TMT Behavior Integration, TMT Heterogeneity and Ambidexterity of Organization—Based on Data from Small and Medium Enterprises

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Abstract. Constructing the ambidexterity of organization is a common strategy that an enterprise should consider in a fierce competitive environment. Despite much research on channels and modes used to build the ambidexterity of organization, it is still not yet explicit in some fields. Drawing on the literature of organizational ambidexterity, TMT (top management team) behavior integration and TMT heterogeneity, this study develops a theoretical model explaining the relationships among the three factors from different perspectives. Using the hierarchical regression method and survey data from 122 SMEs in China, the author finds that (1) TMT behavior integration and TMT heterogeneity have positive impacts on ambidexterity, (2) TMT heterogeneity moderates the relationship between TMT behavior integration and the combined dimension of ambidexterity (CD), and (3) TMT heterogeneity does not moderate the relationship between TMT behavior integration and the balanced dimension of ambidexterity (BD).

Introduction

Innovation is the source of organizational development; only by constantly innovating can an organization maintain its vitality and competitiveness and occupy a place in an increasingly competitive market. March [1] introduced the concept of “dual innovation” and notes that central to the ability of a firm to survive over time is its ability to profitably exploit existing assets and positions and simultaneously to explore new technologies and capture new opportunities. The functions of the two kinds of innovation are to ensure the current viability and the future viability, respectively, of the firm. Then, a question arises regarding how an organization maintains a balance of the two modes of innovation to adapt for survival and development, as well as what kind of organizational ambidexterity it should have.

In the process of promoting the ambidexterity strategy, TMT plays a decisive role in the organization. Smith & Tushman [2] believes that the effective implementation of exploitation and exploration by TMT would promote the continuous growth of organizational performance and that the strategic layout contradicts the organizational structure; the root of the paradox lies in some executives. The operational mechanism of a TMT can determine the quality of decisions. Meanwhile, the composition of TMT also affects the formulation and implementation of strategic decisions. The homogenization of team members will lead to a single mode of thinking and uniformity of information access. Even if a good organizational code or TMT behavior integration exists, it is still difficult to promote strategic organizational ambidexterity. The following questions arise: how do TMT behavior integration and TMT heterogeneity affect organizational ambidexterity, and what is the relationship between them? Comparing most of the data collected in this field from the market economy, this paper utilizes data from SMEs in China. The conclusion could be used as reference for the development of SMEs under the condition of economic transformation.
Theory & Hypothesis

Organizational Ambidexterity

Ducan [3] introduces the term "dual innovation" to describe the strategic orientation for an organization focusing on both types of innovations. March [1] shows that exploration includes things captured by terms such as search, variation, risk-taking, and experimentation and that exploitation includes such things as refinement, choice, production, and efficiency. Exploitation possesses the characteristic of incremental innovation to maintain current viability, and exploration has the characteristic of breakthrough innovation fostering future competitive advantage. He & Wong [4] mention that “the two kinds of innovations are based on fundamentally different logics that creates tensions”. Therefore, maintaining an appropriate balance or trade-off between them is a primary factor in system survival and prosperity [1, 2]. Further, “organizational ambidexterity is a core dynamic capability, the ability of senior managers to seize opportunities through the orchestration and integration of existing assets to overcome inertia and path dependence” [5].

For models of ambidexterity, there are some classifications. 1) “Dual structure”[3,6,7]. However, it was found that although structural differentiation is conducive to reducing the conflict between two innovative activities, it is difficult to achieve real structural separation, and tight links across units at the senior executive level must be maintained [8]; the task of balancing exploration and exploitation should be delegated to the higher-level system [9] or could be achieved with the strategy of “organizational vacillation” [10]. 2) Birkinshaw & Gibson [11] suggest “contextual ambidexterity” with individual employees dividing their time between alignment-focused and adaptability-focused activities in the context of their day-to-day work. 3) Mom & Bosch [12] mention “leadership ambidexterity”, findings that top-down knowledge inflows conduct exploitation activities, bottom-up and horizontal knowledge inflows relate to these managers’ exploration activities, and encouraging different directions of knowledge flows facilitates “leadership ambidexterity”. Cao, G &Z [13] define two models of ambidexterity: the balanced dimension of ambidexterity (BD) and the combined dimension of ambidexterity (CD): “BD corresponds to a firm’s orientation to maintain a relatively close balance between exploratory and exploitative activities, whereas CD corresponds to their combined magnitude”. The findings are that managers in resource-constrained contexts may benefit from a focus on managing trade-offs between exploration and exploitation demands, but for firms that have access to sufficient resources, the simultaneous pursuit of exploration and exploitation is both possible and desirable.

