IDEA GROUP PUBLISHING
701 E. Chocolate Avenue, Suite 200, Hershey PA 17033-1240, USA
Tel: 717/533-8845; Fax 717/533-8661; URL-http://www.idea-group.com
ITB12747

This paper appears in the book, *Emerging Trends and Challenges in Information Technology Management, Volume 1 and Volume 2*
edited by Mehdi Khosrow-Pour © 2006, Idea Group Inc.

Strategic IS Usage to Support Supply Chain Activities: A BP-ISP Integration Perspective

Che-Chan Liao, Pu-Yuan Kuo, Department of Information Management, National Chung Cheng University,
160 San-Hsing, Min-Hsiung, Chia-Yi 621, Taiwan, R.O.C., kuo@mis.ccu.edu.tw

ABSTRACT

Though there is a wide acceptance of the strategic importance of integrating operations with suppliers and customers in supply chains, many questions remain unanswered about how best to using information systems to support supply chain activities. Is it more important to link with suppliers, customers, or both? Similarly, we know little about the integration between business planning for supply chain activities and information system planning for using IS to support SCM and improved supply chain performance. This paper empirically addressed these questions, and found (1) a positive link between BP-ISP integration and IS usage in supply chain activities, and (2) High IS usage in supply chain activities improved supply chain performance. Findings from this study contribute to our theoretical understanding of implement change in contemporary supply chains, and have important implication for manufacturers interested in improving their supply chain's performance using information systems.

INTRODUCTION

The purpose of supply chain management is to integrate the processes from the end user through original suppliers. The backbone of supply chain management is information technology/ information systems (IT/IS) which is used to acquire, process, and transmit information among supply chain partners for more effective decision making. The goal of using IS to support supply chain management are multidimensional and include cost minimization, increased levels of services, improved communication among supply chain companies, and increased flexibility in terms of delivery and response time. The planning and execution of supply chain activities is a part of BP (Business planning). The deployment of information systems to support supply chain management is a part of ISP (information system planning).

BP-ISP integration can be defined as the alignment of IS strategies with business goals and business strategies gained through coordination between business and IS planning functions and activities(Teo & King,1999; King & Teo, 1997). If deployment of information systems to support supply chain management are not coordinated with planning and execution of supply chain management, it is likely to be very difficult for using IS to support supply chain activities and to contribute to the achievement of supply chain performance. In addition, it is only through such efforts that technical issues can be effectively integrated with business issues. The purposes of this study are to investigate how to use information system to support supply chain management in a strategic perspective and to find out the impact of difference level IS usage to support SCM activities on supply chain performance.

LITERATURE REVIEW

A supply chain is an integrated manufacturing process wherein raw materials are converted into final products, then delivered to customers. At its highest level, a supply chain is comprised of two basic, integrated processes: (1) the Production Planning and Inventory Control Process, and (2) the Distribution and Logistics Process.

Lancioni et al. (2000) classified supply chain activities into seven parts, include purchasing/procurement management, inventory management, transportation management, order processing management, customer services management, production scheduling management, and relations with vendors management. Some researchers also named supply chain activities as supply chain process. This study was try to investigate business how to using IS to support SCM activities, so we adopt the category of Lancioni et al. (2000) for this purpose. The category is also similar to the classification of practitioner and supply chain related system developer. The designing and execution of All supply chain activities is a part of business planning.

Recently, information systems are broadly using to support business operation, include SCM. Information system is not just a single technology, but a combination of technologies, applications, processes. There are many difference systems using for enable supply chain management such as material management system, order processing system, inventory management system, etc. Develop or buy a information system for some special purposes usually take a lot of time and money. It is also cause big lost in time and money if system incompatible with supply chain process. To avoid this, IS planning must coordinate with business planning. Some studies suggest that greater extent of BP-ISP integration helps to ensure that IS function supports organizational goals and activities at every level by identifying critical applications for development and ensuring the adequate resources are allocated to critical applications.

