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Research on the Influence of Senior Management Team Structure on Team Performance

From the Perspective of Shared Mental Model

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***Abstract*—The senior management team has always been a research hotspot in various fields. Most scholars only study the influence of senior management team structure on Shared Mental Model and Shared Mental Model on team performance, without really considering the three. In order to study the relationship between senior management team structure, Shared Mental Model and team performance, this paper uses SPSS 18.0 and AMOS 24.0 to analyze the factors affecting team performance and their paths through the structural equation model, and finds that Shared Mental Model plays a part of mediating role in the influence of senior management team structure on team performance.**

Keywords—senior management; team structure; Shared Mental Models; team performance

I. INTRODUCTION

Overall decisions of modern enterprises are often made by senior management teams. At present, researches on senior management teams mainly focus on team conflicts and other aspects. Even though a few scholars focus on the relationship between the ability of team members to share information and learn from each other and the structure and performance of senior management teams, it is only a single study. Therefore, this study will combine the three factors and study the influence of senior management team structure on team performance from the perspective of Shared Mental Model.

II. LITERATURE REVIEW

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A. Senior Management Team Structure

A senior management team is a group of senior executives with decision-making and executive capabilities. The executive layer has strong executive ability and leadership, is able to timely deal with problems, and has the ability to control the severity of problems within a certain range. Senior management team structure plays an important role in the decision-making and execution process.

Huang He Da (2015) proposed that the measurement dimensions of team structure include personality and age, and the homogeneity of personality reduces conflicts among members, so as to facilitate the decision-making of unified goals [1]. Li Xue, Wei Yuher (2015) put forward the structure of the team also includes the ability to measure dimensions [2].The executive team with strong ability often has higher comprehensive strength, which enables the team to have more advanced decision-making and execution ability. Cheng Dan (2012) proposed that the professional background of the core players in a team is also one of the important dimensions [3].

In this paper, the team structure was measured from three dimensions of population characteristics, ability and heterogeneity of professional background. Demographic characteristics include age differences, personality and other factors. These three dimensions are more in line with the current talent development needs and can well reveal the characteristics of the current executive team.

B. Shared Mental Model

In 1943, Kenneth Craik put forward the concept of mental model, which refers to the psychological reflection of an individual in reality or imagination. Craik believed that mental model was rooted in the mind of an individual and affected individual behavior.

Based on the research on mental model, cannon-bowers and Salas (1993) studied mental model at the team level and proposed the concept of Shared Mental Model. They believed that the common cognition of team members could coordinate their behaviors and achieve common goals [4]. According to Jin Yanghua and Wang Chongming (2006), the Shared Mental Model refers to team members involved in different professional fields playing corresponding roles, achieving common cognition through communication and coordination, and striving for common goals [5].

C. Team Performance

The dimension of team performance has always been a hot topic of debate. The narrow dimension of team performance measurement only includes financial indicators, and some scholars pay attention to internal factors of the team.

Nie Fengying (2017) took the discipline service team as the research object, and proposed that the positive communication among members of a team could greatly improve the quality of teamwork [6]; Xu Ke (2016) found that team fit among team members had a positive effect on team performance [7]; Liu Yazhuan (2018) believed that the high level of equilibrium ability had a high position in the senior management team, and the team could improve the international status of the enterprise by forming efficient long-term decisions [8].

In the research on the dimensions of team performance, few scholars pay attention to the quality and efficiency of internal communication among team members. This paper measures from the three dimensions of communication effectiveness; team fit and balance ability to enrich relevant content.

III. Research Hypothesis and Theoretical Framework

For the research of Shared mind model, scholars are relatively mature from the concept to the application of inquiry system, but most of them only study the relationship between Shared mind model and senior management team structure or the relationship between Shared mind model and team performance, without really considering the three. Based on this research defect, this paper delves into the possible relationship among the three.

A. Research Hypothesis

1) Senior management team structure and team performance

Yang Qing and Wang Yu (2019) proposed that age and personality have a positive impact on entrepreneurial team performance [9]; Lu Chen, Cao Fanghui, Zhou Zhizhen and Gao Hong Li (2017) found that whether senior management teams had the same or similar professional background would determine the knowledge structure of the team and the professionalism of organizational decisions [10].

