

*Full length research paper*

# Research on factors of green purchasing practices of Chinese

Weifeng Yang\* and Yuelei Zhang

School of management, Wuhan Textile University, Wuhan, China

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**Green purchasing is a key strategy for enterprises to reduce waste and improve efficiency and enhance competitiveness. Based on the survey of 144 companies, five Principal components of green purchasing practices were extracted through factor analysis using SPSS statistic software. And then, regression analysis were conducted to verify the hypothesis, it drew a conclusion on leaders' support will boost the green purchasing practices and cost of environmental management will hinder the green purchasing practices of Chinese enterprises.**

**Keywords:** green purchasing, environment cost management, empirical study

## Introduction

With the change of the social economic development level and market environment, enterprise competitive means have developed gradually from the quality competition, the service competition, the brand competition to the green competition. The export of our products is threatened by "international green trade barriers" which directly affect our business competitiveness in the global market. In addition, customers increasingly incline to the environmentally friendly products due to a large number of unethical business practices in the consumer goods industry that have been exposed. Facing to a variety of competitive pressure from the external environment, our country's enterprises must start the green transformation and management to the whole supply chain from purchasing raw materials to delivering the products to enhance its competitiveness by reducing the number of raw materials and waste, recovering, collecting, reusing, recycling and reprocessing the scrap and old product and packing. The company green purchasing which is the source of green transformation process is the key factors to carry out the green transformation (Min H and Galle P, 1997).

Therefore, it is undoubtedly an important practical significance to develop green management of the enterprises in china by strengthening the research of impact factors to the green procurement implementation. However, Now most domestic and international research focuses on supply chain management, or the external

environment and specific-industry. Some scholars examined the influence of green purchasing factors on enterprise's performance.

Goh Chee Wooi and Suhaiza Zailani(2010) conducted an investigation on Green Supply Chain Initiatives in the Context of SMEs in Malaysia, they found out the key barrier in adopting green supply chain initiative, including attitudinal and perceptions barrier, information related barrier, technical barrier, resource barrier and business strategic orientation. Eltayeb and Zailani (2009) reviewed twenty one literatures on green supply chain initiatives and concluded that the green supply chain initiatives can be generally classified into three major elements. Amy H.I. Lee et al.(2009)concerned environmental issues While the works on the evaluation and/or selection of suppliers, they proposed a model for evaluating green supplier. ZhuQingHua et al. (2004) identified the main factors of green supply chain management pressure, practice and performance for China manufacturing enterprise by questionnaire survey. Maria Björklund(2011) reckoned business environment is very important for enterprise purchasing, He investigated the different factors that influence on environment purchasing through E-mail for traffic transportation services, as well as in the Swedish context. Annika Varnäs, Berit Balfors et al. (2009) explores the current practice, problems and opportunities of green procurement of construction contracts. Tarig Khidir eltayeb et al.(2010)examines the effect of four drivers; regulations, customer pressures, social responsibility, and expected business benefits on green purchasing in the Malaysian manufacturing sector. They found green purchasing is affected by regulations, customer pressures, and

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\*Corresponding Author Email: [ywf828@163.com](mailto:ywf828@163.com)

expected business benefits, however, high social responsibility doesn't constitute a genuine driver to adopt green purchasing for Malaysian's firms. Qinghua Zhu, Joseph Sarkis and Kee-hung Lai (2007) explored the green supply chain management practice, initiatives and performance of the automotive supply chain in China. They showed that these enterprises have experienced high and increasing regulatory and market pressures and have strong internal drivers for green supply chain management practice adoption. However, their green supply chain management implementation, especially with consideration of external relationships, is poor. Liu Bin et al. (2009) found the performance appraisal factor between green purchasing practice and enterprise for China manufacturing enterprise.

It is limited to research implementation impact factors of China's enterprises green purchasing factors in an empirical way from both inside and outside at the same way. This paper will use factor analysis and regression analysis to research on impact factors of China enterprise green purchasing practices and find the factors of impacting the enterprise green purchasing strategies.

The next section presents a review of the extant literature that focuses on the green management, green purchasing, green practice. This literature leads to the study's hypotheses. Afterwards, we describe the methodology and analysis used to test these hypotheses. We conclude by presenting and discussing our findings.

