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Empirical research on the impact of open-book accounting on organizational performance

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ABSTRACT: In order to optimize the cost of supply chain and seek cost reduction opportunities, the enterprise discloses the inter-enterprise cost data, which is called as open-book accounting. However, the cooperation between each enterprise across organizational boundaries also involves in the inter-organizational cost management This paper mainly researches whether the open-book accounting can produce a positive impact on the enterprise performance when the enterprise carries out the inter-organizational cost management. Therefore, the research establishes a relation model from the theory of open-book accounting, inter-organizational cost management and performance, and introduces the regulated variable of information technology to demonstrate whether it is helpful for enhancing the impact of the inter-organizational cost management on the performance. The empirical results show that the open-book accounting has a positive impact on the inter-organizational cost management, and ultimately promotes the improvement of organizational performance; meanwhile, information technology plays a positive regulatory role in the relationship between the inter-organizational cost management and performance.

Keywords: open-book accounting; performance; inter-organizational cost management; information technology

1 INTRODUCTION

In recent years, with the development of times, in order to reduce costs and maintain competitive advantages, the enterprises put eyes to the upstream and downstream of the supply chain, across the organizational boundaries, share the cost information, reduce the total cost of supply chain and achieve mutual benefit and win-win. Inter-enterprise information sharing, and data disclosure is often called as open-book accounting (OBA). Open-book accounting is an important information-sharing tool in the inter- organizational cost management (IOCM). OBA can exert its maximum effectiveness with a variety of management methods by IOCM; the implementation of IOCM is also inseparable from the transparent supply chain relations and the disclosure of cost data. For the enterprise with IOCM, the effective implementation of open-book accounting will inevitably have an impact on the enterprise performance. Through questionnaire survey of the enterprises using the open-book accounting, this paper researches whether the application of open-book accounting can improve the enterprise performance in the actual inter-organizational cost management. Inter-enterprise exchange level is inseparable from the development of information technology, so the information technology is introduced as a regulated variable, aiming at exploring whether the information technology can improve IOCM application.

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2 THEORETICAL BACKGROUND

2.1 *Open-book accounting*

Open-book accounting was originated from the "open-book management" mode advocated by Stark (John P. Stack) from American Springfield Reconstituted Company in 1979, that is, to disclose the enterprise's accounting books, and share financial data with staff [1]. Its core idea is that the suppliers and customers disclose their own cost information with a certain formal mechanism, including one-piece costs, wage level and even marginal profit and so on; both parties are committed to exploring the cost reduction oppor-

tunities from these disclosed cost information, and sharing earnings from cost saving [2]. The cost information involves in the internal confidentiality of the enterprise, so both parties are necessary to be highly trusted. The use of open-book accounting is not limited to a certain stage, but throughout the whole operation process, such as the supplier's selection stage, production preparation stage and production stage. Buyers can share the cost information via open-book accounting, and make improvement in the important production stage, especially the product design stage, so that it is conducive to the cost reduction of the suppliers, and the buyers and sellers can achieve mutual profits. The essence of open-book accounting is a generalized expression of the arrangement of the accounting information sharing system, which contains consultation, negotiation and agreement on the information disclosure [3].

2.2 *Inter-organizational cost management*

In the 1960s, the practice of inter-organizational cost management of the system gradually develops in Japan, especially IOCM practice led by Toyota. However, the real theory was proposed by Tanaka until 1977. Cooper and Slagmulder carried out a systematic discussion of IOCM in 1999, and defined the inter-organizational cost management as "a coordinated behavior between buyers and suppliers for cost reduction" [4], which marks that IOCM becomes an independent management accounting research area.

Currently, IOCM draws more attention of the academia and the trade union. Nowadays, the enterprises are committed to enhancing the core competitiveness, and outsourcing becomes a new way of non-core projects. Now, the traditional cost management could not meet the demand of contemporary enterprises. Inter-organizational cost management is throughout the entire supply chain. Through coordination of the relationship between the buyer and supplier, and helping to determine an effective inter-organizational cooperation mode, a win-win situation will be eventually created. IOCM involves in the cooperation between each enterprise on the supply chain, so the management is very complex and requires comprehensive use of various methods. The cost of 80% -90% of new products needs to be determined at the design stage, so it is very important to seek for cost reduction opportunities in the product design [5], such as the use of parallel cost management, target costing and so on. The basic condition for the implementation of IOCM is to share the cost information, which must be involved in an important information sharing tool, which is open-book accounting.

