Dynamic mechanisms of Business model elements to performance: from the perspective of value creation

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Abstract

Based on the perspective of value creation, this paper has refined six elements of business model, which comes from the literature of business model. After the annual regression analysis, we have found that, the core elements, which affect performance of business model significantly, are various among different years. Based on the analysis above, this paper has proposed a dynamic mechanism of Business model elements to performance of information and technology enterprises.

Keywords: business model elements, value creation perspective, information and technology enterprises.

1.INTRODUCTION

The term business model has flourished with the emergence of the internet and its massive adoption for e-commerce. However, little research has been conducted so far on the foundation research of business model (Cheng and Sun, 2013). Further development of what business model elements are and what relationship between business model elements is needed (Song and Li, 2013).

According to the theory of "structure-behavior-performance", the variation among business model elements is a typical expression of business model evolution (Liu, 2014). Therefore, it is very crucial to make clear that, what business model elements and what relationship among business model elements are.

2. BUSINESS MODEL ELEMENTS

To conduct this study, we followed a multistep process. First, we searched for articles published in leading practitioner-oriented and academic management journals during the period 2001 to 2014. Our list of keywords included "business model", "value networks", "value claiming", "value creation", "value acquisition" and "revenue model". Using the “one-step” Business Source Complete Database as a starting point, our overall sample contained 133 articles. Eliminating 119 articles that didn’t fit the topic of “business model elements”, our final database, therefore, included 24 articles.

Based on value creation perspective, we coded with the elements, which is contained in the 24 publications, selecting the ones, which can represent the most characteristic of business model. Based on the framework of “three-dimension of value”, this paper attempts to promote 6 elements included customer value, market positioning, resource endowment, value networks, cost structure and revenue model (Xiang et al., 2014).

3. DATA AND METHODS

3.1 Research methods

When it comes to fuzzy issues, scholars have took quite a few effort on research methods(Mansour, 2014;
Khamrui and Mandal, 2014; Vidhya and Raju, 2015; Devi et al., 2015; Morales-Guarín et al., 2016). Zhang and Yu (2016) used clustering and mining algorithm to solve high dimensional problem, while Yang and Hu (2016) used real-time analysis to do with e-business Platform issue.

We conducted stepwise regressions among the year from 2002 to 2014, which totally contained 28 models. Stepwise regression analysis can get annual core elements, which affected performance mostly, and the interaction relationship among elements.

### 3.2 Sample

The criterion of “Classification of the National Economy Industry”, which has been revised three times in 1994, 2002, and 2011, has been conducted in 1984. First appearing in 2002, its name is “information transmission, computer services and software industry”, which was renamed in 2011, as “information transmission, software and information technology services industry”. The database of Guo Tai An uses “information and technology” instead. So, we use the term “information and technology” as follow.

We collected data on listed information and technology enterprises from 2002 to 2014 as Original samples. Eliminating the companies, which had missing data, we have got the final samples.

### 3.3 Research model

(1) Independent variable

In the process of value creation, an enterprise must know that, which value does they want to transmit to target customers. That is Custom Value (CV). We used the sales subsidiary to reflect customer value. In The annual report of listed companies, The Top Five customer Sales Revenue Growth Rate (TFS) can better response customer value.

Value claiming needs to help new ventures established its Market positioning (MP), so as to make sure that, they create value for whom (Morris et al., 2005). We divided market position by geographical area. We divided market position as three kinds of forms, namely local dominance, regional extension, and international expansion. Among them, the local dominated enterprises included the ones, whose income within some province (region) took place in the total ones of more than 50% (including 50%). Regional expansion enterprises included the ones, whose business took place in three or more than three provinces (regions). International expansion enterprises refers to the ones, whose business took place aboard. When the enterprise is a local dominance one, MP takes 1, when the enterprise is a regional expansion one, MP takes 2, when the enterprise is an international expansion one, MP takes 3.

