

PROPOSED DISSERTATION TITLE

Analysis of the vendor selection criteria in the automotive parts industry in China

1. Aim, objectives and feasibility of the dissertation

Topic

As Parthiban, Zubar and Katarak (2013) stated, decisions about sourcing need to be considered strategically because they will contribute to reduce costs and thus, increase profits for firms. Nevertheless, Weber, Current, and Benton, (1991) argued new strategic directions may require new criteria for operational decisions, such as purchasing. Mummalaneni, Dubas and Chao (1996) added, on this sense, that several factors affect supplier selection processes, making “cost-reduction-based view” insufficient for supplier evaluation when deciding on sourcing options. Therefore, other relevant selection criteria, which need to be clearly defined, should be analyzed and used by firms in the vendor selection criteria problem. The implications of such analysis, in terms of Dickson (1966), is the way purchase managers weigh each criterion and prioritize them in the decision process to ensure an optimal selection. Sustainability in the supply chain cannot be overlooked because of high competition levels in the market, and beside of economic factors, social and environmental aspects needs to be considered. In consequence, vendor selection problem must be addressed as a multi-criteria decision-making process.

The research will be restricted to automotive parts industry in China because of its constant growth and contribution to the Chinese economy. For instance, automotive parts industry has constantly increased its contribution to Chinese GDP since 2001, according to Sachon et al. (2016).

Finally, the management topic I would like to research is an “*Analysis of the vendor selection criteria in the automotive parts industry in China*”

Aims and Objectives

This research aims to create new knowledge about vendor selection process in automotive parts industry in China by analyzing several criteria involved in the decision-making process. Analysis will be carried out by researching what these criteria are, what relative weights are assigned to each other, the order of importance given by purchasers and decision makers, and the decision-making paths followed by them among multi-approach criteria.

This automotive parts industry is characterized for its high rivalry, according to Sachon et al. (2016), and fast growth, in particular, for aftermarket, in which prices are tended to be commoditized. Wu and Barnes (2012) highlighted the importance of vendor selection process in building competitive advantages. Therefore, selection criteria involved in these processes become relevant for research, particularly costs with its associated factors, and its ranking position comparing with other criteria. However, special attention will be put in triple bottom line by depicting environmental and social criteria factors and its relative importance against others.

On this sense, the following research questions need to be answered,

1. What are the criteria and factors chosen by purchaser preferences that influence the vendor selection decision-making process in the automotive parts in China?
2. What is the importance of those criteria relative each other?
3. What are the trade-offs carried out by purchaser among several factors to make the right purchase decision?

The research objectives can be listed as below,

1. Determine what are vendor selection criteria and factors chosen by purchaser preferences in the Chinese automobile parts industry.

2. Determine how those criteria are prioritized and selected by decision makers each another.
3. Determine whether economic criteria are prioritized higher or lower than social and environment criteria and explain its reasons and whether this behavior is affected by companies' strategy.

This research can contribute to the industry providing managerial implications in several aspects. Understanding of key vendor selection criteria and its order of importance in the industry, that is exposed to high competition and changing environments may allow to purchase managers to make optimal sourcing decisions that may be translated as direct benefits for automotive parts firms.

Feasibility

Conscious about time and wording requests, the scope of the research will be limited to ensure research questions being answered in the frame given by those restrictions.

Inspired in available researches, I plan to carry out an intensive literature review over those articles related to vendor selection criteria, considering several articles from different journals in relation with the topic to determine what are the most likely criteria that fit into the industry.

Then, to collect research data, questionnaires will be prepared to be sent to several players of the industry, including manufacturers and agents, which information is taking from data base that includes more than one thousand contacts. Correspondent permissions will be asked, and ethical guidelines will be followed.

On this sense, it is expected above strategy answers research questions and achieve research objective under the normative of the dissertation.

2. Literature review

Vendor selection criteria has been deeply discussed in the literature and researches have been focused on different topics of this decision-making problem. Some of the most frequently addressed areas are, the identification of the criteria used by decision makers in vendor selection process, the relative importance each other given by them to ensure an optimal selection, the trade-off decisions they make by using those criteria and, vendor selection frameworks modelled from those variables. Literature review chosen for this research will cover the first two topics previously mentioned to answer research questions. However, researches addressing on the latter two areas contribute to the research questions because they also identified criteria, weighting methods and described methodologies can be implemented in the final research proposal.