2.3 *Performance*

Bates and Holton (1995) note that: "performance is a multidimensional structure, with different results due to different measurement factors. Based on the discussion of the concept of performance in the existing literature, it can be generally divided into two views of results and behavior. In addition to these two mainstream views, some scholars, such as Zhong Lifeng and Shi Kan (2002) believe that a more general concept of performance should be used in the specific practice of performance management, including behavior and results. Behavior is one of conditions to achieve performance results [6]. Viewing from the classification of performance, performance can be classified into individual performance and organizational performance. The organizational performance refers to the performance obtained by the entire organization within a certain period [7]. The performance hereinafter referred to is the organizational performance. The current methods of measuring organizational performance are mainly as follows: Govindarajan (1984) adopts the scale of 12 items to divide the organizational performance into short-term performance and long-term performance; Eisenhardt and Schoonhoven (1990) measure the organizational growth with annual sales growth amount; Lumpkin and Dess (2001) believe that only financial indicators used to measure the organizational performance is not enough, which should also include non-financial indicators, such as reputation, public image, and employee satisfaction, etc.

3 RESEARCH MODEL AND HYPOTHESIS

ICOM requires the joint use of a variety of methods and tools. This paper only analyzes the application of the management tools of OBA in IOCM, and also concerns about whether OBA can promote the improvement of organizational performance via the platform of IOCM. Currently, the inter-enterprise cost management is closely related with the information technology. Therefore, this paper introduces a regulated variable - information technology, and analyzes whether the information technology is conducive to the implementation of IOCM, in order to effectively improve the performance. The research model is shown in Figure 1.

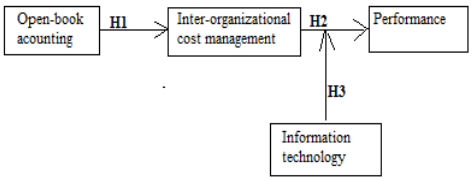

Figure 1. Research model

3.1 *Open-book accounting and inter-organizational cost management*

Open-book accounting is not only a kind of management tool, but also a kind of management strategy and

management thought, which changes the previous traditional financial governance mode. Deng Jine (2010)[1] proposes that open-book accounting can promote the development of IOCM, but the information sharing risks, cost information and other relevant issues play an inhibition role in IOCM. Meanwhile, the author points out that the rational use of open-book accounting can enhance the sharing value of cost information; enhance the inter-organizational trust; optimize the implementation of IOCM. The research believes that IOCM create a fairer and more transparent environment for open-book accounting, and open-book accounting can be more effective to promote enhancement of the enterprise performance through the platform of IOCM and integration with a variety of other management methods. Moreover, in accordance with the existing empirical literatures at home and abroad, the majority of scholars support a positive relationship between open-book accounting and inter-organizational cost management. Therefore, based on the theoretical demonstration and empirical demonstration, this paper proposes that open-book accounting can reduce product cost and promote inter-organizational cooperation and cost management, thus achieving the improvement of performance.

Therefore, the following hypothesis is proposed:

H1: The open-book accounting has a positive impact on the inter-organizational cost management.

3.2 *Inter-organizational cost management and performance*

There are more methods of measurement of the organizational performance. This paper believes that the measurement should use subjective evaluation method after comparison of various methods. Only depending on the financial data does not necessarily reflect the real situation of organization, as the organization's strategic planning and the industry environment will have an impact on the organizational performance and organizational sustainable development, and there are few enterprises who are willing to really provide financial data, so the measurement of organizational performance should be integrated with financial and non-financial indicators, so as to be more comprehensive and objective. Viewing from the literatures at home and abroad, we can easily find that, at the level of financial indicators, the inter-organizational cost management is helpful for the enterprise to collaboratively reduce product cost, increase market share and improve financial performance; at the level of non-financial indicators, the inter-organizational cost management is helpful for enhancing effective inter-organizational cooperation, enhancing the inter-organizational trust, and improving market competitiveness. After integration with these two indicators, we can comprehensively obtain that the inter-organizational cost management plays a promoting role in the organizational performance.

Therefore, the following hypothesis is proposed:

H2: The inter-organizational cost management has a positive impact on the organizational performance.

3.3 *Information technology*

The important role of information technology in the enterprise has obtained general consensus in the practice circle and academia, and more and more companies use information technology to reduce product cost, improve operation efficiency, improve management and decision-making, and create competitive advantage [8]. In the academia, the famous "information technology productivity paradox" [9] was first proposed by Rebort Solow, a winner of the Nobel Economics Prize, who found that a large amount of IT investment in the United States fails to bring high productivity. However, after the 1990s, some scholars believe that "information technology productivity paradox" not only has disappeared, but also made the economy in that period have a rapid development due to a large amount of investment in information technology. Currently, the relationship between information technology and organizational performance is uncertain, but in recent years, the theoretical demonstration and empirical demonstration basically hold a positive view.