Value network (NV) is a complex system, which included suppliers, customers, dealers and other partners. Value network, which serves The Value claiming, is one of the most important aspects of value creation (Yunus et al., 2010). Value network involves the value of suppliers, partners and other stakeholders. So, The Number of Joint Venture can better reflect the requirements of collaborators.

Endowment of Resources is also crucial to create value (Johnson et al., 2008). We uses Industry Rankings of the Size of Company's Assets reflect Company Size, while using Industry Rankings of Financial Condition reflect The Financial condition. In addition, Net Value of Intangible Assets reflects the enterprise's Intangible Assets. We made exponential value of Net Value of Intangible Assetsto eliminate the influence of enterprises’ scale.

Cost Structure is the first step of the value allocation and acquisition process (Yunus et al., 2010). Cost management isguarantee to improveproduction efficiency and service innovation (Verwaal et al., 2009). Cost Structure reflects a kind of structure of the proportion of various costs. We adopts the ratio, of Total Operating costsdivides Total Cost, to reflect the very indicator.

According to research of Morris (2005), the destination of enterprise management is to earn money, Income Pattern could ensure a stable revenue stream. Account Receivable is a model of shipment before collections; Advance from Customers is a model of collections before shipment. Two financial indicators reflectthe
question that, why companies charge, charge to whom, and how to charge. Therefore, we adopted The Percentage of Account Receivable and The Percentage of Advance from Customers to measure Income Pattern.

(2) Dependent variable

Usually, the enterprise performance can be measured by ROA and ROE. ROA = Net Income/Average Total Assets * 100%, ROE = (Net/Net Assets) * 100%.

Therefore, the functions, which comes from business model to performance, of information and technology enterprises are shown as (1) and (2).

\[
ROA_t = a_0 + a_1 TFS_t + a_2 MP_t + a_3 NOJ_t + a_4 SOC_t + a_5 FC_t + a_6 NIA_t + a_7 CS_t + a_8 ACP_t + a_9 ARP_t + \mu_{1t} \tag{1}
\]

\[
ROE_t = b_0 + b_1 TFS_t + b_2 MP_t + b_3 NOJ_t + b_4 SOC_t + b_5 FC_t + b_6 NIA_t + b_7 CS_t + b_8 ACP_t + b_9 ARP_t + \mu_{2t} \tag{2}
\]

\(t (1 \leq t \leq 13)\) denotes year, standing for the year from 2002 to 2014. TFS, denotes The Top Five Sales Revenue Growth Rate of \(t\) year. MP, denotes Market Position of \(t\) year. NOJ, denotes The Number of Joint Venture of \(t\) year. SOC, denotes The Industry Rankings of the Size of Company’s Assets of \(t\) year. FC, denotes The Industry Rankings of Financial Condition of \(t\) year. NIA, denotes Net Value of Intangible Assets of \(t\) year. CS, denotes Cost Structure of \(t\) year. ACP, denotes The Percentage of Account Receivable of \(t\) year. ARP, denotes The Percentage of Advance from Customers of \(t\) year. \(a_0, b_0 (1 \leq i \leq 9)\) are coefficients of every variable, \(a_0, a_1, b_0, b_1\) are constant term, while \(\mu_{1t}\) and \(\mu_{2t}\) are random disturbance.

4. DATA ANALYSIS

4.1 Descriptive statistics

The standard deviation of business model elements of information and technology enterprises in China from 2002 to 2014, are shown as table 1.