### **literature review and research hypothesis**

Despite the fact that green purchasing is an established concept within the purchasing field, common definitions do not exist. One common definition referred to is the practice of companies taking supplier environmental product and process performance into account when purchasing products and service. Carter et al. (1996) defined green purchasing as: in order to facilitate reusing and recycling resource reduction, the purchasing department should participate every activities of supply chain management and should more concretely purchase reused, recycled materials so as to reduce the use of resources as much as possible. Zsidisin and Siferd defined that green purchasing is a set of principles, methods under premise of full considering the impact on the environment. Zhu Qinghua et al. (2002) considered green purchasing as: every department in the enterprise consults decision-making to improve business performance by decreasing the using materials cost and end treatment cost, protecting resources and enhancing the enterprise reputation, etc. Martha Turner (2010) pointed out the potential aim of green procurement is to eliminate waste, and purchasing department will focus on value by comprehensive considering the total cost in the process of eliminating waste, which should focus on the business of waste disposal activities. Usually, it can save more cost in the

source of supply chain to prevent waste than at the end of supply chain. Purchasing activity is the key starting point of eliminating waste, so a key factor of the successful green purchasing is the condition of company recycling and reusing waste. Hokey et al (2001) proposed that reducing the emissions of exhaust and sewage and so on, not only is the premise of ensuring the implementation of green procurement system, but also is the important way to promote the development of green procurement. The type of companies' resources can influence both the purchasing practice, the technology, equipment and facilities of separating waste can impact the purchasing practice.

Stock (1992) thought that green purchasing can improve a firm's economic position, by reducing disposal and liability costs, conserving resources, and improving an organization's public image. Min H and Galle P (1997, 2001) find that the two most highly rated obstacles to effective implementing green purchasing was cost and revenue. In the process of implementing green procurement, the enterprise is bound to increase investment, training staff costs and the communication costs with suppliers, etc, which hence causes the loss of other investment opportunities (Liu Bin, 2009) This study will define these the increase of investment and cost as the corporate environmental management cost. Zhu Qinghua et al. (2004) found the suppliers stress had greater impact on the implementation of green supply chain through research. Fangmiao Hou (2007) pointed out that the close cooperation of suppliers and buyers would promote the successful completion of green purchasing activities.

In the process of purchasing and procurement, Suppliers must consider the ultimate disposition of the materials and components that enter the firm, purchasing managers can ask upstream members of the supply chain to commit waste reduction and provide environmentally friendly product. Suppliers, e.g. transport service suppliers and product suppliers, can impact firms' green purchasing activities (Carter et al., 1998) and drive green supply chain management (Walker et al., 2008) The availability, characteristics, knowledge, ambitions, equipment and actions of the suppliers can have an impact on purchasing (Knudsen, 2003) and green purchasing. To achieve an effective environmental performance, the purchaser must take, and be given, the responsibility and resources for educating suppliers and demonstrate ongoing commitment (Murray, 2000).

The relationship formed with customers described in terms of communication patterns, cooperation and dependency is addressed in the purchasing literature, and in the environmental purchasing literature. Carter et al. (1998) describe customers as having a direct impact on firms' environmental purchasing activities and Walker et al. (2008) investigates how customers' influence drives green supply chain management. The priorities of the customers can influence the environmental management and environmental purchasing.