There are several metrics to measure supply chain performance. Beamon(1996) claim the key performance indicators of supply chain are cost, lead time, customer response and flexibility. Neely (1995) classified the indicators into four parts: quality, flexibility, and cost. Teigen(1997) proposed a supply chain evaluate system, using customer satisfaction, inventory control, and flexibility to measure supply chain performance. According to previous studies, a combination measurement was proposed.

A conceptual model proposed to test some hypothesis below:

- **H1.** BP is positively related to BP-ISP integration.
- **H2.** ISP is positively related to BP-ISP integration.
- **H3.** Level of BP-ISP integration is positively related to higher IS usage to support SCM activities
- **H4.** IS usage to support SCM activities is positively related to higher supply chain performance
- **H5.** Level of IS usage to support SCM activities are no significantly difference between each SCM activities

RESEARCH METHOD

The study was conducted using a random sample of respondents drawn from the corporate 1000 book in Taiwan, subject firms are chosen from high tech industry. Over 1000 participants were contacted by phone and participant agreed to join this research were kept in our respondent list.

The development of the instrument involved a series of pretests using MIS faculty members , doctoral students and practitioners over a period

Figure 1. Conceptual model

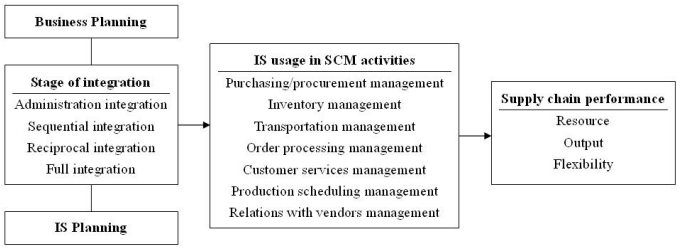

Table 1.ANOVA of H5

	Sum of square	Degrees of freedom	Mean square	F value
between	11.273	6	1.879	7.815*
within	95.204	396		

** P value <0.050*

of about three months. The pretests resulted in changes in the wordings of certain items and rearrangement of the order of items to improve clarity and minimize ambiguity.

Questionnaires were prepared and sent to IS department managers with instructions requesting him/her to forward the questionnaires to the SCM related department executive like logistics manager, transportation manager, etc. As a validation check, both respondents were asked to state and briefly describe the business segment for which they were responsible.

664 questionnaires sent, seventy-five completed questionnaires were returned, a response rate of 11.2%. usable "match pairs" were returned by sixty-seven firms. This response rate is adequate but some what lower than that usually achieved.

The reliability of the scales was assessed using Cronbach's Alpha, which are indication of the internal consistency of the items measuring the same construct. In this study, the Cronbach's alpha value are all over 0.6(overall: 0.9593, BP-ISP integration: 0.8861,IS usage in supply chain activities: 0.9597, supply chain performance: 0.9084).

DATA ANALYSIS AND DISCUSSION

H1 & H2 are attempting test level of BP and ISP highly related to level of BP-ISP integration. In the study, we found level of BP-ISP integration highly related to level of BP (correlation coefficient of BP-ISP integration and BP: 0.551**), it shown the firms with high BP-ISP integration also have high level of BP. On the other hand, level of BP-ISP integration highly related to level of ISP (correlation coefficient of BP-ISP integration and ISP: 0.525**), it shown the firms which got higher level of BP-ISP integration have better level of ISP. Our hypothesis, H1 and H2 are statistically significant.

The purpose of H3 is to understanding the relation of BP-ISP integration and IS usage to support SCM activities. For this purpose, we apply Spearman correlation analysis and found the correlation coefficient is 0.339. It would be better to say that level of BP-ISP integration is highly related to IS usage to support SCM activities. H3 is statistically significant, or it may be nearer the truth to say that the firms with high level of BP-ISP integration usually good at using IS support SCM activities.

H4 intended to check IS usage of SCM activities related to supply chain performance. We run the regression analysis to find the answer. Statistically, IS usage to support SCM activities and supply chain performance are related under confidence level alpha=0.01. That is to say firms with high IS usage to support SCM activities usually got good supply chain performance.