<table>
<thead>
<tr>
<th>Year</th>
<th>CV</th>
<th>MP</th>
<th>NOJ</th>
<th>SOC</th>
<th>FC</th>
<th>NIA</th>
<th>CS</th>
<th>ARP</th>
<th>AFCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>0.21</td>
<td>0.56</td>
<td>0.16</td>
<td>0.24</td>
<td>0.23</td>
<td>0.80</td>
<td>2.64</td>
<td>0.30</td>
<td>0.20</td>
</tr>
<tr>
<td>2003</td>
<td>0.16</td>
<td>0.48</td>
<td>0.32</td>
<td>0.23</td>
<td>0.23</td>
<td>0.70</td>
<td>0.79</td>
<td>0.22</td>
<td>0.19</td>
</tr>
<tr>
<td>2004</td>
<td>0.40</td>
<td>0.54</td>
<td>0.32</td>
<td>0.23</td>
<td>0.27</td>
<td>0.69</td>
<td>0.70</td>
<td>0.38</td>
<td>0.29</td>
</tr>
<tr>
<td>2005</td>
<td>0.27</td>
<td>0.51</td>
<td>0.25</td>
<td>0.22</td>
<td>0.21</td>
<td>0.69</td>
<td>0.87</td>
<td>0.48</td>
<td>0.13</td>
</tr>
<tr>
<td>2006</td>
<td>0.25</td>
<td>0.43</td>
<td>0.15</td>
<td>0.24</td>
<td>0.26</td>
<td>0.81</td>
<td>0.90</td>
<td>0.39</td>
<td>0.12</td>
</tr>
<tr>
<td>2007</td>
<td>0.42</td>
<td>0.52</td>
<td>0.16</td>
<td>0.19</td>
<td>0.28</td>
<td>0.82</td>
<td>0.96</td>
<td>0.46</td>
<td>0.22</td>
</tr>
<tr>
<td>2008</td>
<td>0.39</td>
<td>0.52</td>
<td>0.19</td>
<td>0.21</td>
<td>0.26</td>
<td>0.81</td>
<td>0.89</td>
<td>0.36</td>
<td>0.19</td>
</tr>
<tr>
<td>2009</td>
<td>0.21</td>
<td>0.61</td>
<td>0.12</td>
<td>0.22</td>
<td>0.32</td>
<td>0.81</td>
<td>0.77</td>
<td>0.35</td>
<td>0.16</td>
</tr>
<tr>
<td>2010</td>
<td>0.01</td>
<td>0.60</td>
<td>0.08</td>
<td>0.27</td>
<td>0.34</td>
<td>0.69</td>
<td>0.93</td>
<td>0.36</td>
<td>0.15</td>
</tr>
<tr>
<td>2011</td>
<td>0.25</td>
<td>0.58</td>
<td>0.07</td>
<td>0.27</td>
<td>0.34</td>
<td>0.70</td>
<td>0.90</td>
<td>0.31</td>
<td>0.14</td>
</tr>
<tr>
<td>2012</td>
<td>0.02</td>
<td>0.60</td>
<td>0.11</td>
<td>0.33</td>
<td>0.30</td>
<td>0.63</td>
<td>9.84</td>
<td>-1.25</td>
<td>0.10</td>
</tr>
<tr>
<td>2013</td>
<td>0.04</td>
<td>0.64</td>
<td>0.10</td>
<td>0.32</td>
<td>0.32</td>
<td>0.63</td>
<td>12.83</td>
<td>-1.22</td>
<td>0.11</td>
</tr>
<tr>
<td>2014</td>
<td>0.02</td>
<td>0.68</td>
<td>0.14</td>
<td>0.50</td>
<td>0.50</td>
<td>0.72</td>
<td>0.87</td>
<td>0.28</td>
<td>0.08</td>
</tr>
</tbody>
</table>
4.2 Data processing

This analysis make stepwise regression for business model elements in Chinese informational and technological listed companies from 2002 to 2014. Although the data is a kind of panel data, the amount of companies of some certain years is not enough, we used cross-sectional regression analysis instead. Heteroscedasticity is the main problem to be solve in the process of cross-sectional regression analysis. But the heteroscedasticity test will reduce the freedom of regression. According to the research purpose, which is aim to find the principle from business model elements to performance, the heteroscedasticity testing will delete a great many of business model indicators. Therefore, we adopts the method of stepwise regression, only to avoid multi-collinearity effects on least-squares regression.