**Table 1.** Green purchasing practice research summary

| <b>Author, Time</b>  | <b>Paper title</b>   | <b>Main findings</b>  |
|--|--|---|
| Drumwright,1994  | Socially responsible organizational buying:Environmental concern as a noneconomic buying criterion   | The experience and ability of entrepreneurs and organizational environment is the key to success of developing green purchasing action.   |
| Min H and Galle P,1997                                     | Green Purchasing Strategies:Trends and Implications  | the biggest obstacle of the effective implementation of green purchasing is the cost and income, and the environment friendly packaging is the key to the success of the project.   |
| Craig R. Carter, Joseph R. Carter,1998                     | Interorganizational Determinants of Environmental Purchasing: Initial Evidence from the Consumer Products Industries   | Environmental purchasing activities will be facilitated through increased coordination with suppliers as well as downstream members of the supply chain, including retailers.   |
| Craig R. Carter, Lisa M. Ellram, Kathryn J. Ready,1998     | Environmental Purchasing: Benchmarking Our German Counterparts   | presented a reliable and valid scale used to measure environmental purchasing, and compare the actions of U.S. purchasing managers to those of their German counterparts and find that the company adopt more obvious green purchasing activities in Germany than the United States . |
| Steve V. Walton, Robert B. Handfield, Steven A.Melnyk,1998 | The Green Supply Chain: Integrating Suppliers into Environmental Management Processes  | Discussed five primary areas for change to increase purchasing's impact on environmental results, find the positive environmental strategy can save cost and reduce waste.  |
| George A. Zsidisin, Thomas E. Hendrick,1998                | Purchasing's involvement in environmental issues: a multi-country perspective  | Discussed the extent of involvement that purchasing managers in Germany, the UK, and the USA have in environmental issues, purchasing managers want greater levels of participation in environmental issues.  |
| Craig R Carter, Rahul Kale,Curtis M Grimm,2000             | Environmental purchasing and firm performance: an empirical investigation  | Through empirical study demonstrates the relationship of green purchasing and performance, the green purchasing is significantly related to both net income and cost of goods sold.   |
| Hokey Min, William : Galle,2001                            | Green purchasing practices of US firms   | identify variables that either promote or inhibit the successful implementation of green purchasing and to evaluate the effects of green purchasing on the firm's supplier selection, waste management, packaging, and regulatory compliance.   |
| Qinghua Zhu and Joseph Sarkis,2004                         | Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises | examine the relationships between GSCM practice and environmental and economic performance, find the relation of GSCM practice and performance is not only one.   |
| Liu Bin and Zhu Qinghua,2005                               | The Supplier Selection Based on Green Purchasing   | environmental indicators are proposed as a main aspect in supplier' evaluation.   |
| Qinghua Zhu, Joseph Sarkis, Kee-hung Lai,2007              | Green supply chain management: pressures, practices and performance within the Chinese automobile industry   | the enterprises have experienced high and increasing regulatory and market pressures and at the same time have strong internal drivers for GSCM practice adoption.  |
| Leire, Charlotte ,2009                                     | Increasing the environmental and social sustainability in corporate purchasing: Practices and tools  | green purchasing practices in private sector organizations is limited, and mainly focus products of strategic importance. purchasing managers use information tools in green purchasing seem to vary with the type of purchasing situation.   |

Table 1. Cont.

|   |  |   |
|---|--|---|
| Kaman Lee,2009  | Gender differences in Hong Kong adolescent consumers' green purchasing behavior  | Discusses the influence the gender on the green purchase, find female adolescents have strongly perceived in green purchasing behavior than male adolescents.   |
| Roberto Maria Grisi, Luigi Guerra, Giuseppe Naviglio,2010 | Supplier Performance Evaluation for Green Supply Chain Management  | present the basis for the implementation of a Fuzzy-AHP model for "green" suppliers evaluation.   |
| Diane Mollenkopf , Hannah Stolze et al.,2010              | Green, lean, and global supply chains  | An in-depth examination of the literature revealed drivers, barriers, converging, and contradictory points across the three supply chain strategies.  |
| M Björklund,2010  | Influence from the business environment on environmental purchasing--Drivers and hinders of purchasing green transportation services | The internal management, image, resources of the firm, customer demands, carriers and governmental means of control can influence the green purchasing.   |
| Nabsiah Abdul Wahid, Elham Rahbar, Tan Shwu Shyan, 2011   | Factors Influencing the Green Purchase Behavior of Penang Environmental Volunteers   | Social influence, environmental concern, green product knowledge, specific environmental knowledge, environmental label and income level are having significant impact to green purchase behavior of green volunteers.            |
| Joseph Sarkis,2012  | A Boundaries and Flows Perspective of Green Supply Chain Management  | Research literature can be integrated into these comprehensive multidimensional frameworks which also provide opportunities as vehicles for future research. Research directions are described utilizing the framework presented. |

Zhiyi He et al. (2004) found by investigation that in the consumer market, green product mark was the main conditions of gaining the customer trust and the competitive advantages, almost 2/3 of customers prefer to "buy a product because of its environmental protection demands" and the customers awareness of environmental protection could advance the implementation of corporate green transformation. Ottar Michelsen et al.(2009) also held the pressure of customers was the main drive of the enterprise implementing the environment-friendly product when studied the green procurement of Norway. Revenues can be positively impacted when customers prefer the products of environmentally friendly firms, resulting in increased market share vis-a-vis less environmentally oriented competitors. Environmentally friendly products can be differentiated through certification programs such as the Green Cross or Ecologo.

