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Study on the Relationship between Information Technology Investment and Operation Performance

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Abstract: *This study intends to explore the impact of operation strategy on information technology investment, as well as the impact of the level of information technology investment on the degree of market orientation, the degree of organizational learning, the customer relationship management activities and the performance. The results show that prospector strategy and analyst strategy have a significant impact on the level of information technology investment; the level of information technology investment has a significant impact on the degree of market orientation, customer relationship management and organizational learning and the operation performance. Enterprises can adopt the prospector strategy and analyst strategy and attach importance to investment in information technology so as to improve their operation performance.*

Keywords:*information technology investment, market orientation, customer relationship management*

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I. Research background and Purpose

How the engineering technical consultants choose appropriate operation strategy and use information technology to improve the company's operation performance has become the key point of many enterprise strategies. Few of the empirical researches discussed the impact of the level of information technology investment on the degree of market orientation, customer relationship management activities and organizational learning as well as the operation performance. This study takes engineering technical consulting companies as the research objects and explores how the level of information technology investment affect market orientation, organizational learning, customer relationship management activities and performance.

II. Literature Review

2.1 Information technology investment

Roberts (1996) held that information technology refers to all the software and hardware tools used to obtain, apply, store and communicate information. Miller & Doyle (1987) believed that information technology investment must incorporate personnel training based on the needs of developers and users. According to discussions of relevant literature (Miller & Doyle, 1987, Sohal et al.,2001, Duffy, J., 2000) , this study divides information technology investment into four aspects, including personnel cognition, software and hardware investment, personnel training, and applications of information technology.

2.2 Types of operation strategy

A Based on the way enterprises respond to environmental change, Miles & Snow (1978) divided operation strategy into four types: prospector strategy, defender strategy, analyst strategy and responder strategy. Among them, the responder strategy is believed by Song et al. (1996) to be a strategy that lacks competitive advantage. This study adopts the classification of operation strategy proposed by Miles & Snow (1978).

2.3Market orientation

Narver and Slater (1990) divided market orientation into three dimensions, including customer orientation, competitor orientation and cross-functional coordination. Kohli & Jaworski (1990) held that market orientation includes collecting market information, transmitting market intelligence and responding to market intelligence. This study adopts the dimension of market orientation put forward by Narver& Slater (1990).

2.4 Organizational learning

Sinkula et al. (1997) pointed out that organizational learning can be measured by three dimensions: commitment to learning, shared vision and open mind. Tippins&Sohi (2003) divided the content of organizational

learning into four dimensions: information acquisition, information dissemination, shared interpretation and organizational memory. This study adopts the four dimensions of organizational learning proposed by Tippins&Sohi (2003).

2.5 Customer relationship management

Kandell (2000) pointed out that customer relationship management focuses on meeting the needs of customers and aims to retain customers. Peppers et al. (1999) pointed out that customer relationship management activities should first identify customers, then classify customers and provide different services for corresponding customers. Swift (2001) pointed out that enterprises can carry out customer relationship management in four steps, i.e. knowledge discovery, market planning, customer interaction, and analysis and refinement. This study adopts the four steps proposed by Swift (2001) as the dimensions.

2.6Enterprise performance

Tippins&Sohi (2003) measured the organizational performance by using profitability, return on investment, customer retention and sales growth rate. Kirca et al. (2005) used overall business performance, profitability, sales volume and market share as indicators to measure performance. Slater &Naver (2000) used return on investment as the indicator to measure enterprise performance. In this study, profitability, business growth rate, return on investment, customer retention, market share and other indicators are used to measure performance.

2.7 Information technology investment and market orientation

Baker & Sinkula (1999) believed that organizations with high market orientation would actively collect information and then respond to the market. Desai et al. (2001) held that information technology investment would enable companies to effectively process market information. This study proposes H1: the higher the level of information technology investment, the more significant positive impact on the level of market orientation.

2.8Information technology investment and organizational learning

Zheng (2006) pointed out that there is a significant positive relationship between information technology investment and organizational learning. Chen (1994) believed that effective use of information technology would have a positive impact on organizational learning. This study proposed H2: the higher the level of information technology investment, the more significant positive impact on the level of organizational learning.

