To test the hypotheses, this study carried out a field study in the enterprise in Beijing, Shanghai, Guangzhou, Hebei, etc. The respondents were strictly voluntary in this study. Data were gathered through a standardized questionnaire, which contained 7-point Likert scales. In order to maximize the commitment to the study, the participants were assured that their respondents would be strictly confidential, and the survey outputs would contain data in a aggregated form without any individual identification, and used for research purpose only. A liaison person in each firm, who was responsible for distributing and returning the questionnaires. Of a total of 248 individuals involved, 213 usable surveys were completed (a 91% response rate), and no team in the sample had a response rate lower than 80%.

## Analysis and Results

### Reliability and validity tests

Internal consistency and construct validity was assessed to test the reliability and validity. The results show that KMO = 0.922. Burtlett sphericity test results show that the approximate chi-square value is 2077.461, df = 136, P = 0.000, indicating that the measurement items are suitable for factor analysis, and the factor load of each item is greater than 0.5; The Cronbach'sa values of staff improvisation and innovation performance are 0.866 and 0.903, all of which are greater than 0.7; the AVE of all variables are greater than 0.5, and the CR are greater than 0.7. Confirmatory factor analysis was adapted to test the construct validity, The results are shown in the table 1,  $\chi^2/DF$  is less than 3, RMSEA is less than 0.08, The values of CFI GFI, NFI and TLI are all greater than 0.8, 3 variable measurement scales have good construct validity.

**Table 1.** The results of confirmatory factor analysis for variables

Model fit	$\chi^2/DF$	RESEA	CFI	GFI	NFI	TLI
Staff Improvisation	1.413	0.043	0.990	0.968	0.966	0.984
Innovation Performance	2.275	0.075	0.990	0.980	0.983	0.981

### Correlation Analysis

The existence of a certain degree of correlation between variables is the premise of regression analysis. Table 2 shows the descriptive and correlations matrix for variables in this study. The correlation between staff improvisation and innovation performance is positive and significant ( $r=0.621$ ,  $p<0.01$ ); The correlation between spontaneity dimension of staff improvisation and innovation performance is positive and significant ( $r=0.537$ ,  $p<0.01$ ); The correlation between creativity dimension of staff improvisation and innovation performance is positive and significant ( $r=0.513$ ,  $p<0.01$ ); The correlation between utilizing available resource dimension of staff improvisation and innovation performance is positive and significant ( $r=0.470$ ,  $p<0.01$ ).

**Table 2.** Descriptive and Correlation Matrix for Variable

Variable	Mean	SD	1	2	3	4	5
1 Innovation Performance	4.811	.869	1				
2 Staff Improvisation	4.652	.369	.627**	1			
3 Spontaneity	4.449	.169	.537**	.750**	1		
4 Creativity	4.596	.489	.513**	.818**	.438**	1	
5 Utilizing Resource	4.782	.471	.470**	.805**	.450**	.526**	1

Notes: n=213; \*  $p<0.05$ , \*\*  $p<0.01$

## Regression Analysis

This study tested the relationship between improvisation and innovation performance through regression analysis. In model 2,  $R^2$  is 0.402, that indicating the explicable variation of innovation performance was 40.2%. Staff improvisation had a significant positive impact on innovation performance ( $\beta = 0.615$ ,  $p < 0.001$ ), so hypothesis (H1) was supported.

In model 3,  $R^2$  is 0.280, that indicating the explicable variation of innovation performance was 28.0%. Spontaneity behavior of staff improvisation had a significant positive impact on innovation performance ( $\beta = 0.502$ ,  $p < 0.001$ ), so hypothesis (H2) was supported. In model 4,  $R^2$  is 0.282, that indicating the explicable variation of innovation performance was 28.2%. Creativity behavior of staff improvisation had a significant positive impact on innovation performance ( $\beta = 0.503$ ,  $p < 0.001$ ), so hypothesis (H3) was supported. In model 5,  $R^2$  is 0.283, that indicating the explicable variation of innovation performance was 28.3%. Utilizing resource behavior of staff improvisation had a significant positive impact on innovation performance ( $\beta = 0.427$ ,  $p < 0.001$ ), so hypothesis (H4) was supported. As depicted in Table 3.