Drumwright(1994) classified the enterprise according to the company leader's different view on environment responsibility through the research of 10 enterprises, provided a framework for the design of business organizational structure and the implementation of green procurement, and but also found the environmental awareness of senior leaders had a great influence on the success of the enterprise green purchasing. Burton

Hamner (2007) studied and proposed the involvement of senior leaders can strengthen cooperation with its suppliers and promote the implementation of green supply chain.

With the deterioration of ecological environment, the Governments has been enacting a series of national laws, regulations and policies to regulate, such as restrict and punish acts of resource consumption and environmental pollution in the use of taxes and charges and other means, encourage and subsidize acts of resources conservation and environmental protection through the form of funds or subsidies, strictly regulate the operation of the organizations through making industrial policy to limit the waste of resources and serious environmental pollution industries, and gradually ask organizations to provide green products. Implementation of green procurement system and buying green products is an important way of the organization adapting to the external environment, and enhancing their competitiveness (Carter C R et al.,1998).

The researches summary on green purchasing practice are summarized as shown in Table 1, mainly includes three aspect: green purchasing supplier selection method; green purchase supplier evaluation; The relationship of green purchasing practice and performance.

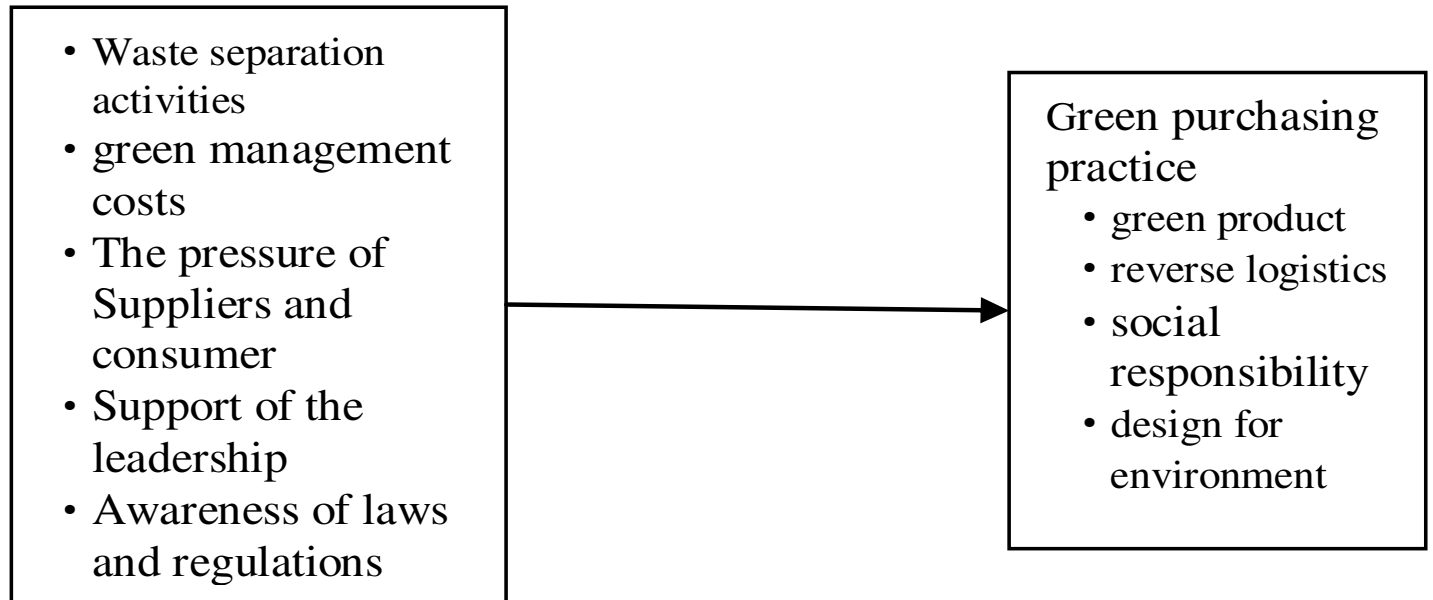


Figure 1. Theoretical framework

**Theoretical framework:** This research attempts to explore each factor that influence on green purchasing practice, which promote/hinder to adopt green purchasing initiative in China.(Figure.1).

