Review on SCM Empirical Research Published in Chinese Journals: Trends and Future Research Directions

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Abstract

Supply chain management (SCM) is an important research field and has yield many valuable theories and methods. To use empirical research methods to build and testify the theories in SCM field is not only necessary but fruitful. This paper reviews and evaluates SCM empirical research in 63 papers published in Chinese journals from 2001 to 2009, to assess these papers' research purposes, research industries, research contents, data collection approaches, and data analysis technologies. To compare the SCM empirical research in China with the research in USA, we find some interesting differences and make a conclusion of the problems in Chinese research. We also discuss the trends and directions for further empirical research in SCM.

Keywords: Supply chain management, Empirical research, Research methods, Data collection, Data analysis approach

1. INTRODUCTION

Supply chain management (SCM) has attracted many researchers' interests in the management science field, and the number of papers that have been published in related journals is growing steadily. For example, Management Science publishes more than 10 SCM related papers each year, and Operation Research has about 10.4% papers fall in SCM field (Liu, 2003). Today, research in SCM includes supply chain design, supply chain strategic management, supply chain cooperation and collaboration, supply chain integration and optimization, auction and reverse auction, supply chain simulation and modeling, green supply chain and risk management in supply chain, as well as innovation issues in supply chain (Zhang, Yang, Wang, 2009). Many research results have been applied in different companies and industries, and have made great contribution to the real operation practice. Yet, there are still many issues need to be solved in empirical way, like the testing and verifying the established theories and models. Also, as a new and developing research field (Da, 2008; Lamming, Zheng, Harland, 2006), SCM still has many unsolved problems that need to use empirical methods to find the inside rules and to explain the potential relationships.

According to WIKI, 'Empirical research is research that derives its data by means of direct observation or experiment, such research is used to answer a question or test a hypothesis. The results are based upon actual evidence as opposed to theory or conjecture; as such they can be replicated in follow-up studies.' Empirical research has played an important role in social science from 1950s' (Chen, Xu, Fan, 2008), and from the view of positivism paradigm, most of the science research is get data from experiment or questionnaire, and make conclusion from the data analysis. These days, empirical has been applied widely in management science, especially in the last decade, empirical research based on practice and theory makes great contribution to the operation management research. There are two kinds of empirical research, namely theory building and theory testing. Considering the characteristics and requirements of operation management, Gupta, Verma, and Victorino (2006) classified the empirical research in OR into four types: theory building, theory testing, providing proofs, and application.

Compared with western academic research, empirical research in China is somehow still in it's beginning phase, both in the research contents and research range. This paper give a comprehensive review on the empirical research in the SCM field published in China journal, points out the deficiency and gives the future research directions.

2. RESEARCH DESIGN

We select all academic papers that are official published in Chinese journals from 01/1999 to 11/2009, and we

choose www.cnki.net as our database, since CNKI (China National Knowledge Infrastructure) is a national knowledge infrastructure proposed by the World Bank in 1998 and launched by Tsinghua University in 1999. The database provides the full text of Chinese research journal articles, dissertations and important conference proceedings papers. In the first turn, we search the database by using supply chain as the key word in the paper title, and in the second turn we use empirical as the keyword to search from the first turn's results. 63 papers are returned as the result (exclude 3 papers that have the same paper title and author name but in different journal). Compared with the 11538 papers that returned in the first turn (has supply chain in the paper's title), 63 papers count to only less than 0.55 percent, which is a very small fiction. The result shows that though SCM is already a popular field in China, yet empirical research is still very deficient and need more attention and efforts.

2.1 PUBLITION TIME

From our search result, the first SCM empirical research paper published in China is in 2001, and it's the only one paper in that year. Compared with the same kind paper published in America (Robert, Spekman, Kamauff, etc, 1998), it is 3 years later. There was no SCM empirical research paper published in 2002, and only one paper again in 2003. From 2004 on, the number began climbing slowly but constantly (Fig 1), and this change shows that Chinese researchers are paying more and more attention to empirical research in SCM.

Insert Figure 1 Here

2.2 RESEARCH PURPOSE

In the 63 papers, 29 papers tried to build new theory or new models, 19 papers tried to provide the proofs, 13 papers focused on application, and only 2 papers tried to verify the theories established by their peers. This result is very far from the SCM empirical research in America, according to Sushil's investigation, 39.5 percent of the empirical research in operation research in Production and Operations Management are aimed to verify the established theories. This difference shows that, researchers in China pay more attention to build new theory and new model but few of them show interests on test and verify the established theories or models, which is a very interesting phenomena. But the 32 papers that tried to provide proofs and studied the application show the practice of SCM has been widely applied in different industries and companies in China, and already captured many researchers' interests and attention.