Based on the above literature research, this paper proposes the following hypotheses:

H1: senior management team structure has a significant positive impact on team performance.

2) Senior management team structure and Shared Mental Model

Xu Hong Jun (2015) conducted an empirical study on a total of 29 cross-cultural teams in some joint ventures and wholly foreign-owned enterprises in Tianjin, Hebei and other provinces and cities, and found that senior management team structure has a significant positive correlation with the construction of Shared Mental Model[11].

Based on the above research, this paper proposes the following hypotheses:

H2: the top management team structure has a significant positive impact on the Shared Mental Model.

3) Shared Mental Model and team performance

Zhou Shuangxi (2018) took the Shared Mental Model as a variable of the group from the objective level and the fact level based on the sharing behavior of individual researchers, and confirmed its influence on team performance [12]; Wang Min and Pang Juan et al. (2017) revealed that communication among team members depended largely on the Shared Mental Model, and the model had a positive impact on the establishment of communication mechanism [13].

Based on the above relationship research, this paper proposes the following hypotheses:

H3: Shared Mental Model has a significant positive impact on team performance.

4) Research on mediating effect of Shared Mental Model

Hao Jingxi et al. (2015) conducted an empirical survey of 296 R&D personnel in 21 high-tech enterprises and found that the team-based Shared mind model played a full mediating role, while the collaborative model played a part of mediating role [14]. Zhang Jianwei, Ren Yongcan et al. (2018) verified the mediating effect of Shared mind model after investigating and studying research teams of college students [15].

Based on the above relationship research, this paper proposes the following hypotheses:

H4: Shared Mental Model mediates the effect of team structure on team performance.

B. Theoretical Framework

Through the above literature analysis, this paper measures the structure of senior management team from three dimensions of population characteristics, ability and heterogeneity of professional background. Team performance is discussed from three dimensions: communication effectiveness, team fit and balanced ability. Shared Mental Model mediates the effect of top management team structure on team performance. The planning theory model is shown in the following "Fig. 1".

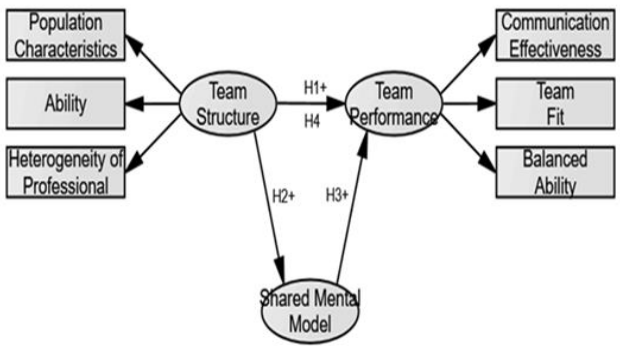

Fig. 1. Plan theory model diagram.

IV. Research Design and Data Analysis

A. Questionnaire Design

In this paper, the Likert five-level scale is used to design a questionnaire consisting of three dimensions: the structure of the senior management team, the Shared Mental Model and the team performance. In questionnaire compiled, combined with the actual situation, adopt a kay mark team process under the dynamic environment, the relationship of Shared Mental Models and organizational performance questionnaire part of the item, the senior management team in Wuhan area as the main sample, the statistical distribution of 103 questionnaire, recycling effective questionnaire 89, effective recovery rate was 86.41%. Among the samples, 39.81% are registered companies, 28.16% are entrepreneurial groups, and 32.03% are university associations.

In the sample, there are 36 managers with a master's degree or higher education, accounting for 40.45%, 41 members with a bachelor's degree, accounting for 46.07% and 13.48%. It can be seen that most of the senior management team members are high-quality talents with high education. In the sample, the age range from 26 to 30 years old was the largest; accounting for 53 people (59.55%). It is in line with the trend of young senior management team.

B. Data Reliability and Validity Analysis

The results of SPSS 18.0 analysis are shown in "Table I". According to the reliability Cronbach's alpha coefficient test, the Cronbach's alpha coefficients of senior management team structure, Shared Mental Model and team performance are all above 0.9, indicating that the measurement dimension set in this paper has high credibility. The KMO values of the three variables were 0.890, 0.911 and 0.925, respectively (when the KMO value was above 0.8, it was appropriate, and when the KMO value was above 0.9, it was very appropriate), and when the Sig value was above 0.000, it indicated that the questionnaire had high reliability and validity.