**Hypothesis development:** Based on the research significance, literature review and the theoretical framework, the hypothesis for the research are put forward:

H1: The enterprise waste separation activity has a positive effect on the implement of green procurement

H2: The increase of the corporate environmental management cost will hinder the implementation of green procurement

H3: The pressure of suppliers and consumers has the positive impact on the green purchasing implementation of enterprise

H4: The support commitment of the enterprise leaders has the positive impact on the green purchasing implementation of enterprise

H5: The enterprise cognitive level of laws and regulations has the positive impact to the green purchasing implementation of enterprise

## Research Design

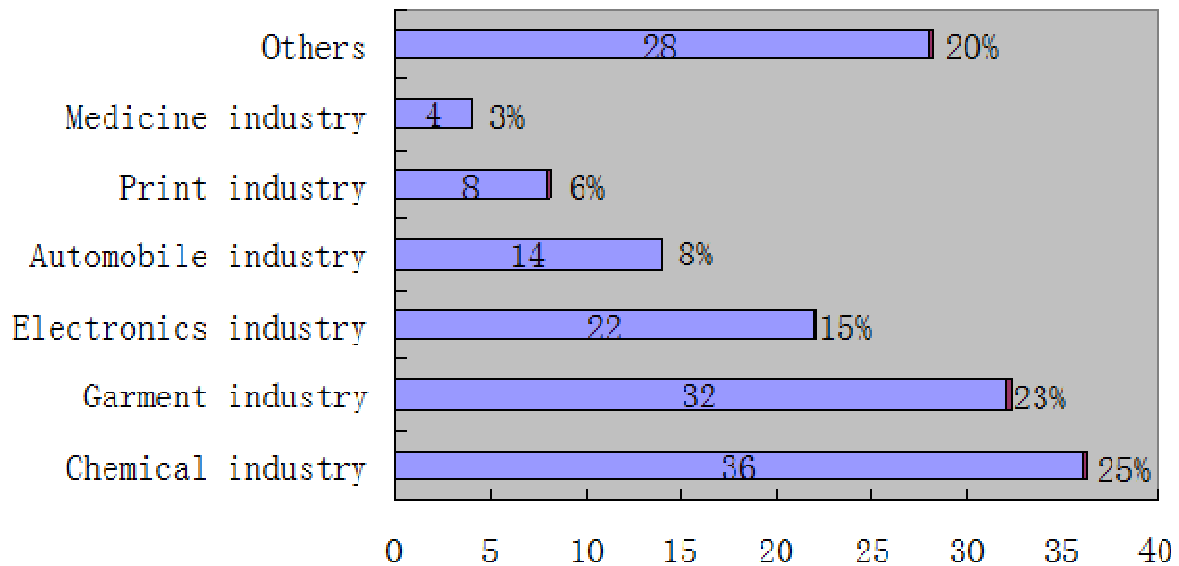
### Sample Collection

The questionnaire in this study was developed on the basis of the domestic and international relevant study, the questionnaire scales include two parts: the basic information, green procurement practices. among which,

the later was extended in the basis of the given literature and it included 20 items. Scale items were measured on a 5-point Likert scale, where 1 denotes To No Extent and 5 denotes To A Very Great Extent. The survey was carried out from October 2010 to September 2011, in defining the sampling frame, the researchers wanted to avoid sampling industries with relatively little or no environmental purchasing activity. We chose more sample in Chemical industry and Garment industry, which are likely to be highly involved with green issues, including green purchasing. Also we collected other industries sample in order to guarantee the representation. However, it is difficult to reach every company and it is expected the response will be low. The questionnaire will be sent by e-mailing, telephone interviews and study conference and field studies to the selected company to participate the survey. More than 200 middle and top managers and professional purchasing personnels and field experts which come from China among mostly from the Hubei Province have participated in the survey, in which 144 valid questionnaires were received. The industry sectors of sample surveyed were shown in Figure 2.