Insert Figure 2 Here

2.3 RESEARCH CONTENT

SCM has many sub-field, from strategic research to daily decision. We make the category based on Sushil's classification, and 35 percent of the 63 papers fall into the SCM practice, and 30 percent of the papers tried to explain the relationship of SC performance with other factors, and 22 percent of the papers focus on understanding how to deal with the collaboration and cooperation in SC. Only 8 percent of the papers mentioned the green SC and 5 percent talked about risk issues in SC. This results shows that SC research in China is still in the phase of enhancing SC operation and solving the specific problems happened in the daily process, but lacked the emphasis on environment problems and risk management which is very important and necessary in modern SC operation.

Insert Figure 3 Here

2.4 RESEARCH INDUSTRY

In Sushil's findings, the SCM academic empirical research interests in industry has move from manufacturing industry to service industry in recent years. Our findings in the 63 papers shows a very interesting difference, the most popular industry in SCM empirical research in China is neither manufacturing nor service but agriculture. 10 papers declared that their data came from agriculture, and only 7 papers show interests in manufacturing industry. Most of the papers collected data from more than one industries, and thus can't be sorted into a specific industry. This difference reflects that agriculture and manufacturing industry are still the most important industries in China, and service industry is still in the growing stage, and need more attention in the future research.

Insert Figure 4 Here

2.5 DADA COLLCTING METHOD

There are different data collecting methods in empirical research based on the research purpose as well as the research objectives, such as questionnaire, archival data, case study, simulation, and interview. In the 63 papers we review, 24 of them adopted case study method, and 19 papers collected their data by handing out and collecting questionnaire. Few of the papers used face to face interview or getting data from the company's open

financial report. There are some papers even did not mention their data source. Our review shows that case study and questionnaire are the most popular methods to do SCM empirical study in China, and there are still some unclear or misunderstanding in the definition or scope of empirical research in Chinese researchers. Some authors use empirical in their paper title but did not even use any empirical research method in their paper.

Insert Figure 5 Here

2.6 DATA ANALYSIS APPROACH

The most popular data analysis approach in empirical research include descriptive, correlation, model, regression, factor analysis, chi-square test, SEM, t-test, ANOVA, simulation, MANOVA, cluster analysis, logistic regression, and discriminate analysis . In the 63 papers we studied, 12 of them used SEM, two papers used APH and one paper applied ANOVA method. When it comes to software, seven papers used SPSS, three papers used AMOS and three papers used LISREL. Our static result shows that, Chinese academic researchers always combined descriptive methods with other methods like t-test and regression to design their research. And SEM is the most popular method in recent years, and SPSS is the most popular data analysis software.

3. CONCLUTION

Our conclusions are based on the analysis of 63 papers that were classified as empirical papers published in China journals from 2000 to 2009 in the supply chain management field. During the decade we covered in our study, articles based on empirical data have increased substantially from 0 to 10 papers per year. This trend suggests that the operations management community pays more and more attention on the empirical methods in the supply chain study. But our data also shows that Chinese researchers' empirical study in SCM also has a large space to improve.

Purpose of empirical research. We observe that among the four purposes of empirical research (theory building, theory verifying, application and providing evidence), theory building was the major purpose of Chinese researchers' empirical research. This result might due to two reasons: the lack of theories that was built through empirical study in SCM in Chinese past research, and (or) Chinese researchers are more likely to build theory than test theory build by others.

Research content of empirical research. We noticed that only a small number of papers focused on the green supply chain and risk management. This result shows that green management practice is still a new field in China supply chain operation and needs more attention. When it comes to risk management, it is also a new research interest for the researchers and still in the beginning phase of research.

Lack of triangulation. We also noticed that most of the papers were based on one data collection method, thus pointing out the lack of triangulation. As empirical study matures within the supply chain management field, we think it is desirable to have more papers based on multiple data-collection methods.

Approaches of analysis. We found that the SEM is the most popular data analysis approach among Chinese researchers, and accordingly, AMOS is the most popular analysis software. We encourage research within the SCM to use multivariate technologies so that researchers can increase triangulation and draw stronger conclusions from the empirical research.

The SCM empirical study has a bright future with the fast development of global operation management and service networks, and the community has a wide range of research opportunities and new methods.