**Table 3.** The Result of Regression Analysis

	Innovation Performance				
	M 1	M 2	M 3	M 4	M 5
	$\beta$	$\beta$	$\beta$	$\beta$	$\beta$
Gender	-0.088***	-0.059	-0.058	-0.074	0.083
Age	0.166	0.084	0.119	0.128	0.200
Education	-0.011	-0.015	-0.003	-0.007	-0.015
Improvisation		0.615***			
Spontaneity			0.502***		
Creativity				0.503***	
Utilizing Resource					0.427***
R2	0.031	0.402	0.280	0.282	0.283
F	3.617***	57.572***	33.284***	33.680***	33.800***

Note: \*,  $p < 0.05$ ; \*\*,  $p < 0.01$ ; \*\*\*,  $p < 0.001$

## Discussion and Conclusion

Improvisation is a dynamic ability in organization that is done by the organization or its members. Therefore, it occurs at various levels and different dynamics. Improvisation would happen within one (individual), between two or a few (team) or many peoples (organizational). Therefore, this paper focuses on individual level staff improvisation. Based on literature research, the staff improvisation was defined as the behavior ability that creatively combine and distribute available resources to perform task, with unconventional plan or method in case of treatment-emergent event or emergency circumstances.

This study focuses on the relationship between improvisation and innovation performance of staff in technology service enterprises in the Chinese context. Through empirical research, it had found that staff improvisation exert positive effects on the innovation performance. Furthermore, the three sub-dimensions of improvisation of staff, including spontaneity behavior, creativity intention and utilizing available resource, can significantly promoted the firm innovation performance. Although some scholars abroad shows that fuzzy between the main effect, but this paper based on a technology service enterprises staff as the research object, found that individuals impromptu spontaneous,

creative and dimension of utilizing available resource are conducive to R&D staff innovation, and improve their innovation performance, so managers should encourage the staff's ability to play improvisation. This is consistent with studies by Chinese scholars.

This article further enriches and deepens improvisation research. Since the concept of improvisation was introduced into organization management, the current research perspective has covered topics such as technology research and development, innovation, organizational learning, strategy, and marketing. However, it is clear that improvisation on high-tech enterprises has not received enough attention, and high-tech enterprises are precisely the environment where improvisation is most likely to occur. At the same time, this article decentralizes the perspective of improvisation from the overall level of the organization to individual employees, and examines the effect of individual improvisation in the organization from a more micro perspective, which is conducive to a more precise study of improvisation in organization. Staff improvisation is the source of organizational improvisation. Studying individual improvisation can better explain and manage organization improvisation [13]. This article attempts to research the staff improvisation staff technology services enterprise, and provides a new path for the research of improvisation.

### **Limitations and Prospects**

This study adopted employee self-evaluation for survey and cross-section data for analysis. However, completely self-rated data may not only affect the availability of the questionnaire, but also further affect the accuracy of the data due to the bias and selective memory of the researchers. And cross-section data reflects the relationship between variables at a certain point in time, it is difficult to explore the dynamic relationship of improvisation on innovation performance.

In the future, employee self-evaluation and leadership review can be adopted in the form of longitudinal data to continue relevant research. Subsequent study could carry out longitudinal studies or case studies based on time span to further explore the causal relationship between variables. Moreover, improvisation management was currently divided into three levels: organization, team and individual. An organization, when in state of improvisation, Which has the characteristics of a complex system, such as self-organization, mutation, Non-linear change, and so on. Further cross-layer research could be carried out, especially focusing on the impact of team-level factors on individual improvisation, and further clarifying how individual improvisation plays a role in organizations and teams, and providing more scientific management suggestions for stimulating employee improvisation.

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