Article 1

The first paper is 'An analysis of vendor selection systems and decisions' by Dickson (1966). This research was focused on the identification of vendor selection criteria in United States and Canada and the relations among those different criteria. As Dickson (1966) stated, several criteria can be extracted from literature, but what are those that are in the mind of purchasers? A match between Dickson's (1966) research question and the first one addressed in the previous section of this proposal can be easily identified. Dickson (1966) also indagated on how those criteria related each other in the decision-making process, and what were the most important ones, addressing on the second research question. Dickson (1966) also gave special attention to "price" criteria and determined what are those criteria that would override "price" as priority selection conditions. This important finding can be addressed in this research by answering what are the relations between criteria because, as mentioned in previous section, it seems industry tends to commoditize prices given competition, then it would be interesting to find what are the criteria that override "price" in the researched industry. Finally, the most interesting finding of Dickson (1966) for this research is that "price" is not the most important ranked criteria for purchasers, which purchase preference are shaped by other criteria rather than price. Given some time passed since Dickson (1996), it would be good to test whether same behaviors are present today in the industry researched in this proposal.

Article 2

The second paper is 'Vendor selection criteria and methods' by Weber, Current, and Benton (1991). The authors carried out an extensive literature review of 74 articles in which they depicted several criteria were considered important for academicians and purchasers since Dickson (1966). Weber, Current, and Benton (1991) raised the interesting question about whether Dickson's (1966) rating would have varied, given changes world have gone through since then, or kept same. They also counted criteria repetitions in researched journals and ordered from most to less repeated and compared this rating against Dickson's (1966). Alike Dickson (1966), Weber, Current, and Benton (1991) found "net price" tops the list as the most discussed criteria in the literature. This finding reinforces the need to answer the research question addressed in this proposal about relations between criteria because Weber, Current, and Benton (1991), in some extent, are demonstrating that vendor selection criteria prioritization evolves over time. Following this reasoning, it would be interested to compare the finding of the proposed research against Dickson (1966) to measure the evolution of the criteria.

Interestingly, Weber, Current, and Benton (1991) also found criteria are consistent with Dickson's (1966) when Just in Time methodology is introduced. This finding brings the idea to investigate in which extend selection criteria prioritization is affected by companies' operation strategies.

Article 3

The third paper is 'Chinese purchasing managers' preferences and trade-offs in supplier selection and performance evaluation' by Mummalaneni, Dubas, and Chao (1996). This is the first research among those selected for this proposal that analyzes vendor selection criteria problem in the same proposed environment, China industry. The paper contributes to the research question of this proposal by providing a set of criteria used in supplier selection decision-making process in China, how purchase managers weighed each criterion, what were relation among criteria and finally, what are trade-off decisions made by managers. The study of Mummalaneni, Dubas, and Chao (1996) sets a base on which this proposal can start in terms of used methodology because it includes an appendix that describes how the authors collected and analyzed the data. Besides methodology, the findings of the research are useful for this proposal in terms of used criteria, even though the criteria and factor list will be enlarged for this proposal by adding environmental and social aspects, criteria rating ordered by importance, and the correlation between factors to define trade-off path to optimal supplier

selection. Factors that describe each criterion will differ from Mummalaneni, Dubas, and Chao (1996) and will be orientated to fit into particular aspects of the industry.

Article 4

The fourth paper is 'The influence of culture on industrial buying selection criteria in Taiwan and Mainland China' by Chang and Ding (1995). In this study the authors debated and empirically demonstrated what are the cultural factors and national values that influence selection criteria of price and delivery time in China and Taiwan. Interestingly, the authors recognized negotiation styles are influenced by culture and value and they wanted to know which components of both dimensions impact on purchasing decisions, considering price and delivery time as the main criteria. Although they found delivery time is not affected by, neither cultural dimensions nor national values, price is influence by masculinity (cultural dimension), integration and moral discipline (national values), in China. Remarkably, collectivism, another cultural dimension expressed as the need of getting familiar with vendors, does not affect purchasing behavior, according to Chang and Ding (1995). However, it is a *sin a qua non* condition to start business. The most important contribution of Chang and Ding (1995) to this research is the need to indagate on cultural dimensions and value factors influencing the purchasing decisions in the Chinese automotive parts industry by adding selection criteria that refer to these aspects in the dissertation. This represent a novel approach to the supplier selection problem that is not found in the literature.

Article 5

The fifth paper is 'Exploring the importance of different supplier selection criteria' by Kumar Kar and Pani (2014). The extensive research is based on, and crosses over, the most important and relevant Indian industrial environments. It was focused on finding vendor selection criteria and the weights purchase managers and decision makers assigned to each criterion. Being India and emergent economy, similar to China, criteria found in the study could be considered for this research. Furthermore, those found criteria and order of importance given by weights, are consistent with previous literature mentioned in this section. There is one more important finding of Kumar Kar and Pani (2014) contributes to this research, the relative importance of the criteria "electronic transaction capability" to be considered, given the modern times industry is submerged in.