After the analysis of AMOS 24.0 software, the structural equation model of the theoretical model is shown in "Fig. 2".

TABLE I. Cronbach's Alpha Coefficient and KMO and Bartlett Spherical Test

The variable name	classification	Cronbach's Alpha	KMO	Sig.
Team structure		904.	890.	000.
Shared Mental Model		953.	911.	000.
Team performance		960.	925.	000.

TABLE II. Convergence Validity

Dimensions	The title	Parameter significance estimation				Factor load	The questions the reliability	Component reliability	Convergent validity
		Unstd.	***S.E.***	***T - the value***	***P***	***Std.***	***SMC***	***CR***	***AVE***
Top management team structure	demographics	1.000				734.	539.	870.	693.
	Ability	1.523	200.	7.607	*	962.	925.		
	Professional heterogeneity	1.163	157.	7.417	**	785.	616.		
Shared Mental	Q8_ Shared Mental Model 1	1.000				817.	0.667	0.926	0.676

Dimensions	The title	Parameter significance estimation				Factor load	The questions the reliability	Component reliability	Convergent validity
		Unstd.	*S.E.*	*T - the value*	*P*	*Std.*	*SMC*	*CR*	*AVE*
Model	Q8_ Shared Mental Model 2	935.	102.	9.186	*	834.	0.696		
	Q8_ Shared Mental Model 3	1.051	108.	9.770	*	870.	0.757		
	Q8_ Shared Mental Model 4	950.	110.	8.643	**	799.	0.638		
	Q8_ Shared Mental Model 5	944.	112.	8.439	**	786.	0.618		
	Q8_ Shared Mental Model 6	1.043	116.	9.004	**	823.	0.677		
Team performance	Effectiveness of communication	1.000				951.	904.	944.	849.
	Team fit	877.	053.	16.547	**	937.	878.		
	Ability to balance	849.	062.	13.634	**	874.	764.		

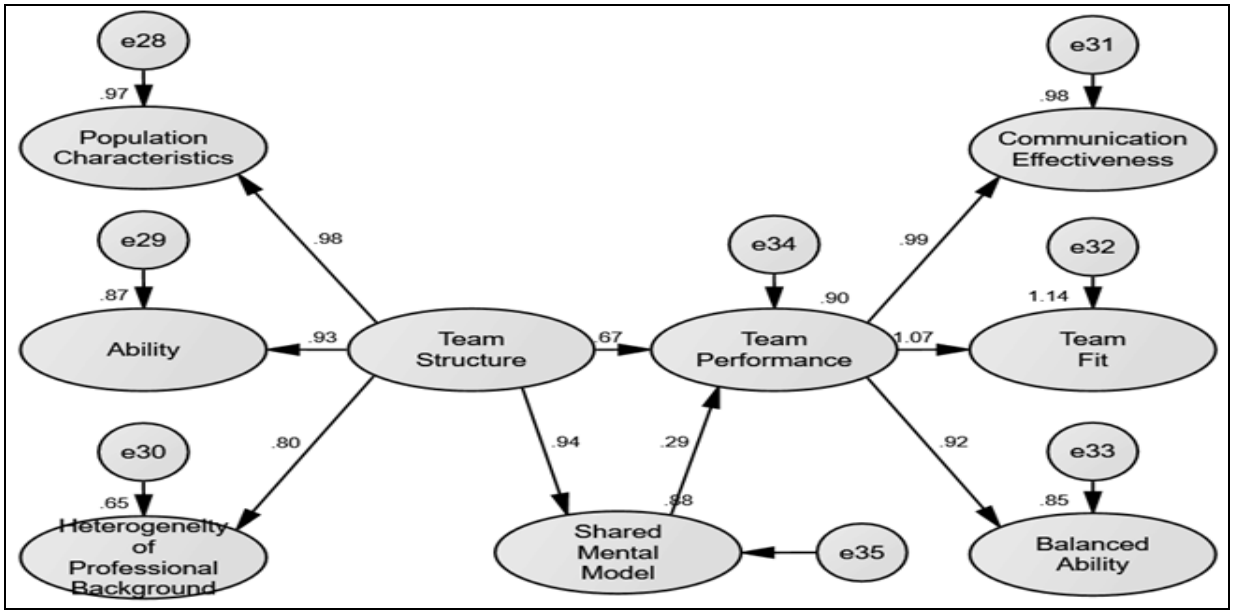

Fig. 2. Structural equation model diagram.