TMT Heterogeneity

The importance of TMT’s function is emphasized. Wiklund & Shepherd [14] stress that one of the important roles of senior managers is resource integration and assignment, which should guarantee that the organization is in a more opportunity-accessible environment. Smith & Tushman [2] mention that sustained organizational performance depends on TMT effectively exploring and exploiting. Hambrick & Mason [15] propose a theory called "upper echelons perspective." The theory states that organizational outcomes, strategic choices and performance levels are partially predicted by managerial background characteristics. It implies that strategic choices result from idiosyncrasies of TMT in discontinuous environments. TMT cognitive conflict caused by the cognitive differences is thought to be closely related to innovative orientation, and heterogeneity of TMT is the leading cause of cognitive conflict [16]. Heterogeneous TMT can lead to higher-quality decisions than homogenous teams and a higher possibility of increased market share and profitability [17]. The greater the heterogeneity of educational backgrounds of TMT members, the faster the organization can launch new products in comparison to its competitors and become the industry leader [18]. Researchers have verified this hypothesis through various experiments. Talke & Rost [19] empirically proved that TMT diversity has a strong impact on the strategic choice of firms to focus on fields of innovation. Acar [20] finds that TMTs with a higher degree of age diversity leads to higher levels of export performance. Bantel & Jackson [21] find that more innovative banks are managed by more educated teams who are
diverse with respect to their functional areas of expertise. Therefore, this study assumes that TMT heterogeneity will positively affect the quality of decision-making and the strategic orientation of organizational ambidexterity.

**TMT Behavior Integration**

Social categorization and identity theory indicate that social categorization into groups is a sufficient condition to induce discrimination against an out-group [22]. It is likely that there would be some sub-groups in TMT according to the theory. Quality decisions result from a well-aligned organizational code among TMTs. Without such an organizational code, conflicts between sub-groups would occur, and the frequency of team interaction as well as the internal communication efficiency and cooperation would be reduced. Hambrick [23] puts forward the concept of "aggregation" which is used in integrating the behavior of TMT. The elements of TMT behavior that should be integrated are information exchange, team cooperation and joint decision-making. TMT behavior integration could encourage members of TMT to consider the overall organization and avoid focusing only on "their own field". Carmeli & Schaubroeck [24] find that TMTs in which members reported higher behavioral integration made higher quality strategic decisions. A large body of research supports the result [23,25,26,27,28,29]. Therefore, this study assumes that a high level of TMT behavioral integration will lead to a high degree of cooperation among members, improving the efficiency of decision-making and effectively promoting organizational ambidexterity. Two assumptions have been made above that describe how single elements affect organizational ambidexterity. In reality, two or more elements can interact in their effects on the same objective. Therefore, following hypothesis model is put forward.

**Hypothesis Model**

According to the above analysis, this study introduces a model (F1) in which TMT behavior integration acts as an independent variable, TMT heterogeneity acts as a moderating variable, and organizational ambidexterity acts as a dependent variable. Referring to Cao et al.[13], two kinds of ambidexterity (CD and BD) are applied to determine which is more suitable for operation. The purpose of this study is to empirically verify the moderating role of TMT heterogeneity between TMT behavior integration and organizational ambidexterity (CD and BD).

![Diagram]

F1: A model of the relations in ambidexterity of organization

- **H1a**: TMT behavior integration and TMT heterogeneity are positively related to CD
- **H1b**: TMT behavior integration and TMT heterogeneity are positively related to BD
- **H2a**: TMT heterogeneity plays a positive moderating role in the relationship between TMT behavior integration and CD
- **H2b**: TMT heterogeneity plays a positive moderating role in the relationship between TMT behavior integration and BD
The Analysis of Data

Data Source and Inspection

A total of 200 firms were investigated, and 122 completed and usable questionnaires were ultimately received from the CEOs and CTOs. The data collection is cross-sectional, and all data were from small and medium-sized organizations (below 300 employees and younger than 20 years), which are mainly located in high-tech promoting development zones in China; further, all are highly technical enterprises with strong creative tendencies. The history of the sample organizations is generally short, with only 2.5 percent of organizations aged 15 years or more, and only 15.6 percent of organizations aged over 10 years. The sample enterprises span a wide range of professional backgrounds, including rapidly developing high-tech industries in more recent years (biotechnology, computer software, high-tech materials, environmental technology, electronic appliances and medical devices, etc.). The content validity meets accepted standards and expert opinions of the content and the reliability coefficient meet test of the reliability criteria for different sources of data with consistency validity.