Article 6

The sixth paper is 'Development and validation of performance measures for vendor selection in Indian manufacturing industries' by Sarode, Adarsh and Khodke (2010). This is another study of suppliers' selection criteria problem based on Indian manufacturing industry. The objective of the research is to determine a set of selection criteria that are validated, allowing its use for industrial purchase decision-making processes in India. The authors carried out an extensive and comprehensive literature review to determine a set of criteria and factors that determine those criteria, similar to the aim of this dissertation. Then, the paper contributes to this study by providing a detail of used reliability calculation method, Cronbach's alpha and scale score correlations to measure proper assignment of each item to scale. Sarode, Adarsh and Khodke (2010) also applied validation by using, content validity and construct validity, which methods can be used in this dissertation. Finally, access to questionnaire, criteria, factors and Likert scale used in the research contribute to the design of the questionnaire to be used in this dissertation.

Article 7

The seventh paper is 'Strategic vendor selection criteria discussed in relation to demand and supply perspectives' by Shen (2014). This research was empirically developed in Taiwan, considering an array of different industries to find vendor selection criteria based on Business Process Improvement under different strategies and taking into account the opinions of both, vendors and purchasers. The finding of the research contributes to this dissertation in the sense of determining what are criteria will be always considered by purchasers and agreed by vendors, despite of strategy deployed by organizations. They are, quality, service and cycle time. Same as it was mentioned in the review of Article 2 and previous section, it would be interested to understand if vendor selection criteria weights are modified or changed according to firm strategy.

Article 8

The eighth paper is 'Multi-criteria decision-making approaches for supplier evaluation and selection: A literature review' by Ho, Xu and Dey (2010). Although the research is a literature review based on 78 articles of suppliers' evaluation and selection methods used by academics and practitioners, it provides an extensive and comprehensive list of vendor selection criteria used in each article. A wide range of industries are covered, including automotive. Furthermore, similar to the findings of other researches, price is not the most used criteria. Therefore, it pertinent to raises the following questions, whether this

phenomenon is present in Chinese automobile part industry, and if it so, what are the reason. For the purposes of this dissertation, the list of Ho, Xu and Dey (2010) complements the criteria list of the literature review described in Article 2 with a more contemporary approach, and the widest range of vendor selection criteria are available to be used.

Article 9

The ninth paper is 'Comprehensive and configurable metrics for supplier selection', by Huang and Keskar (2007). The article emphasizes the need of integrating qualitative and quantitative data to create a set of supplier selection criteria that is aligned with companies' strategies, in particular cars' OEM manufacturers, and determine a selection method that use that data and optimize the outcomes of the multiapproach decision-making process. The research of Huang and Keskar (2007) contributes to this dissertation by the introduction of criteria that contemplate environmental issues, aspect was not considered previously. It also provides seven criteria can be used in the automotive industry and more than 100 factors that describe those criteria. Finally, the author offered a definition of the metrics can be used while deciding on vendor selection criteria. Those metrics can be used in the dissertation. Those metrics are, inclusiveness, universality, measurability and consistency.

Article 10

The final paper is 'Sustainable criteria in a supplier selection: a pre-review' by Mahmood et al. (2014). This short but interesting and useful paper argues that supplier selection criteria should include, besides economical factors, environmental and social criteria as well. Mahmood et al. (2014) complements Article 9, which also defined environment criteria, by adding social aspects to be considered in this research. Sustainability will be addressed by including criteria that describe the triple-bottom line, which is composed by economic, social and environmental aspects. It will be interesting to find out the relative importance given by purchasers and decision makers in the Chinese automotive parts industry in order to assure the crescent market pressures do not affect sustainability of the supply chain, as was addressed in the research question.

3. Research methodology and methods

Vendor selection criteria phenomenon to be researched in this dissertation will try to reflect the thoughts, preferences and behaviours of purchase managers when sourcing decisions need

to be made in the automotive parts industry in China. Subjectivities and qualitative data will be required to address the research questions and achieve research objectives what identified this study with interpretivism paradigm.

Given the research questions goals and objectives of finding out what vendor selection criteria are, and the importance each other, an appropriated research methodology to be applied is conjoint analysis because it is designed to evaluate different alternatives paths of preferences and assign an order of importance to each criterion, or attribute, as they are recognized in the methodology. Conjoint analysis captures, as this research requires, thoughts, preferences of behaviours, and needs qualitative data to be processed, what make it an adequate methodology aligned with the epistemological paradigm of the study.

