Supply side management innovation:—Analysis on Enterprises in Scientific Industry Park Based on Market Orientation

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Abstract: This research presents a conceptual framework for incorporating organizational learning and innovations as the mediating variables between market orientation and organizational performance. The samples of this study include 145 companies from the information technology industry in the Scientific Industry Parks. The global model fit is acceptable. This empirical result supports the constructs mentioned above. 1. Market orientation has a positive and direct impact on organizational learning, administrative and technical innovation. 2. Organizational learning has a positive and direct impact on administrative and technical innovation, but with no statistically significant direct impact on performance. 3. Organizational learning does have a positive and indirect impact on performance by means of organizational innovations. 4. It is not statistically significant that the impact of the two innovation types (both administrative and technical) interact with each other.

1. Introduction
The main purposes of enterprises are to create more benefits and attract more customers. The market decides what kind of customers it has and the customers decide the direction of enterprises’ development. Therefore, marketing and innovation serve as the two pillars for the purposes of enterprises. (Drucker, 1954) Many scholars believe that market orientation is the core of modern enterprises and their strategies and that through marketing and market orientation enterprises can change their business performance. (Ruekert, 1992; Deshpande et al 1993; 1998; Thirkell and Dau, 1998; Ngai and Ellis, 1998; Caruana, Ramaseshan, and Ewing, 1998; Appiah-Adu and Singh, 1998; Chang and Chen, 1998) Organizational innovation is another important function of enterprises. As innovation can be seen in new products, new business models, new technologies, new markets or new management methods, it also has a positive impact on the business performance of enterprises. (Damanpour and Evan, 1984; Zahra, de Belardino, and Boxx, 1988; Damanpour, Szabat, and Evan, 1989; Khan and Manopichetwattana, 1989) And today, as the world market becomes highly transparent, organizational innovation becomes increasingly more important when enterprises strive to survive and develop. (Grønhaug and Kaufmann, 1988) From above, it is evident that a certain connection exists among organizational innovation, market orientation, organizational learning and organizational performance. This paper tries to integrate the former studies on the mediating variables of these factors and make out their relations, hoping to present references for managers of enterprises in Scientific
Industry Parks so that they can have an overall understanding of such connection and apply them to the process of production and sales.

2. Hypothesis

Wherever Times is specified, Times Roman or Times New Roman may be used. If neither is available on your word processor, please use the font closest in appearance to Times. Avoid using bit-mapped fonts if possible. True-Type 1 or Open Type fonts are preferred. Please embed symbol fonts, as well, for math, etc.

Through literature review, we find that scholars like Ames and Hlavacek (1989), Narver and Slater (1990), Ruekert (1992) defined market orientation from management and even philosophical view, they believe that market orientation means setting marketing goals according to the market situation. And such a definition is similar to the definition and content of market orientation from the action level. Slater and Narver(1995) believe that market orientation and organizational learning supplement each other. And through empirical research, Baker and Sinkula(1999) find that the organizational learning orientation(a higher level of organizational learning) and market orientation have a significant positive impact on organizational performance, and that learning orientation and market orientation have a combined impact on the performance. Therefore, this study believes that ‘the market orientation-organizational learning-organizational performance’ chain exists. The market orientation affect organizational performance through organizational learning, and such an indirect or mediating impact may be ignored. Based on the theory above, this research raised the following hypothesis:

H1: Market orientation has a positive impact on organizational learning.
H2: Organizational learning has a positive impact on organizational performance.
H3a: Market orientation has a positive impact on management innovation.
H3b: Market orientation has a positive impact on technological innovation.
H4a: Management innovation has a positive impact on organizational performance.
H4b: Technological innovation has a positive impact on technological innovation.
H5a: Management innovation has a positive impact on organizational performance.
H5b: Technological innovation has a positive impact on management innovation.
H6a: Organizational learning has a positive impact on management innovation.
H6b: Organizational learning has a positive impact on technological innovation.

3. Design of Research Framework

Through literature review and analysis and the hypothetical discussion, this study tries to introduce a conceptual framework.

Analysis and Research

Following the advice of scholars like Anderson and Gerbing(1988) and Williams and Hazer(1986), we take the research method of two-stage LISREL analysis. In the first stage, we do Cronbach’s alpha analysis and confirmatory factor analysis to get the reliability, convergent validity and discriminant validity of constructs and components. In the second stage, we cut the multiple components to several or single component. They then are analyzed through LISREL development structure mode to test hypothesis of this research.

