Mental Model of Top Management Team: Dimensional Structure, Development Mechanism, Environment Construction

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Abstract. The purpose of this study is to explore the dimension, structure and development mechanism of TMT mental model, and the way TMT construct environment. Basing on the basic premise of “emotional man”, this study puts forward three research propositions to set up a research framework, and then we conduct a longitudinal case study of Lenovo group with the aid of causal map method, and draw the conclusion: First, value pursuit, business principles, business orientation and business model are the four dimensions of TMT mental model, and the value pursuit direct the business principles, the business principles direct the business orientation, the business orientation direct the business model. Second, the self-evolution of value pursuit is internal driving factors of the TMT mental model self-evolution. Third, as the self-evolution of TMT mental model, the way TMT construct environment will develop from choosing the environment actively, to breaking the environment actively, and finally, to creating the environment actively.

Introduction

Since Hambrick and Mason (1984) put forward upper echelons theory, a large amount of research has verified that the mental model of top management team is the key variables influencing enterprise performance after loosening rational man supposition. However, as the research focusing on the inner structure and activity mechanism of top management team is in short, the mental model of top management team still remains as “black box” to be explored (Lawrence, 1997). In fact, emotion and cognition are two kinds of most basic mental activities (Loveday, 1901), and in the interactions between emotions and cognition, emotion occupies more basic position. Emotion is the direct feeling and experience of conscious activities (Loveday, 1901), which is the source of momentum and initiative; the movement and development of emotions have the tendency of not being changed by the external environment (Scheler, 1993); the tendency is displayed in: the basic needs based on emotional desires have the “instinct oid” properties of being restrained by the environment but not being changed by the environment. When certain lower needs are satisfied, the corresponding higher level needs will take the predominant position (Maslow, 1954). As emotion has this property, Sartre, existentialism scholar, regards human beings as “emotional person” and believes that emotion is the essence of human beings’ existence. Thus, emotion should be the core element of managers’ mental model.

Research Design

Research techniques and objects: The issue studied in this paper is on how the mental model of top management team is formed and evolved, and how to interact with the environment. Therefore, the core of the research is to disclose the existing internal process of “how does it happen”; for the research of this kind of issues, case study is proper (Yin, 1994). The three research propositions put forward on the basis of previous research in this paper is the initial theoretical framework.

Data source: As the time span of this case study is large, the collected data from interviews may lead to such issue as recall bias; therefore, this paper takes historical text to make research. This paper collects information from multiple channels and makes use of principles of methodological
triangulation to compare and verify materials from various sources, to ensure the accuracy and data and to elevate the validity. The main sources are: books written by external researchers on the basis of field investigation and record in the development history of Lenovo; books and documentation written by internal members based on personal experience; and reports about Lenovo in famous finance and economics newspapers and periodicals.

**Cause-effect graphs:** This paper analyzes a large amount of collected text data on cases. As cause-effect graphs can reflect the inner special cognitive system of research objects and are helpful for disclosing the implicit knowledge and customs of enterprises, cause-effect graphs are commonly seen in the research on enterprise managers’ internal cognitive structure or mental model (Eden, 1992). Cause-effect graphs are helpful for this paper to reveal the structural dimensions of mental model reflected in the key events of each development phase of Lenovo’s top management team, the relationship among the dimensions and the interactive relationship between the mental model of top management team and the environment. This paper refers to the initial theoretical framework built by Carley and Palmquist (1992) first, and then start the procedures of cause-effect graphs. The four steps of cause-effect graph drawing put forward by Axelrod (1976) are as followings. First is identifying key sentences: his paper identifies the data in this paper one by one and then recognizes key sentences; second is to draw the original cause-effect graphs; third is to classify original concepts into present theories; fourth is to draw the final cause-effect graph. The example of cause-effect graph drawn with four-step approach is shown in Table 1.