H5 is aim to find out the truth of no significantly difference IS usage on each SCM activities. We apply ANOVA to check this, and the result presented in Table 1. As the table indicates, level of IS usage on different SCM activities is difference. Then we employ pair comparison to find out the detail, levels of IS usage to support transport management, relations of vendors management are different to other five activities. We make a lot of phone call to some of our respondents to understanding the real state of industry, and we found a common answer that many high tech firms outsourcing the logistics to third party and focus on their core competition. On the other hand, many high tech firms have long term relationship with their supplier, so they do not invent on IS to support relations of vendors management.

CONCLUSIONS

Many businesses have invested an enormous amount of resources and effort in conduct SCM and the development of SCM related systems. In general, they contend that this saves them and their customers a considerable amount of time and money and, perhaps more importantly, provides them with an opportunity to be more competitive and profitable. If supply chain planning is not compatible with SCM related systems, the firm will waste a lot of money and time or more than those. A lot of anecdotal evidence in the literature supports their contention but there is no hardcore empirical evidence to back their claims. This research fills this gap by providing empirical evidence of the much anticipated relationships between IS usage to support supply chain activities and supply chain performance from BP-ISP integration strategic perspective. The results of the study should, however, be viewed with caution due to small sample size. A more comprehensive statistical analysis of the data using Structural Equation Modeling and Partial Least Squares will be undertaken shortly to get a better handle on this matter.

REFERENCE

1. Beamon, B. M.(1996), "Performance Measures in Supply Chain management", Proceedings of the 1996 Conference on Agile & Intelligent Manufacturing Systems, Rensselaer Polytechnic Institute, Troy, New York, NY, 2-3 October
2. Beamon, B. M.(1999), "Measuring Supply Chain Performance ", International Journal of Operations & Production Management, 19(3), pp.275-292.
3. Cooper, M.C., Lambert, D.M. and Pagh, J.D., "Supply chain management: Implementation issues and research opportunities," The International Journal of Logistics Management, Vol. 9, No. 2, 1998, pp. 1-19.
4. Christopher, M. "Logistics and Supply Chain Management," Financial Times, 1994,Irwin.
5. Ettlie, J. E., Bridges, W. P. and O'Keefe, R. D. (1984), "Organization Strategy and Structural Differences for Radical Versus Incremental Innovation," Management Science, Vol.30, 682-695.
6. Henderson, J.C. and Venkartraman, N., "Strategic Aligment: Leveraging Information Technology for Transforming Organizations," IBM Systems Journal, Vol.32, Iss.1, 1999,pp.4-16.
7. Holmstrom, J., "Implementing Vendor-Managed Inventory the Efficient Way: A Case Study of Partnership in the Supply Chain," Production and Inventory Management Journal, Third Quarter, 1998, pp.1-5.
8. King, W.R. and Teo, T.S.H., "Integration Between Business Planning and Information System Planning: Validating a Stage Hypothesis," Decision Sciences, Vol.28,No.2,1997,pp.279-307.
9. King, W.R., "Strategic Planning for Information Resources: The Evolution of Concepts and Practice", Information Resources Management Journal, 1988, Vol.1,pp.1-8.

10. Lancioni, R.A., Smith, M.F., Oliva, T.A., "The Role of the Internet in Supply Chain Management," Industrial Marketing Management, Vol.29, 2000, pp. 45-56.
11. Lee, H.L. and Billington, C., "Material Management in Decentralized Supply Chain", Operation Research, Vol. 41, No. 5, 1993, pp. 835-847.
12. Reich, B.H. and Benbasat, I., "Measuring The Linkage Between Business and Information Technology Objectives," MIS Quarterly, March 1996,pp.55-77.
13. Handfield, R. B. and Nichols, E. L. Jr.(1999),"Introduction to Supply Chain Management", Prentice-Hall
14. Teo, T.S.H. and King, W.R., "Assessing The Impact of Integrating Business Planning and IS Planning," Information and Management, Vol. 30, 1996,pp. 309-321.