After contacts with all the enterprises in the Scientific Industry Park, we sent 201 questionnaires to 201 enterprises. If the reply wasn’t received ten days after the arrival of the questionnaires, we’d phone
the contact person of the enterprise and asked again for their help on the questionnaires. Some enterprises lost the questionnaires and we resent them new ones. After two round of reminder calls, we received 156 questionnaires in total. Through the primary check, we cut one questionnaire for it didn’t answer enough questions on it. So we got 155 valid questionnaires, accounting for 77.1% of the total. These 156 enterprises accounted for 65.3% of all the enterprises in the park, and the rates of enterprises in each industry have only minor differences. Therefore, we believe the data we collected can be presentative. More specific information about the samples can be seen in Table 1.

| Number of employees | Number | Percentage | Respondents | Number | Percentage |
|---------------------|--------|------------|-------------|--------|------------|
| <= 100              | 48     | 30.8       | 1           | 8      | 5.1        |
| 101-200             | 45     | 28.8       | 1-2         | 61     | 39.1       |
| 201-300             | 16     | 10.3       | 2-3         | 40     | 25.7       |
| 301-500             | 16     | 10.3       | 3-4         | 30     | 19.2       |
| 501-800             | 25     | 16.0       | 5-50        | 10     | 6.4        |
| > 800               | 6      | 3.8        | Abandon the | 7      | 4.5        |

| Number of years of establishment of the | Age of respondents |
|----------------------------------------|--------------------|
| 1                                      | < 25               |
| 1-2                                    | 25-35              |
| 2-3                                    | 35-45              |
| 3-4                                    | 45-55              |
| 5                                      | Abandon the        |

| Organization industry | Number | Percentage |
|-----------------------|--------|------------|
| Literary and creative media | 69     | 44.2       |
| science and technology  | 30     | 19.2       |
| communication          | 31     | 19.9       |
| Computer & Computer peripheral equipment | 26     | 16.7       |
| total                  | 156    | 100        |

| Total Respondents      | 156    | 100        |

Table 1 Distribution of samples

4. Reliability and Validity Analysis
First, the Cronbach’s alpha coefficients were used to test scale reliability. For the scale reliability of market orientation, the Cronbach’s alpha coefficients of customer orientation, competitor orientation, interfunctional coordination, long-term view, emphasis on profits and market orientation are 0.85, 0.72, 0.76, 0.78, 0.78 and 0.92. For the scale reliability of organizational learning, the Cronbach’s alpha coefficients of promises on learning, the will of sharing, open-mindedness and organizational learning are 0.88, 0.90, 0.80 and 0.94. For the scale reliability of organizational innovativeness, the Cronbach’s alpha coefficients of innovation on using people and management, planning innovation, management innovation and technical innovation are 0.94, 0.85, 0.94 and 0.86. As the Cronbach’s alpha coefficients of political and public relations, a component of long-term performance, is below 0.4, this item is deleted. The reason for this may be that the government has already attached great importance on the enterprises in the Scientific Industry Park, and thus these enterprises don’t set this item as the long-term performance indicator. So, for the measures’ reliability of organizational performance, the Cronbach’s alpha coefficients of long-term performance and organizational performance are 0.83 and 0.91. Therefore, the Cronbach’s alpha coefficients of all the scales we used surpass the 0.70 threshold recommended by Nunnally(1978) for the test of scale reliability. Also, through confirmatory factor
analysis of components, the composite Cronbach’s alpha coefficients of market orientation components (competitor orientation, customer orientation, interfunctional coordination and long-term view) surpass 0.7, the acceptable level, and their variances extracted either surpass or are close to 0.5, indicating that the internal consistency can be accepted here.

This research examines whether components have enough convergent validity and discriminant validity through confirmatory factor analysis. From table 2, we can see the reliability and validity are both within the acceptable threshold.

| Market oriented | factor loadings | CR | AVE     |
|-----------------|----------------|----|---------|
| 1. not limited to measure mode | 308.42 | 270 | 188.03*** |
| 2. customer orientation and competitor orientation (the correlation coefficient is defined as one) | 696.16 | 271 | 151.39*** |
| 3. coordination between customer orientation and function (the correlation coefficient is defined as one) | 619.91 | 271 | 111.49*** |
| 4. customer orientation and long term point of view (the correlation coefficient is limited to one) | 619.91 | 271 | 111.49*** |
| 5. customer orientation and emphasis on profits (the correlation coefficient is limited to one) | 656.93 | 271 | 148.51*** |
| 6. coordination between the competitor orientation and function (the correlation coefficient is limited to one) | 622.55 | 271 | 114.13*** |
| 7. competitor orientation and long term point of view (the correlation coefficient is limited to one) | 664.68 | 271 | 156.26*** |
| 8. competitor orientation and emphasis on profits (the correlation coefficient is limited to one) | 673.82 | 271 | 167.40*** |
| 9. Coordination and long term perspective (the correlation coefficient is limited to one) | 684.69 | 271 | 176.27*** |
| 10. Function between the coordination and the emphasis on profits (the correlation coefficient is limited to one) | 675.81 | 271 | 167.39*** |
| 11. long term perspective with emphasis on profits (the correlation coefficient is limited to one) | 635.29 | 271 | 126.87*** |