### Reliability and validity

Reliability refers to the stability and consistency of the results, commonly measured to the Cronbach's Alpha. Validity refers to the conformity of conclusions and reality, including content validity and construct validity. Cronbach's Alpha internal consistency coefficient is applied to test the internal consistency of each item by SPSS13.0. The composite reliability was above 0.70, the



**Figure 2.** Industry sectors of sample surveyed

recommended minimum. This gives a composite score for the green purchasing construct, which we refer to as Table 2.

For Reliability test, as can be seen from the table, Composite reliability is 0.702, the reliability value of each of the latent variable is greater than 0.7, indicating construct reliability. Although the Cronbach's Alpha coefficient of the dependent variable is 0.674 and don't reach statistical recommended standards, but in line with professional explanation than the principles of statistical testing, we believe that the internal consistency test of the dependent variable item is still scientific.

For Validity test, this questionnaire was developed ,based the main theory of the previous studies in reference to a large number of studies scales and project scale indicators within field area, and had repeatedly revised to determine the final from, so the high validity has proved in this study. Through above test measurements, the science and rationality of the scale are fully demonstrated.

### Factor analysis

Through factor analysis by SPSS, this paper identifies main factors for pressure/drivers on green purchasing to clarify and simplify the analysis of the problem. In this study, five factors were extract by principal component analysis method, which aims to reduce dimension thoughts so that the much indicator transform into a few composite indicators. The orthogonal rotation to maximize the variance was conducted to name the factor of green purchasing practices interpretability. For green purchase practices we can extract five factors for further analysis,

the green purchase rotation factor loading matrix in Table 3. From this table we can see the five factors explain 89.065% of the original variables information , and these five factors have very good explicable. So the five factors of green purchasing practice were defined as the waste separation activities that infer reuse, recycling, recovery of resources etc, the environmental management costs that infer the increase of investment and cost of training, the pressure of suppliers and consumers that include the demand of partners and the attention of consumer for green products, the support and commitment of the leadership that infer the consciousness and initiative of the leader on to the social responsibility of the enterprise, and the awareness of laws and regulations that constraints of the law.

The coefficient for the rotation factor loading estimates were shown table 3, namely the correlation coefficients for the question items and factor variables. Based on Statistical analysis results and the original information that was reflected the extracted factors, five factors can be explained strongly. Namely  $X_1$  is named Waste separation activities,  $X_2$  is named Environmental management costs,  $X_3$  is named The pressure of suppliers and consumers,  $X_4$  is named Support and commitment of the leadership,  $X_5$  is named Awareness of laws and regulations.

### Hypothesis testing and Results

Hypothesis testing is carried out to use regression analysis, Green purchasing practice as the dependent

**Table 2.** Reliability analysis results

| The variable level     | Variables                                | Cronbach's Alpha | Cronbach's Alpha | The total reliability |
|------------------------|--|------------------|------------------|-----------------------|
| The latent variables   | Waste separation activities              | .859             | .808             | .702                  |
|                        | Environmental management costs           | .851             |                  |                       |
|                        | the pressure of suppliers and consumers  | .816             |                  |                       |
|                        | Support and commitment of the leadership | .799             |                  |                       |
|                        | Awareness of laws and regulations        | .742             |                  |                       |
| The dependent variable | Green purchasing practice                | .674             | .674             |                       |

**Table 3.** Factor loading matrix rotation of green purchasing practice scale item

| Surveys problem items   | X1   | X2   | X3   | X4     | X5   |
|---|------|------|------|--------|------|
| P1:reuse,recycling,recovery of Product,parts,and materials  | .982 |      |      |        |      |
| P2:Avoid the use of hazardous materials or manufacturing processes of impacting seriously environment | .796 |      |      |        |      |
| P3:Increase costs in training   |      | .895 |      |        |      |
| P4:Increase cost of purchase of environmentally friendly materials                                    |      | .875 |      |        |      |
| P5:Increase in environmental investment   |      | .777 |      |        |      |
| P6: Providers in promoting environmental-friendly packaging improvements                              |      |      | .940 |        |      |
| P7:The establishment of a green corporate image   |      |      | .899 |        |      |
| P8:Environmental awareness of consumers   |      |      | .873 |        |      |
| P9:Competitors' green strategy  |      |      | .798 |        |      |
| P10:Suppliers in the promoting environmentally friendly products improvements                         |      |      | .689 |        |      |
| P11:Support of middle management for green management   |      |      |      | .904   |      |
| P12:Commitment of top leadership for environmental management   |      |      |      | .892   |      |
| P13:Corporate environmental vision  |      |      |      | .795   |      |
| P14:Potential environmental regulations   |      |      |      |        | .896 |
| P15:Local environmental regulations   |      |      |      |        | .892 |
| P16:State environmental regulations   |      |      |      |        | .795 |
| P17:Potential liability of disposal of hazardous materials  |      |      |      |        | .703 |
| Explanatory power of total variance %   |      |      |      | 89.065 |      |