Variable Set-Up

In this paper, the age of the organization, the organization scale, the organizational sales growth rate and R&D capital investment are used as control variables. TMT heterogeneity is used as a moderating variable, and educational background, tenure, age, and career experience are measurement dimensions that are widely used for this kind of study. TMT behavior integration is used as a dependent variable, and three measurement dimensions are adopted. One is “joint decision” including five criteria: when making decisions, a team always searches widely for solutions; in decision making, a team always sets a variety of action plans for the stated objectives; a team is always able to view risks and opportunities in multiple ways in decision-making; a team always carefully analyzes the pros and cons of each action plan in decision-making; a team always selects a course of action through a variety of criteria in decision-making. The second is “cooperation act” including four criteria: it does not take much time for team members to adapt to each other in decision making; a team always makes strategic decisions very quickly; and it always takes a long time to make important decisions. The third is “information exchange” including four criteria: to improve the performance of the organization, members will note each other’s deficiencies in their work; the view of any member will be questioned without scruple; to improve the effectiveness of our work, we will evaluate each other's shortcomings; and we will brainstorm to get better results. Organizational ambidexterity is used as an independent variable. There are two parts. Part one is used to measure exploratory innovation which includes four criteria: upgrading of products; expanding product categories; exploring new markets; and entering into new technical fields. Part two is used to measure exploitative innovation and includes four criteria: to improve the quality of existing products; to improve the universality of existing products; to reduce the production cost of the products; to consolidate the existing markets.

The scale to measure the data of the questionnaire adopts the method used by He & Wong [4] using 7-time Likert rating scale which expresses the importance of different dimensions in the scale. The paper also adopts the research method proposed by Cao et al.[13], measuring CD by multiplying of exploration innovation and exploitative innovation and measuring BD by subtracting of exploration innovation from exploitative innovation. In the analysis of the data of BD, the data are arranged by subtracting the data from the highest value in the data, making the value positive to facilitate processing.

Correlation Analysis

Using the data from 122 valid questionnaires, this study conducts empirical analysis in the forms of descriptive statistical, relative and regression analyses. The descriptive analysis of variables shows that the mean exploitative innovation value is higher than that of exploratory innovation, indicating that the proportion of exploitative innovation in the enterprises is higher than that of exploratory
innovation. Table 1 lists the relationships among the variables involved in this study. There are some findings that are in keeping with the hypothesis. For example, as scale increase, firms tend to focus on long-term development with more investment in R&D; the older the organization, the higher the degree of TMT heterogeneity; and behavioral integration of TMT and heterogeneity of TMT promotes the ambidexterity of organizations.

Table 1. Correlations among variables (Pearson correlation matrix).

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.Age of organization</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.Size of organization</td>
<td>.590**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.Growth of organization</td>
<td>-.242**</td>
<td>-.151</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.Research input</td>
<td>.166</td>
<td>.533**</td>
<td>-.113</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.CD</td>
<td>.021</td>
<td>.135</td>
<td>.093</td>
<td>.072</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.BD</td>
<td>.004</td>
<td>-.015</td>
<td>.096</td>
<td>-.188*</td>
<td>.031</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.TMT heterogeneity</td>
<td>.540**</td>
<td>.285**</td>
<td>-.163</td>
<td>.075</td>
<td>.196*</td>
<td>.304**</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>8.TMT behavior integration</td>
<td>-.214**</td>
<td>-.143</td>
<td>.265**</td>
<td>-.174</td>
<td>.274**</td>
<td>-.021</td>
<td>-.163</td>
<td>1.00</td>
</tr>
</tbody>
</table>

**. Significant correlation was found at the .01 level (bilateral), *. Significant correlation was found at the .05 level (bilateral)

The Regression Analysis of CD

The results of hierarchical regression are shown in table 2. The analysis of TMT behavioral integration and CD show the following: F = 2.843 and p < 0.05, which means that the two factors are significantly positively related. The analysis of TMT heterogeneity and CD shows the following: F = 3.915 and p < 0.01, which confirms that the two factors are significantly positively related. Model H1a is workable. The analysis of the moderate role of TMT heterogeneity in the relationship between TMT behavioral integration and CD shows the following: F = 4.272 and p < 0.01, so H2a is validated.