In theory, the enterprise with a high level of integration of information technology can transfer across different operational channels, combine and process external data from customers, suppliers and vendors [10], and the enterprise can reduce production cost, increase profits and improve performance through achieving information sharing. Moreover, the inter-enterprise cost collaborative management requires partners sharing resources, and forming a virtuous partnership. The modern information technology can meet such demand through establishing a shared information system, and create a highly trusted supply chain environment. This paper mainly introduces the information technology as a regulated variable to empirically research whether the information technology can promote inter-organizational cost management to play a greater role in enterprise operation, and explore whether the enterprise needs IT investment in the implementation of inter-organizational cost management.

Therefore, the following hypothesis is proposed:

H3: Information technology will enhance a positive relationship between inter-organizational cost management and organizational performance.

4 RESEARCH METHODS

4.1 *Sample source*

The research involves in the inter-enterprise cooperation and management, so the main object is the enter-

prise management layer. Due to geographical restrictions, the main research objects are enterprises in Jiangsu, Zhejiang and Shanghai. The questionnaire survey is mainly focused from June 2014 to January 2015. Survey respondents are divided into three parts: the first part is the enterprises in Jiangsu, Zhejiang and Shanghai, who are mainly surveyed through field research and network; the second part is members in the training class of the enterprise management cadre graduated from business management school; the third part is the classmates and friends and contacts. A total of 400 copies of questionnaires are sent out, and 245 copies are recovered. After removing incomplete and invalid questionnaires, there are 203 copies of actual usable questionnaires, with final recovery rate of 61.3%, and effective rate of 82.86%.

4.2 *Variables measurement*

The measurement scale is mainly used after appropriate adjustment according to the scales in the existing literatures, and the initial questionnaires are designed after several discussions with the relevant scholars and enterprise executives. The questionnaire adopts five-point Likert scale method. First, the trial survey is given to the initial questionnaires. According to its reliability and validity and trial survey results, there is a need to redesign and modify the questions with inaccurate expression of content, in order to form a final questionnaire.

In the questionnaire, the measurement scale of information technology (IT) mainly adopts Barua (2004) scale, and its measurement content mainly combines with ERP thought. Currently, there are less open-book accounting (OBA) scales, so Klaus, Melanie and Felix (2011) scales are directly used. Inter-organizational cost management (IOCM) scale mainly adopts Malhotra (2005) measurement scale, which mainly involves in enterprise cooperation characteristics and management methods of IOCM. Performance (B) measurement scale includes financial and non- financial indicators, which adopts Marchand, Kettinger and Rollins (2001) measurement scale.

4.3 *Statistical analysis method*

The research uses the structural equation modeling (SEM) for empirical analysis. SEM is more convenient for the discussion of relationship of multiple variables, the prediction and the path analysis, which is favored by many scholars in recent years. The reliability and validity analysis of the research model uses SPSS 15.0 software. After passing examination, AMOS 7.0 software is used to complete confirmatory factor analysis of relationships between variables.

5 DATA ANALYSIS AND RESULTS

5.1 *Validity and reliability analysis*

The measurement model of the research consists of four latent variables, 13 observable variables, which first use SPSS15.0 for the reliability and validity analysis of the scale, and the analysis results are as shown in Table 1. Table 1 shows that the internal reliability of the scale (namely, Cronbach's Alpha value) is greater than 0.7; AVE values are greater than 0.5; the composite reliability is between 0.794 and 0.8815, greater than 0.7, the above data show that the reliability and validity of the model are better.

The research also carries out discriminant validity

Table 1. Reliability and validity analysis of the measurement model

Latent variables	Observed variables	Load of standard factor	Measurement error	Cronbach's Alpha	AVE value	Composite reliability	P value
Open-book accounting(OBA)	OBA1	0.946	0.110	0.786	0.6821	0.8071	
	OBA2	0.685	0.535				P<0.01
Inter-organizational cost management (IOCM)	IOM1	0.751	0.270	0.794	0.5625	0.794	P<0.001
	IOCM2	0.776	0.264				P<0.001
	IOCM3	0.722	0.308				P<0.001
Performance (B)	B1	0.871	0.170	0.834	0.6402	0.8408	
	B2	0.663	0.385				P<0.001
	B3	0.850	0.197				P<0.001
Information technology (IT)	IT1	0.772	0.271	0.880	0.5981	0.8815	
	IT2	0.784	0.297				P<0.001
	IT3	0.750	0.337				P<0.001
	IT4	0.762	0.273				P<0.001
	IT5	0.798	0.375				P<0.001

test for the scale. Discriminant validity test refers to the discrimination through comparison with the square root of AVE value and the absolute value of correlation coefficient of the corresponding variables. The research respectively calculates the correlation coefficients of four variables, and then compares with the square root of AVE value, and the final test results are as shown in Table 2. The square root of AVE values of all variables is greater than the absolute value of the correlation coefficient of variables in this rank, indicating that the scale passes the test.