A comprehensive and extensive literature review will be carried out with the purpose of reviewing the latest vendor selection criteria revealed by academics that can be utilized in this research. Same as several articles, this research will list vendor selection criteria extracted from several journals and decide which ones will be included, as addressed in the previous section. This step is a key step because it is the starting point in which research will be based on.

Data collection method will be done by email, auto-complete questionnaire to capture qualitative data coming from purchasers' preferences. Following established conjoint methodology, and literature, questionnaire will need to be designed using purchase cases or models containing different situations in which selected criteria and factors, and the different levels of each factors are involved, and respondents should evaluate every case in a given Likert-type scale according to their purchasing preference. The study will present purchase cases will also allow to isolate respondents' bias from products they usually purchase because same approaches are not given when different goods or services are bought (Dickson, 1966). Questionnaires will include multiple choice, close and open questions in order to determine the particular set of parts (suspensions, transmission, brakes, etc.), the type of company (manufacturers, trading agents, etc.), the size of the company by employees and turnover, whether they are privates or SOEs, the market they are focused on (aftermarket, OEM, OES, etc.) and whether respondents' companies pursuit a particular strategy (mass production, mass customization, continuous improvement, etc.). Questionnaires will be written in English, translated into Chinese for a selected translator, and translated back into English by another translator in order to minimize translation errors.

This research will also assess the need of interviews to better understand the preferences of decision makers and the necessity of clarification in some topics. They will be addressed on purchasers, operations managers and directors, which sometimes are also owners.

Questionnaires will be sent to purchase managers of automotive parts factories and purchase agents of auto parts in China. The intention of this research is to cover as much as possible the population of the industry and questionnaires can massively reach respondents, in a cost-effective way. It will be a challenge, on the other hand, reach the desire response rate, however follow-up actions will be designed to overcome this challenge. Given the size of the population and the lack of data bases that gather 100% of industry participants, a random sample will be drawn from the list of participants of Automechanika Shanghai 2017, the biggest auto part trade fair in Asia. A prototype pre-test will be carried out with few selected respondents to make final adjustments to questionnaires.

Automotive parts industry in China is composed by local and foreign manufacturers, being the latter the result of joint ventures, private and SOEs companies according to Sachon et al. (2016). The industry keeps growing uninterruptedly since 2001 in terms of turnover, which reached 3.21 trillion RMB in 2015, although growth rate is declining to 15% in same year. It means the industry keeps growing but slower than before. The industry also mirrored the growth of Chinese GDP and car industry too. It is evident when measurements of gross output value ratio between cars and parts manufactures are taken and plotted, which rounds 45%. Exportation shows more unstable behaviors in terms of turnover and suspension conglomerate is the biggest exporter in terms of export value. The industry also provides a characteristic, the high number of purchase agents, which link overseas customer with manufacturers.

Data will be analysed according to conjoint analysis requirements to determine prioritization of criteria and trade-offs decisions. Then, given the large numbers of profiles this research may require, a partial profile analysis must be carried out using orthogonal analysis in order to reduce the number of profiles while keeping the subset representative of the full range of profiles. Conjoint analysis also requests the calculation of part-worth of each factor to establish trade-off decisions, which need calculations of averages and reverse, squared and standardized deviations.

Correlation analysis will be run to test the likelihood each criterion is associated each other. Spearman's correlation method is suitable for this research because it uses non-parametric data for variables measured in the ordinal scale

In order to assure reliability, the ability of the research to produce the same results, Cronbach's alpha statistic tool will be used to analyse internal consistency of questionnaire and measure the reliability of factor assigned to each criterion.

Validity will be assessed by using Principal Components Analysis (PCA) statistic tool to measure the relative importance of the factors to each criterion. Factor model appropriateness will be measured with Kaiser-Meyer-Okline (KMO) correlation matrix. Varimax rotation will be applied and the number of factors to be extracted will be determined by Eigenvalue.

The software needed can be SPSS and TRANSREG procedure.

Ethical challenges may arise on the sides of revealing sensible data from respondents. A signed note assuring none of companies' information will be revealed, including names and data provided, will be sent attached to questionnaires to assure anonymity in their answers. On the other hand, UoL's ethical policy will be fulfilled. Ethical guide provided Bell and Bryman (2007) (as cited by Collis and Hussey, 2013, p.31) will be followed as well.

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