Table 1 Example of cause-effect graph drawn with four-step approach

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Sentence identification</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>In 1986, the company sold 1300 sets of Hanzi boards and occupies one tenth share of the market; in Liu Chuanzhi’s view, “the advantages are not very obvious”. He realizes that the programs in the company are too many, which leads to the dispersion of strength; therefore, the company advocates the policy of “focusing on something important” in the next two years. The so-called “something important” is “Lenovo Hanzi board”. The reason is simple; Hanzi board is not only a “hit product”, and it can also bring along the sales of other products drastically and extend company’s influence to the whole nation. In the following year, the target of the company is directly pointing to Hanzi board, struggling to pull all the resources and people here.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 2</th>
<th>Original cause-effect graph</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Simplification of product category ————&gt; Struggle to develop Lenovo Hanzi board</td>
</tr>
<tr>
<td></td>
<td>Promote other products’ sales with Hanzi board sales</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 3</th>
<th>Classify original concepts into present theories</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>The simplification of product category is the generalization of the common features of businesses, which belongs to business general rules; Struggle to develop Lenovo Hanzi board, which is the option and development orientation of specific businesses and belongs to business orientation; Promote other products’ sales with Hanzi board sales, which is the strategy model to realize business activities and belongs to business model.</td>
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</table>

<table>
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<tr>
<th>Step 4</th>
<th>Final cause-effect graph</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>General rules Business orientations ————&gt; Business models</td>
</tr>
<tr>
<td></td>
<td>Simplification of product category ————&gt; Struggle to develop Lenovo Hanzi board</td>
</tr>
<tr>
<td></td>
<td>Promote other products’ sales with Hanzi board sales</td>
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</tbody>
</table>

**Validity and reliability**

© Validity. In the process of collecting and analyzing the collected data of cases, this paper adopts following approaches to ensure research validity. First is methodological triangulation of multiple data sources. In the process of collecting data, this paper collects related data from various channels, such as books written by internal and external people, speeches of leaders in the company,
enterprise annual, research data of the industry, media data, and so on; all kinds of data sources can
make the best of the both worlds, supplement each other and enforce the corroboration among
proofs. Second is to build proof chain. The cognitive structure and its evolution track of the top
management team in Lenovo group can be defined according to time series with using cause-effect
graphs.
② Reliability. This paper ensures the reliability of research through following ways. First is to
build record of research data bank. This paper builds research data bank after data triangulation, for
the following scholars to make inspection and re-analysis. Second is to develop case analysis
according to formal cause-effect graph approach and procedure. After making cause-effect graph
analysis coding and concept classification on multiple data, this paper makes detailed explanation
on coding and operating steps, to make following researchers to make inspection and re-analysis.

Case Study

Development history of Lenovo Group: Lenovo Group started in 1984, founded with 200
thousand yuan by the computer institute of Chinese Academy of Sciences. After constant
development of 28 years, Lenovo Group grows to be the second computer manufacturer in the
world, occupying as much as 12.9 % of the annual market and breaking the record. In 2012, Lenovo
Group was in world top 500 companies of Fortune, ranking the 370th with great efforts with the
revenue of 29.6 billion US dollars in 2011, and surpassing 80 places. In the classifying the data of
Lenovo Group, this paper firstly recognizes the key events influencing enterprises strategically,
builds data bank of key events, and divides the development history of Lenovo Group into 5 stages,
which are start-up stage, export-oriented industrialization, fast development, diversification stage
and internationalization stage. Then, this paper orders the key events in corresponding stages
according to their influence on enterprises, recognizes the representative key events (as is shown in
Table 2) further, takes them as the main research object and extracts and analyzes the mental model
in various development stages of the top management team.

<table>
<thead>
<tr>
<th>Time</th>
<th>Development stages</th>
<th>Representative key events</th>
<th>Main members in top management team</th>
</tr>
</thead>
<tbody>
<tr>
<td>1984-1988</td>
<td>Start-up</td>
<td>Agency for computers and Hanzi board sales</td>
<td>Liu Chuanzhi, Zhang Zuxiang</td>
</tr>
<tr>
<td>1989-1993</td>
<td>Export-oriented</td>
<td>Implement “overseas trilogy”</td>
<td>Liu Chuanzhi, Zhang Zuxian, and Li Qin</td>
</tr>
<tr>
<td>1994-1999</td>
<td>Fast development</td>
<td>Develop computer business unit</td>
<td>Liu Chuanzhi, Li, Yang Yuanqing</td>
</tr>
<tr>
<td>2000-2003</td>
<td>Diversification</td>
<td>Multiple attempts</td>
<td>Yang Yuanqing, Liu Chuanzhi</td>
</tr>
<tr>
<td>2004-2011</td>
<td>Internationalization</td>
<td>Merge and integrate with IBM computer department</td>
<td>Yang Yuanqing, Liu Chuanzhi, and Amelio</td>
</tr>
</tbody>
</table>