Rotate after 7 iterations

variable will be tested the five factors affecting the green purchase. Regression results of Green Purchasing practice and five factors affecting its practice were shown in Table 4. Analysis of the results proved strong correlation was demonstrated between green purchase practice and five factors, five impact factors are significant in the  $p < 0.05$  level. Which displays that these five factors on the implementation of green purchase plays an important role. Another it has also been seen that Waste separation activities, The pressure of suppliers and consumer, The Support and commitment of leadership and Awareness of

laws and regulations are positively related to Green purchasing practice. But Environmental management cost is negatively related to Green purchasing practice. Together, the results strongly verified the hypothesis H1, H2, H3, H4, H5.

Based on the hypothesis, the green purchasing practice affecting factors model was put forward in

According to the results from these regression analyses in Table 4 and above model diagram, Expression for the enterprises' green purchasing practice can be expressed:  $Y = 0.297X_1 - 0.328X_2 + 0.492X_3 + 0.586X_4 + 0.523X_5$

**Table 4.** Regression results

| Model                                      | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|--|-----------------------------|------------|---------------------------|--------|------|
|  | $\beta$                     | Std. Error | $\beta$                   |        |      |
| X1:Waste separation activities             | .297*                       | .139       | .297*                     | 2.144  | .042 |
| X2:Environmental management costs          | -.328**                     | .138       | -.328*                    | -2.385 | .005 |
| X3:the pressure of suppliers and consumers | .492**                      | .138       | .492**                    | 3.561  | .001 |
| X4:Support and commitment of leadership    | .586***                     | .148       | .586***                   | 3.963  | .000 |
| X5:Awareness of laws and regulations       | .523**                      | .159       | .523**                    | 3.290  | .003 |

\*\*\*Significant at the 0.001 level; \*\* Significant at the 0.01 level; \* Significant at the 0.05 level.

(1). Based on the above expression we can see, the impact of Support and commitment of the leadership on green purchasing practice is most significant ( $\beta=0.586$ , among which is the greatest), it fully demonstrated that Support and commitment of the leadership plays great significance and indispensable role for green procurement practices. The results have clear implications for managers in that a positive effect of Support and commitment of the leadership on firm environmental purchasing activities suggests purchasing and supply managers should focus greater attention on such activities. Together, another three factors (X1: Waste separation activities, X3: The pressure of Suppliers and consumer, X5: Awareness of laws and regulations) has a great impact on green purchasing practice, which the coefficients  $\beta$  is 0.297, 0.492, 0.523. Therefore, the procurement staff should give full consideration to these three factors when they formulate procurement strategies. In addition, the coefficient  $\beta$  which Environmental management costs impact on green purchasing practice is -0.328, which indicating that Environmental management costs that doption of green purchasing strategy may bring can hinder the green purchasing practice.

The main conclusions and limitations

We concluded our paper by examining some theory studies and empirical analysis of the green purchase business activities that comprise environmental purchasing and specific ways that purchasing managers can contribute to environmental initiatives.

(1) The five factors had been extracted as Waste separation activities, Environmental management costs, The pressure of suppliers and consumers, Support and commitment of the leadership, Awareness of laws and regulations. It had been proven they have an impact on green purchasing practice.

(2) For Waste separation activities, supplier of consumer pressure, Support and commitment of the leadership and Awareness of laws and regulations have a significant

positive relationship for green purchasing practice, among which middle and top managers' awareness, priorities and support are the most important to successful environmental practice ( $\beta=0.586$ ) while the impact of Environmental management costs on green procurement practice is a negative correlation ( $\beta=-0.328$ ), indicating that the Environmental management costs retard the green procurement practice. Therefore, the managers should strengthen attention of the leadership and take measures to reduce costs that environmental practice would bring when they develop strategies.