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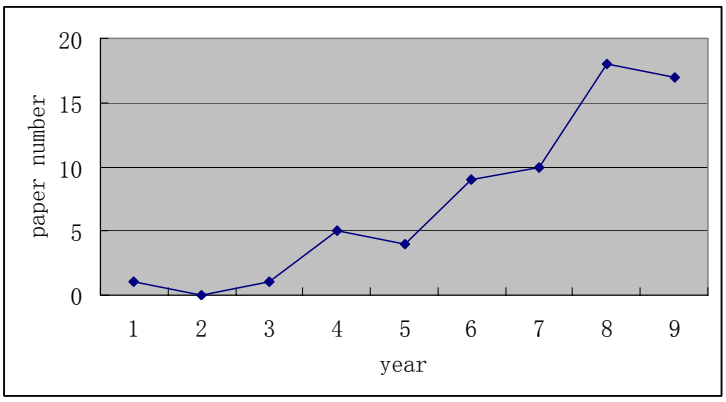

Figure 1. Paper numbers with the year

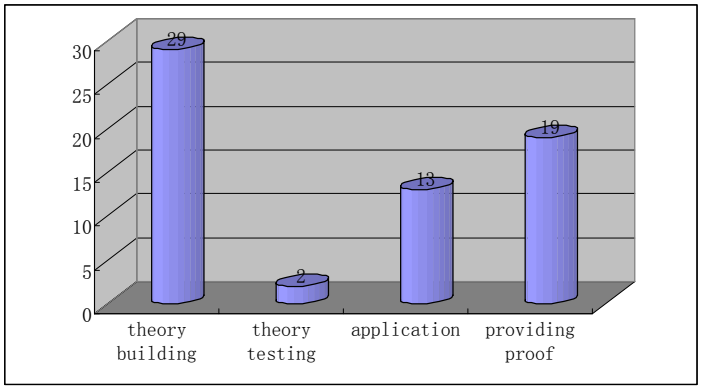

Figure 2. Paper number with research purpose

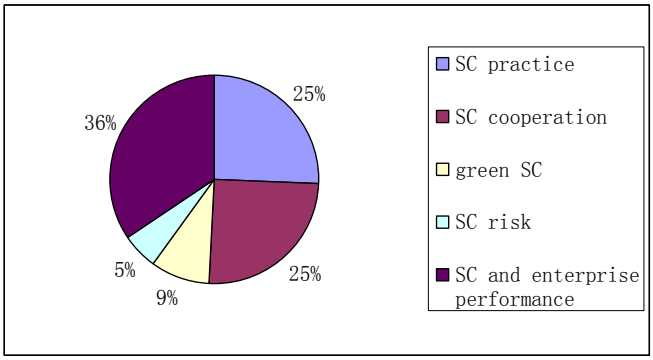

Figure 3. Paper numbers and research content

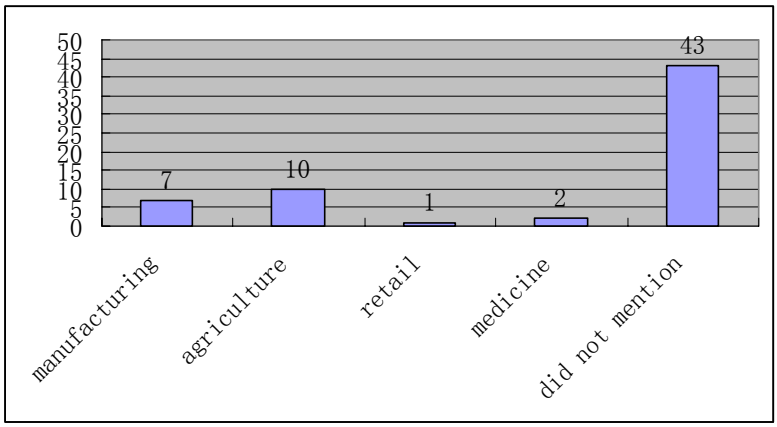

Figure 4. Paper numbers and research industry

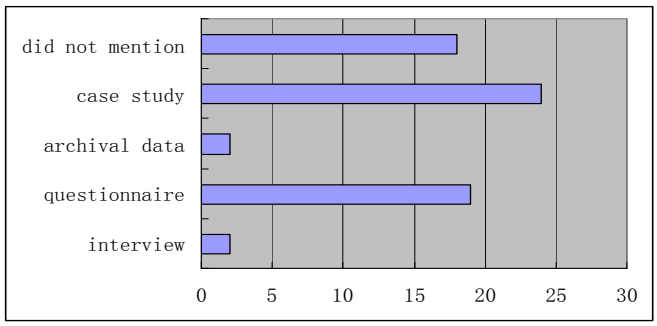

Figure 5. Paper numbers with data collection method