Data source: this research organizes

Constitutional dimensions and their interrelation of mental model of Lenovo Group’s top
management team: According to the data of collected case, this paper constructs the cause-effect
graph of the structural dimension of dominant mental model in every development phase of Lenovo
top management team.
Figure 2 Cause-effect graph of the structural dimension of dominant mental model in every development phase of Lenovo top management team

Data source: this research organizes

**Self evolution driving factors of mental model of Lenovo Group’s top management team**

According to analysis on the cause-effect graph above (Figure 2), it can be obviously discovered that Lenovo Group’s development process is a self-evolution process of the mental model of its top management team, and the overall changes of mental model is actually from the changes of value pursuit of top management team. This study makes the value pursuit dynamic graph of Lenovo top management team (as is shown in Figure 3) and makes analysis of it. Each evolution stage of value pursuit is not denying the previous value pursuit; instead, it is the elevation on the basis of the previous one; every new and higher value pursuit plays the dominant role in the value pursuit system and comes from the inner sport commitment of value pursuit, instead of reaction towards the
external world.

The analysis above proves proposition 2. The value pursuit of top management team has the tendency of autonomous and continuous moving to higher levels, and the autonomous movement of value pursuit makes previous stable mental model evolve from the core until the general rules, business orientation and business models based on the new value pursuit rules come into being and become stable. Therefore, the value pursuit of autonomous and continuous moving to higher levels is the driving factor of the top management team’s mental model autonomous evolution.

**Environment constructing ways of mental model of Lenovo top management team in different development stages**

This study analyzes the construction acts of Lenovo top management team in different development stages from three aspects of customers, suppliers and competitors; Lenovo top management team adopts different constructing ways in different development stages, as is shown in Figure 3.

Table 3  Environment constructing ways of mental model of Lenovo top management team in different development stages

<table>
<thead>
<tr>
<th>Lenovo development stages</th>
<th>Environment constructing acts of Lenovo top management team</th>
<th>Environment constructing ways</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Towards customers</td>
<td>Towards suppliers</td>
</tr>
<tr>
<td>Start-up stage</td>
<td>Actively try to satisfy customers’ shortage needs</td>
<td>Actively choose suppliers that can satisfy self-needs</td>
</tr>
<tr>
<td>Export-oriented industrialization stage</td>
<td>Try to break the weak state of customer demand</td>
<td>Try to break the reliance on suppliers</td>
</tr>
<tr>
<td>Fast development stage</td>
<td>Break the situation of customers’ single demand on imported computers</td>
<td>Break the cooperation model with suppliers</td>
</tr>
<tr>
<td>Diversification stage</td>
<td>Try to cultivate customers’ new demand</td>
<td>Try to integrate suppliers’ techniques creatively</td>
</tr>
<tr>
<td>Internationalization stage</td>
<td>Create new value for customers</td>
<td>Make the example of oriental and western cultural integration</td>
</tr>
</tbody>
</table>

Data source: this research organizes

The analysis above proves proposition 3. In each stage of mental model development, Lenovo top management team construct the environment actively according to inner requirements and rules; moreover, the ways of constructing environment of Lenovo top management team develops continuous upward according to the mental model level, which shows the change from choosing environment to break the environment and finally to create the environment.

**Conclusions and prospects**

**Conclusions:** This paper analyzes the dimension, structure and self-evolution of mental model of
Lenovo top management team and the different ways of constructing environment of top management team under different mental model level. Here are the conclusions.

Conclusion 1: the mental model of top management team is the inner requirement and rules relied by top management team to construct environment.

Conclusion 2: the tendency of top management team’s value pursuit autonomously moving towards higher level is the driving factor for top management team’s mental evolution, and what is the driving factor for top management team’s mental model evolution can answer the key question of why enterprise can develop continuously.

Conclusion 3: the ways for top management team to construct environment evolve to higher level with the mental levels, which reflects the changes from actively choose environment, to actively break the environment, and finally to actively create environment.

Prospects for the future: This paper puts forward theoretical proposition first to construct research framework, and then adopts cause-effect graph to verify propositions with single case. In the future, multi-case studies can be developed on the basis of this paper to examine the reliability of the conclusions in this paper and to make corrections of the theory. Besides, the constitutional dimensions of the mental model in this paper can be made more detailed to develop mental model scale; and the conclusions in this paper can be analyzed and examined with large sample data and new discoveries may reveal.

Knowledge

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References:


646