| Organizational learning | factor loadings | CR | AVE     |
|-------------------------|----------------|----|---------|
| 1. not limited to measure mode | 306.10 | 132 | 29.85*** |
| 2. commitment to learning and shared vision (the correlation coefficient is limited to one) | 335.95 | 133 | 39.92*** |
| 3. commitment to learning and open mind (the correlation coefficient is limited to one) | 346.02 | 133 | 39.92*** |
| 4. share the vision and open mind (the correlation coefficient is limited to one) | 344.93 | 133 | 38.83*** |

| Management innovation | factor loadings | CR | AVE     |
|-----------------------|----------------|----|---------|
| 1. not limited to measure mode | 251.09 | 80 | 71.06*** |
| 2. with the management innovation and organization and Planning innovation (the correlation coefficient is limited to one) | 906.10 | 80 | 71.06*** |

| Organization performance | factor loadings | CR | AVE     |
|--------------------------|----------------|----|---------|
| 1. not limited to measure mode | 199.88 | 40 | 34.66*** |
| 2. short-term performance and long-term performance (the correlation coefficient is limited to one) | 234.54 | 40 | 34.66*** |

Therefore we can see that using a componentwise approach rather than combined approach is acceptable. And it is also acceptable that we conduct the analysis on the measurement model of ‘market orientation-organizational learning and management innovation-organizational performance’. Otherwise, LISREL may not work with too many variables. Measurement variables in this research can be seen in Table 3.
In Table 4, measurement model contain 4 constructs: market orientation, organizational learning, management innovation and organizational performance. For the market orientation construct, by comparing loadings of various components’ factors, we find that in the enterprises’ cognition of market orientation, interfunctional coordination has the highest loading(0.86), followed by customer orientation(0.82), long-term view(0.74) and emphasis on profits(0.53), the least important. This shows that improving interfunctional coordination, competitor orientation and customer orientation are key factors, which conforms with research by Narver and Slater(1990).
From the analysis above, in conceptual framework of this research, all hypothesis are supported except H2, H5a and H5b. Such results confirm with the path coefficient. Results of hypothesis test can be seen in Table 5.

| Route | Relationship between variables | Coefficient of path coefficient | Corresponding Test result |
|-------|--------------------------------|--------------------------------|--------------------------|
| γ11   | Market oriented - Organizational learning | 0.87*** | H1 Support |
| β41   | Organizational learning - Organizational performance | -0.84 | H2 Not supported |
| γ21   | Market oriented - Management innovation | 0.24*** | H3 Support |
| γ31   | Market oriented - Technology innovation | 0.35*** | H30 Support |
| β42   | Management innovation - Organizational performance | 1.16*** | H40 Support |
| β43   | Technology innovation - Organizational performance | 0.51** | H40 Support |
| β32   | Management innovation - Technology innovation | -0.02 | H50 Not supported |
| β23   | Technology innovation - Management innovation | -0.13 | H50 Not supported |
| β21   | Organizational learning - Management innovation | 0.84*** | H60 Support |
| β31   | Organizational learning - Technology innovation | 0.43** | H60 Support |

Table 5 theoretical structure model of the coefficient of the factor and hypothesis verification

5. Conclusion and the Limit of our Research

The empirical results of this research show that only through execution innovation can market-oriented organizational culture improve the organizational performance. This conforms with the research results of Han, Kim, and Srivastava (1998), which believes that innovation serves as a complete intervening variable. Han’s research (1998) takes the banking industry as the object of the empirical research, while our object is the high-tech industry. Both our researches prove the ‘market orientation-organizational learning-organizational performance’ chain, showing that such chain relation doesn’t just exist in the high-paying industries. If market orientation is to improve organizational innovation, besides the direct impact, it is more important that enterprises pose a positive impact on innovation through organizational learning. This is particularly evident in the high-tech industry, where the global competitiveness is high and products lifecycle is short. In the high-tech industry, the products are improving day by day. Though information from customers and competitors can show the situation of the market, management innovation, organizations’ learning ability and faculty’s approval of the organization’s future are much more important. For only through these can enterprises apply their own technology and ability more efficiently than competitors, become more innovative, and gain competitive advantage and achieve better organizational performance. Though this research tries to follow scientific principles, it’s still limited by the following points.

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