The results had clear implications for managers in that a positive effect of some key activities on the green purchasing practice suggests purchasing and supply managers should focus greater attention on such activities. We concluded our paper by examining some of the individual activities that comprise environmental purchasing and specific ways that purchasing managers can contribute to a firm's environmental initiatives.

However it is very limited that the enterprises attach importance on the purchasing strategy in our country, and also lack of Legal consciousness and incentive mechanism of management, etc. For our country enterprise, it should build the green enterprise organization, create the green enterprise culture, establish green purchasing management strategy of the enterprise, cultivate qualified green purchasing personnel so that the negative influence that purchasing activities impact on environment become the least.

From the studies point of view, there are still some limitations in this study from the point of study view:

(1) The mutual interaction between five key factors should be explored for further study, Other factors that are not addressed in the study such as company size, industry characteristics, purchase volume may affect the green purchasing practice.

(2) The questionnaire survey methods have some inherent disadvantages. During the investigation, the respondents



may be influenced by many situations such as knowledge, experience, ability and so on. so respondents can not make a realistic answer.

Future research may consider industry characteristics, and put company size and purchase volume and other key factors as control variables into the factors affecting the green purchasing practice. Furthermore, Future research should also expand the sample size and increase the breadth of the survey sample.

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**APPENDIX 1:**

Green purchasing practices questionnaire

Basic information of enterprise

Name: \_\_\_\_\_

Industry: Chemical Garment Automobile Print Electronics Medicine Others

Number of employees: Less than 50 Less than 100 100-1000

1000-3000 More than 3000

Interview Protocol: how to look at the following things for your enterprise?

How to look at the state environmental protection laws and regulations?

Strongly unimportant Unimportant No opinion Important Strongly important

How to look at the local environmental regulations?

Strongly unimportant Unimportant No opinion Important Strongly important

How to look at some potential environmental regulations?

Strongly unimportant Unimportant No opinion Important Strongly important

How to look at Potential liability of disposal of hazardous materials

Strongly unimportant Unimportant No opinion Important Strongly important

Do you think how to the environmental awareness of Chinese consumers for shopping?

Never reflected Less embodied Certainly consideration Very obvious Strongly obvious

How to look at the a green image of your corporate?

Strongly unimportant Unimportant No opinion Important Strongly important

Tell me does or how to influence on your company for the competitor's green strategy?

Never influence Less influence Certainly influence Very influence Strongly influence

Tell me how to look at the Commitment of top leadership for environmental management?

Strongly unimportant Unimportant No opinion Important Strongly important

Tell me how to look at the support of middle management for green management?

Strongly unimportant Unimportant No opinion Important Strongly important

Does your enterprise have own corporate environmental vision? How to implementation?

Never consideration Plan to consideration Has consider implementation Has implementation Successfully implementation

Do you think the purchase cost of environmentally friendly materials(green puoduct) will increase?

Never influence Less influence Certainly influence Very obvious Strongly obvious

Based on environment factors, do you think the company's environmental investment will impact on the operating costs?

Never influence Less influence Certainly influence Very obvious Strongly obvious

If the corporate adopt a environmental project, what influence the training costs of members caused for company?

Never influence Less influence Certainly influence Very obvious Strongly obvious

Does you company consider reuse,recycling,recovery of Product,parts,and materials?why?

Never consideration Plan to consideration Has consider implementation Has implementation Successfully implementation

Does your company consider to avoid or improve the use of hazardous materials or manufacturing processes of impacting seriously environment?

Never consideration Plan to consideration Has consider implementation Has implementation Successfully implementation

Tell me how to look at the Suppliers in the promoting environmentally friendly products improvements?

Strongly unimportant Unimportant No opinion Important Strongly important

Tell me how to treat the providers in promoting environmental-friendly packaging improvements of your company?

Strongly unimportant Unimportant No opinion Important Strongly important

Tell me how to look at buying less polluting products or green product of your company?

Never consideration Plan to consideration Has consider implementation Has implementation Successfully implementation

Based on ecological factors, the enterprises can consider to select other brands' the raw materials or parts that hasn't cooperate with your company?

Never consideration Plan to consideration Has consider implementation Has implementation Successfully implementation

Does your company intend to switch to a green version product recently?

Never consideration Plan to consideration Has consider implementation Has implementation Successfully implementation