C. Structural Equation Model Analysis

After the analysis of AMOS 24.0 software, the structural equation model of the theoretical model is shown in "Fig. 2".

1) Convergence validity analysis

The CFA analysis results of this study are shown in "Table II". The factor loads of the three dimensions of the high-level management team structure, Shared Mental Model and team performance are all between 0.7 and 0.95, which are significant. The reliability of the subject is between 0.5 and 0.9, the constituent reliability is respectively 0.870, 0.926 and 0.944, and the convergence validity is respectively 0.693, 0.676 and 0.849. Factor load is greater than 0.6, title reliability is greater than 0.5, component reliability is greater than 0.7, and convergence validity is greater than 0.5. Therefore, the three dimensions of senior management team structure, Shared mind model, and team performance have convergent validity.

2) Path coefficient analysis

Path coefficients are shown in "Table III". The path coefficients of the high-level management team structure on the Shared Mental Model and the high-level management team structure on team performance are 0.936 and 0.672 respectively, both of which are significant. Hypothesis H1 and H2 have been verified. However, the standardized path coefficient of Shared mind model on team performance is not significant; indicating that Shared mind model has no significant impact on team performance, and hypothesis H3 is not established.

3) Analysis of mediating variables

According to the standard of Hyes (2009), the mediating effect is not significant when the Z value is greater than 1.69, and both 0.302 and 0.727 are less than 1.69. However, Bootstrapping values do not contain 0, and indirect effects exist (as shown in "Table IV").

TABLE III. PATH COEFFICIENT TABLE

The path		Standardized path coefficient	Nonstandardized path coefficients	S.E.	C.R.	P
Team structure	Shared Mental Model	936.	1.217	188.	6.476	* * *
Team structure	Team performance	672.	912.	366.	2.490	013.
Shared Mental Model	Team performance	287.	300.	262.	1.146	252.

TABLE IV. ANALYSIS OF MEDIATION VARIABLES 1

variable	Point estimates	Product of coefficients The Product of Coefficients		Bootstrapping Bias - Corrected 95% CI		Bootstrapping The Percentile 95% CI	
		SE	*Z*	*The Lower*	*Upper*	*The Lower*	*Upper*
			The Total Effects				
Team structure - team performance	1.277	205.	6.229	934.	1.807	926.	1.771
			An Indirect Effects				
Team structure - team performance	365.	1.206	302.	2.976	1.270	2.594	1.315
			Direct Effects				
Team structure - team performance	912.	1.255	727.	030.	5.101	- 049.	4.047

V. CONCLUSION

In this paper, from the perspective of Shared Mental Models by senior management team structure, the structural equation model research to the relations between Shared Mental Model and team performance, the following conclusions.

- The senior management team with better team structure has higher decision-making ability. The senior management team members have similar personality and age, which is conducive to communication between team members and reach an agreement in the process of making decisions.
- The rich professional background of senior management team members enables them to timely find and correct errors in the decision-making process
- Although it is easy for team members to reach consensus, which improves the efficiency of decision-making to some extent, it is difficult to ensure the quality of decision-making. Sometimes conflicts between members are required.

Based on the above research, this paper puts forward the following suggestions.

- Enterprises should pay attention to the structure of senior management team, which can be examined from three aspects, namely demographic characteristics, ability and heterogeneity of professional background of senior management members, strengthen the cultivation of members' ability, and create a harmonious communication environment.
- While creating a harmonious decision-making atmosphere, the enterprise should conduct expected risk assessment before the implementation of the decision, strengthen its internal process control during the implementation, and formulate risk response plans.

At present, some scholars divide the Shared Mental Model into task-based Shared Mental Model and team Shared Mental Model. Task-based Shared Mental Model and team Shared Mental Model have different characteristics. The next step is to classify Shared Mental Models, which may lead to different conclusions.

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