Endowment of Resources and Revenue Model will affect performance in the significant level of 95% in 2002, as (3) and (4) shown. Resources Endowment and Market Position will affect performance in the significant level of 95% in 2003, as (5) and (6) shown.

\[
ROA = 1.33 - 0.41NIA - 0.38MP - 0.36FC \quad (3)
\]

\[
ROE = 1.00 - 0.04CS + 1.16SOC - 1.81FC \quad (4)
\]

\[
ROA = 1.19 - 1.12CV + 0.15MP - 0.07SOC - 0.25CS - 0.05NOJ \quad (5)
\]

\[
ROE = -0.37 + 1.22CV - 0.02NOJ + 0.12NIA + 0.29CS + 0.07AFCP \quad (6)
\]

Custom Value and Market Position will affect performance in the significant level of 95% in 2004, as (7) and (8) shown. Market Position, Endowment of Resources and Cost Structure will affect performance in the significant level of 95% in 2005, as (9) and (10) shown.

\[
ROA = 0.59 - 0.94CV + 0.30MP + 0.41CS - 0.29ARP \quad (7)
\]

\[
ROE = 0.57 - 0.79CV + 0.35CS + 0.20MP \quad (8)
\]

\[
ROA = 1.11 - 0.98FC + 0.30MP - 0.58CS - 0.29NOJ - 0.15CV \quad (9)
\]

\[
ROE = 1.13 - 0.86FC + 0.35MP - 0.46NIA - 0.28CS - 0.18ARP \quad (10)
\]

Endowment of Resources will affect performance in the significant level of 95% in 2006, as (11) and (12) shown. Custom Value, Endowment of Resources and Cost Structure will affect performance in the significant level of 95% in 2007, as (13) and (14) shown.

\[
ROA = 0.79 - 0.42FC - 0.27NIA + 0.21CS \quad (11)
\]

\[
ROE = 0.94 - 0.56FC + 0.36SOC + 0.15CV \quad (12)
\]

\[
ROA = 0.21 + 0.70CS - 0.20SOC \quad (13)
\]

\[
ROE = 1.22 + 0.22CV - 0.38CS - 0.18FC - 0.14NIA \quad (14)
\]

Endowment of Resources, Cost Structure and Revenue Model will affect performance in the significant level of 95% in 2008, as (15) and (16) shown. Value Network, Endowment of Resources, Cost Structure and Revenue Model will affect performance in the significant level of 95% in 2009, as (17) and (18) shown.

\[
ROA = 0.39 - 0.39CS - 0.22FC + 0.19SOC + 0.11NIA \quad (15)
\]
According to Xiang and Luo (2015), they have found that, in different stage of Zhejiang Wu Chan company, the core elements, which affect performance most are various. In the case study of Jin and Jia (2011), they have found that, core elements, which affect the “Li Si-chen” company’s performance, are quite differentin the early and mature growth period. According to Xiang and Luo (2015), Jin and Jia (2011), and the conclusion of regression analysis results, which is from six key elements to performance, we could put forward a proposition as follow:

**Proposition:** core elements, which affect performance mostly, are various in different years with information and technology listed companies.

\[
ROE = 0.55 + 0.50CS - 0.18SOC + 0.14FC - 0.10ARP \tag{16}
\]

\[
ROA = 0.77 - 0.14FC - 0.26NOJ - 0.26CS + 0.06MP \tag{17}
\]

\[
ROE = 0.35 + 0.33AFCP - 0.32NOJ - 0.26CS + 0.05MP + 0.29NIA + 0.08SOC \tag{18}
\]

Endowment of Resources and Revenue Model will affect performance in the significant level of 95% in 2010, as (19) and (20) shown. Custom Value, Endowment of Resources and Revenue Model will affect performance in the significant level of 95% in 2011, as (21) and (22) shown.

\[
ROA = 0.29 - 0.16FC + 0.16SOC \tag{19}
\]

\[
ROE = 0.28 + 0.16AFCP - 0.07FC - 0.03MP \tag{20}
\]

\[
ROA = 0.75 + 0.25CV - 0.09FC - 0.13CS + 0.05SOC \tag{21}
\]

\[
ROE = 0.76 + 0.20CV + 0.10ARP + 0.09AFCP - 0.13CS + 0.04NIA - 0.05FC + 0.09NOJ \tag{22}
\]