2.9Information technology investment and customer relationship management activities

Ko et al. (2008) pointed out that the maturity of information system will affect the execution degree of customer relationship management activities. Shoemaker (2001) believed that customer relationship management is to establish a partnership with customers through integrating marketing and information technology. This study proposed H3: the higher the level of information technology investment, the more significant positive impact on the execution degree of customer relationship management activities.

2.10 Information technology investment and enterprise performance

Dewan & Min (1997) pointed out that there is a positive relationship between information technology investment and performance. Sander &Premus (2002) pointed out that the use of information technology would have a positive impact on the improvement of performance. This study proposed H4: the higher the level of information technology investment, the more significant positive impact on enterprise performance.

III. Research Method

3.1Questionnaire collection and data analysis

This study is an empirical study of member companies registered in the Chinese Association of Engineering Consultants, with relevant data collected by sending questionnaires via mail. The respondents are senior executives in the companies. 41 valid questionnaires were collected from engineering consulting companies. Nunnally (1978) believed that in the exploratory research, the reliability can be accepted as long as it reaches 0.7 or above. In this study, the reliability values of all variables are above 0.7. The analysis of variance method is used for data analysis in this study.

3. 2 Ways to measure the variables

The ways to measure the variables are described as follows:

3.2.1Measurement of the level of information technology investment

Based on the discussion of relevant literature, this study divides the level of information technology investment into four dimensions: personnel cognition, software and hardware investment, personnel training and application degree of information technology. Likert's 5-point scale method is used for scoring.

3.2.2Measurement of the types of operation strategy

In this study, the operation strategies are classified into three types: prospector strategy, analyst strategy and defender strategy. Likert's 5-point scale method is used for scoring.

3.2.3 Measurement of market orientation

Based on the discussion of relevant literature, this study summarizes the activities that needs to implemented for market orientation include the dimensions of customer orientation, competitor orientation and cross-functional coordination.

3.2.4 Measurement of the degree of organizational learning

In this study, the four dimensions of organizational learning proposed by Tippins&Sohi (2003) are used as the dimensions of organizational learning activities. Likert's 5-point scale method is used for scoring.

3.2.5 Measurement of the execution degree of customer relationship management activities

In this study, the four steps proposed by Swift (2001) are used as the dimensions of the execution of customer relationship management activities. Likert's 5-point scale method is used for scoring.

3.2.6 Measurement of operation performance

Based on the relevant literature, this study takes the profitability, business growth rate, return on investment, customer retention, market share and other indicators as indicators to measure enterprise performance.

IV. Research Results

4.1 Relationship between operation strategy and level of information technology investment

In this study, the execution degree of operation strategy is divided into two groups (high and low execution degree). According to the respective level of information technology investment of the two groups, we can examine whether there is significant difference between them. The results show that enterprises that adopt the prospector strategy and analyst strategy would have a relatively higher level of information technology investment.

4.2Relationship between information technology investment and market orientation

In this study, the level of information technology investment is divided into two groups. According to the respective average scores on the market orientation activities of the two groups, we can examine whether there is significant difference between them. The results support H1.

4.3 Relationship between information technology investment and level of organizational learning

In this study, the level of information technology investment is divided into two groups (high and low execution degree). According to the respective average scores on the level of organizational learning of the two groups, we can examine whether there is significant difference between them. The results support H2.

4.4 Relationship between information technology investment and customer relationship management activities

In this study, the level of information technology investment is divided into two groups. According to the respective average scores on thecustomer relationship management activities of the two groups, we can examine whether there is significant difference between them. The results support H3.

4.5 Relationship between the level of information technology investment and enterprise performance

In this study, the execution degree of information technology investment is divided into two groups (high and low execution degree). According to the respective average scores on the enterprise performance of the two groups, we can examine whether there is significant difference between them. The results support H4.

V. Conclusion

The results show that operation strategy has a significant impact on the level of information technology

investment; the level of information technology investment has a significant impact on the execution degree of market orientation activities, the level of organizational learning, the level of customer relationship management activities and the enterprise performance. It is suggested that enterprises can adopt the prospector strategy and analyst strategy and attach importance to the investment of information technology so as to improve the enterprise performance. This study can provide reference for related companies to invest information technology system.

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