Table 2. Discriminant validity test of scale

Variables	OBA	IOCM	B	IT
OBA	0.8259			
IOCM	0.1844	0.8911		
B	0.0656	0.3834	0.8001	
IT	0.0949	0.1934	0.1378	0.7734

Note: The numbers on the diagonal lines are the square root of AVE value, and the remaining are the correlation coefficients of variables.

5.2 *Structural model analysis*

The research uses AMOS 7.0 for confirmatory factor analysis of the structural model. Table 3 shows the path analysis results of the model. As shown in Table 3, P value <0.05, indicates that the model supports hypothesis H1. That is, open-book accounting has a positive impact on the inter-organizational cost management. P value <0.001, indicates that the model supports the hypothesis H2. That is, inter- organizational cost management has a significantly positive correlation with the performance.

Table 3. Results of hypothesis testing of the research model

Hypothesis	Path	Path coefficient	P value	Conclusion
H1	Open-book accounting → inter- organizational cost management	0.248	0.028	Established
H2	Inter-organizational cost management→ performance	0.498	***	Established

Note: *** indicates P <0.001.

Information technology plays a regulatory role in the relationship between the inter-organizational cost management and the performance, as shown in Table 4. In the model 2, ΔR^2=-0.006, indicating that the information technology does not have a direct positive impact on the performance. In the Model 3, ΔR^2 = 0.049, indicating that the regulatory role of the information technology is established, and the model supports hypothesis H3. Due to different number of the observable variables of the inter-organizational cost management and information technology, the research pairs and multiplies both variables by deleting the variables with a lower factor load, and then through the principle of "large with large, and small with small", thus obtaining the final indicators.

Table 4. Hierarchical regression analysis results

Variables	Performance （B）		
	Model 1	Model 2	Model 3
Main effect			
IOCM	0.498^{***}	0.488^{***}	0.506^{***}
Regulated variables			
IT		0.059	0.068
Interaction effect			
IOCM×IT			0.172^{*}
R^2	0.248	0.242	0.291
ΔR^2		-0.006	0.049^{*}

Note: *** indicates that P <0.001, ** indicates that P <0.01, * indicates that P <0.05.

6 CONCLUSION AND REVELATION

The empirical research results show that: 1. open-book accounting has a positive impact on the inter- organizational cost management; the inter-organizational cost management has a positive correlation with the performance. 2. Information technology does not have a direct positive impact on the performance, but the interaction between information technology and inter-organizational cost management has a positive impact on the performance. Overall, information technology can enhance the positive relationship between the inter-organizational cost management and performance.

The former conclusion indicates that, if the enterprise can rationally use open-book accounting, it would promote inter-enterprise cost management activities, while the inter-enterprise cooperation and exchange can reduce the cost of management, and help to improve the enterprise performance. It reflects that open-book accounting plays a promoting role in the performance through the inter-organizational cost management. Open-book accounting is a double-edged sword [1]. The enterprises should pay attention to the use of open-book accounting in operating the inter-organizational cost management. A good open-book accounting will ultimately generate a positive impact on the organizational performance.

The latter conclusion indicates that the enterprises need to learn "grasping two key links at the same time". A great number of investments in information technology do not necessarily improve the organizational performance. However, combined use of the information technology and inter-organizational cost management can be better to improve the enterprise performance.

Nowadays; the enterprises tend to invest a large amount of capital in the construction of information technology, but fail to obtain appropriate returns. If the information technology is appropriately used to establish an inter-enterprise sharing information system in the process of inter-organizational cost management, it can improve the inter-enterprise information sharing efficiency, enhance trust, reduce the

cost of enterprise and even the supply chain, and help inter-organizational cost management play a better role in improving the performance.

The research results have double significance, that is, theatrical significance and practical significance. The theoretical significance relies in extension of the research fields of open-book accounting and inter-organizational cost to explore the current research hotspot - information technology plays an important role in reducing cost and improving performance. Speaking from the practical significance, the conclusion of this paper guides the enterprises to focus on the use of open-book accounting information to improve inter-organizational cost management, and rationally use these three aspects to enhance the enterprise performance combined with the advanced information technology in the process of inter-organizational cost management.

The limitations of empirical research of this paper are mainly manifested in the localization of survey samples, and limited sample size. In the future, the scope and number of samples can be expanded to do in-depth research, in order to further discuss the relationship between the variables. The research direction can also be extended, which is not limited to the management of open-book accounting and the regulated variable of information technology. We can research the relationship between inter-organizational cost management and other management tools, or introduce other variables to discuss the relationship with inter-organizational cost management.

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