Table 2. Regression analysis of TMT behavioral integration, TMT heterogeneity and CD.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of organization</td>
<td>-.068(-.373)</td>
<td>-.013(-.115)</td>
<td>-.176(-1.411)</td>
<td>-.126(-1.011)</td>
</tr>
<tr>
<td>Size of organization</td>
<td>.195(1.450)</td>
<td>.169(1.303)</td>
<td>.185(1.469)</td>
<td>.183(1.480)</td>
</tr>
<tr>
<td>Growth of organization</td>
<td>.105(1.116)</td>
<td>.043(.459)</td>
<td>.050(.551)</td>
<td>.099(1.090)</td>
</tr>
<tr>
<td>Research input</td>
<td>.008(-.076)</td>
<td>.040(.370)</td>
<td>.040(.379)</td>
<td>.030(.291)</td>
</tr>
<tr>
<td>TMT behavioral integration</td>
<td>.291(3.128)**</td>
<td>.304(3.370)**</td>
<td>.297(3.344)**</td>
<td>.327(3.254)**</td>
</tr>
<tr>
<td>TMT heterogeneity</td>
<td>.293(2.893)**</td>
<td>.327(3.254)**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TMT behavioral integration*TMT heterogeneity</td>
<td>.211(2.345)**</td>
<td>.211(2.345)**</td>
<td>.211(2.345)**</td>
<td>.211(2.345)**</td>
</tr>
<tr>
<td>R² of the model</td>
<td>.034</td>
<td>.109</td>
<td>.170</td>
<td>.208</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>.001</td>
<td>.071</td>
<td>.126</td>
<td>.159</td>
</tr>
<tr>
<td>F value</td>
<td>1.030</td>
<td>2.843**</td>
<td>3.915***</td>
<td>4.272***</td>
</tr>
</tbody>
</table>

Note: The dependent variable is ambidexterity. The normalized regression coefficient beta and the value of the t-test of the coefficient in brackets are listed in the table. *p<.10, **p<.05, ***p<.01, two-tail test.

The Regression Analysis of BD

According to the regression analysis of the hypothesis H1b, F=1.448 and p>10, indicating that TMT behavioral integration and BD are not significantly correlated. The model is false. Since H1b is not workable, correspondingly, H2b is also not workable. The results are shown in Table 3.

Research Results and Discussion

Through data analysis, it is proved that TMT behavior integration and TMT heterogeneity positively relate to ambidexterity (CD). Regarding the above mentioned theory, many experts have proven the
law [23], and this paper reconfirms it. The purpose of TMT behavior integration including joint decision-making, cooperative activity, and information exchange is to make high-quality decisions. If there are no sufficient norms for promoting knowledge transfer, there can be no understanding and trust among members in TMT. Particularly in traditional Chinese culture, there is something known as the "middle way" orientation and "face culture"; as a result, members are reluctant to express differing opinions that might offend others. Meanwhile, TMT heterogeneity is a part of high-level organizational design that could effectively eliminate the side-effect of “circle culture” that result in the phenomenon of “one single brain”.

Table 3. The regression analysis of TMT behavioral integration and BD.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of organization</td>
<td>-.018(-.154)</td>
<td>-.033(-.279)</td>
</tr>
<tr>
<td>Size of organization</td>
<td>.143(1.071)</td>
<td>.150(1.120)</td>
</tr>
<tr>
<td>Growth of organization</td>
<td>.085(.910)</td>
<td>.102(1.067)</td>
</tr>
<tr>
<td>Research input</td>
<td>-.251(-2.297)**</td>
<td>-.264(-2.390)**</td>
</tr>
<tr>
<td>TMT behavioral integration</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>R² of the model</td>
<td>.053</td>
<td>.059</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>.021</td>
<td>.018</td>
</tr>
<tr>
<td>F value</td>
<td>1.639</td>
<td>1.448</td>
</tr>
</tbody>
</table>

*Note:* The dependent variable is BD. The normalized regression coefficient beta and the value of the t-test of the coefficient in brackets are listed in the table. *p<.10, **p<.05, ***p<.01, two-tail test.

The result proved the moderating role of TMT heterogeneity in the relationship between TMT behavioral integration and ambidexterity (CD). In reality, more factors could be involved in a simple function. When two variables simultaneously act on one variable, the results would be different compared to the independent actions of the two variables. The result illustrates that TMT behavioral integration regulates the operational mechanism of TMT members (decision-making procedure, communication procedure, communication frequency) which lays the institutional foundation for scientific decision-making, while TMT heterogeneity can provide human resources and generate the promotional effects of the role of TMT behavior integration on ambidexterity.

Cao et al. [13] mention that CD tends to maximize the sum of the two kinds of innovation instead of pursuing the absolute balance thereof, making it suitable for firms that have access to sufficient resources. When the environment changes, the organization needs to make appropriate adjustments to resources inputs in order for great innovation to occur. It is a coordinated effort to devote resources to adapt to environmental change and pursue a greater amount overall innovation. The samples used are all high-tech enterprises, with the characteristics of high risk and high return. High-tech enterprises are strongly supported by the government in terms of finance, policy and other resources. Therefore, they have rich resources available to them. While BD tends to maintain a fixed balance between the two types of innovation, it is suitable for firms in resource-constrained contexts. Therefore, in this case hypothesis H2a is correct and H2b is invalid. The standpoint of Cao et al. [13] is proved as well.

The deficiency of this paper is that the data used are cross-sectional in nature, which cannot reflect the effects of TMT behavior integration and TMT heterogeneity on organizational ambidexterity in a dynamic environment.

Reference