Endowment of Resources, Cost Structure and Revenue Model will affect performance in the significant level of 95% in 2012, as (23) and (24) shown. The Endowment of Resources and Revenue Model will affect performance in the significant level of 95% in 2013, as (25) and (26) shown.

\[
ROA = 2.47 - 0.31FC + 0.13SOC - 0.20CS - 0.22NIA \tag{23}
\]

\[
ROE = 2.53 - 0.34FC + 0.11SOC + 0.33AFCP - 0.17CS + 0.03MP + 0.14ARP - 0.21NIA \tag{24}
\]

\[
ROA = 0.66 - 0.27FC + 0.13SOC \tag{25}
\]

\[
ROE = 0.80 - 0.27FC + 0.22AFCP + 0.10SOC + 0.11ARP \tag{26}
\]

Market Position and Endowment of Resources will affect performance in the significant level of 95% in 2014, as shown in (27) and (28).

\[
ROA = 0.61 - 0.20FC + 0.11CV + 0.03MP + 0.06SOC + 0.13NIA - 0.02ARP - 0.05CS + 0.03NOJ \tag{27}
\]

\[
ROE = 0.83 - 0.22FC + 0.14CV + 0.02MP - 0.04CS + 0.04ARP \tag{28}
\]

An organization can be seen as a system, which is made from core and edge elements. In the research of Xiang and Luo (2015), they have found that, in different stage of Zhejiang Wu Chan company, the core elements, which affect performance most are various. In the case study of Jin and Jia (2011), they have found that, core elements, which affect the “Li Si-chen” company’s performance, are quite different in the early and mature growth period. According to Xiang and Luo (2015), Jin and Jia (2011), and the conclusion of regression analysis results, which is from six key elements to performance, we could put forward a proposition as follow:
5. DISCUSSION

Demil and Lecocq (2010) argued that, the operation of enterprises is the internal factors, which affect the relationship among business model elements, of business model innovation. Contrast with the evolution phase and core elements, which affect the enterprise’s performance most, of different period, we can draw a dynamic mechanism figure from core business model elements to performance of Chinese information and technology enterprises listed, as shown in figure 1.

As is shown in figure 1 that, shaded area on behalf of core elements, which affect performance most. The Endowment of Resources and Cost Structure had a significant effect on performance in 2002. Base on Cost Structure and Endowment of Resources, Enterprises could improve performance for future. In this period, enterprises’ business model developed fast. They mostly emphasized on the process of “value creation → value allocation and acquisition” process, to provide cash flow for continuous expansion. As it come to the year of 2003~2007, enterprises should focus on Custom Value, Market Position, Endowment of Resources and Cost Structure to expand business scope. Over the years form 2008 to 2014, enterprises implementing contraction strategy, as the element of revenue model has significant effects on performance. In addition, after re-position of customer value, in 2011, enterprises sought after segmentation to keep sustainable competitive advantage. Enterprises implemented harvest strategy in this stage to Narrow the demand for business.

According to analysis above, this paper have got some enlightenments follow. In the first place, a company should use systematic thought, making 6 elements as a hole part, so as to obtain matching effects. Furthermore, a company should follow value creation logic, with core elements as gripper for business. As it comes to the beginning term of business model, enterprises should focus on internal resources to to build strength for further development. In the expansion term of business model, a company should focus on Custom Value and Market Position. With the amount of competitors flying, Custom Value gradually became homogeneity. And then, Core elements shifted to internal resources endowment and cost structure. In the adjustment term of business model, enterprises gradually began to harvest (focusing on Revenue Model). In the term, Endowment of Resources and Revenue Model became internal guarantee for enterprises’ sustainable development. As the enterprise’s operation is stable, information and technology enterprises need to re-focus on customer value to seek for more opportunities in new segmentation.

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