© 2006 IEEE. Personal use of this material is permitted. However, permission to reprint/republish this material for advertising or promotional purposes or for creating new collective works for resale or redistribution to servers or lists, or to reuse any copyrighted component of this work in other works must be obtained from the IEEE.

Investigating supplier selection using repertory grid technique

Xiaoli Lin, *Central Queensland University*, Sharon Purchase, *University of Western Australia*

Abstract—Supplier selection is an important part of supply chain management as suppliers tend to play as strategic roles for most organizations. This study investigates the supplier selection criteria in Chinese textile industry using repertory grid technique. Twenty-one purchasing employees from textile industry in China were interviewed. Thirty-three constructs were elicited from the twenty-one interviews. Counts and frequency were used to identify the most mentioned criteria by respondents. Variability index was used to determine the constructs' differentiation power among three supplier groups. Eight constructs were identified to be the criteria used by purchasers and they are: **guanxi**, **problem-solving methods**, **service**, **term of payment**, **credibility** (known as **Xinyong** in Chinese), **delivery**, **quality** and **price** in ranking order.

Index Terms—China, Guanxi, Repertory grip, Supplier selection.

I. INTRODUCTION

Purchasing has a direct impact on an organization's success (Ellram et al., 2002) resulting in senior management investigating the buying process with a strategic imperative (Poirier & Bauer, 2001). Three decades of academic research in this area has found that the supplier contributes to the organization's competitive advantage through service improvement, product quality improvement and cost advantages (Porter, 1999). Therefore, supplier selection is coming under increased scrutiny and further research is needed to enhance our understanding of this important aspect.

This study investigates criteria used by Chinese clothing manufacturers for selecting fabric suppliers in the textile industry. Current research is mostly based on western organizations (Wind, Green & Robinson, 1968; Lehmann & O'Shaughnessy, 1974; Perreault & Russ, 1976; Abratt, 1986; Bilesbach, Harrison & Croom-Morgan, 1991; Wilson, 1994) with only a few studies investigating Asian countries (Chao et al., 1993; Mummalaneni, Dubas & Chao 1996). Thus, there is a lack of research on supplier selection within Asian economics which this research attempts to address.

Repertory grid technique was used to uncover and explore the criteria used by the Chinese manufacturers when selecting

their textile suppliers. Given the contextual nature of the supplier selection process and the exploratory nature of this study, this technique offers benefits as it focuses on how people understand situations in their own context rather than putting them in the researcher's world (Smith, Thorpe & Holman, 1996). As such, the results reflect the manufacturers' real world as opposed to the researcher's prescribed settings.

II. LITERATURE REVIEW

The supplier selection process has been widely researched across industries and nations in the last three decades (See Chao et al., 1993; Qu & Brocklehurst, 2003; Hansen, 2001; Preis, 2003; Silva et al., 2002 and Kannan & Tan, 2003). Table-1 summaries supplier selection criteria across regions and industries.

<i>Authors</i>	<i>Industry</i>	<i>Region</i>	<i>Supplier selection criteria (top 6)</i>
Kannan & Tan (2003)	general	US and Europe	Ability to meet delivery due dates Commitment to quality Technical expertise Price of materials Frequent communications Respond to unexpected demand
Mummalaneni et al. (1996)	general	China	Quality On-time delivery Responsiveness to customer needs Price/cost Quality of relationship with supplier Professionalism of salesperson
Abratt (1986)	High-tech	South	Technical

	markets	Africa	service provided Product reliability After sales support Supplier's reputation Ease of maintenance Ease of operation
Hirakubo & Kublin (1998)	Electronic and office equipment	Japan	Price Delivery Quality Capability Technical Manufacturing
Haydu & Hodges (2004)	Turfgrass-sod	Japan	Quality Price Availability Delivery
Bharadwaj (2003)	Electronic components	Multiple regions	Product quality Conditions of products on arrival On-time delivery performance Accuracy in filling orders Order cycle time Ability to fill emergency orders Price
Billesbach et al. (1991)	JIT companies	Multiple regions	Delivery reliability Quality conformance Response flexibility Price Technical support JIT capability
Silva et al. (2002)	Textile products	Multiple regions	Work quality Delivery time Cost Responsiveness to requests Good design Innovative ability

Table-1: Comparison of studies done in different regions and industries

As shown in table-1, supplier selection criteria vary across regions and industries and hence are very context-based. Criteria that are general across regions and industries include price, quality and delivery. Other criteria are industry specific, for example JIT capability is critical only in JIT companies. Recent research into Chinese supplier selection decisions is minimal even though the economy is undergoing radical changes. Given that no previous research has focused on both Chinese buyers and textile industry, this study aims to fill this gap by investigating the selection criteria in this specific context. Therefore, following research question was developed:

Research Question: What are the key criteria used by Chinese purchasers in their supplier selection?
This question was investigated using a qualitative methodology described in the next section.

III. METHODOLOGY

This study used face-to-face interviews to explore the purchasers' views in depth applying a repertory grid technique. Repertory grid technique is the operationalization of Kelly's psychological theory of personal constructs (Kelly, 1955). Kelly's (1955, p.42) psychological theory of personal constructs indicated that "individuals use their own personal constructs to understand and interpret events that happen around them and thus they come to understand the world by developing a personally organized system of interpretation based on their experiences".

Interviewees were asked to name nine suppliers (Lemke, Goffin, & Szwejczewski, 2003) with whom their company have ever dealt with. In the case that they have dealt with less than nine suppliers, six were requested instead. To uncover the factors considered in supplier selection, the interviewees were asked to name three types of suppliers, three suppliers with whom they frequently deal with, three less frequently deal with and three they have dealt with only once or twice (Lemke, Goffin, & Szwejczewski, 2003).

Nine pre-number cards were arranged prior to the interview and interviewees were asked to write down a suppliers' name on each card. To ensure the randomness of group card selection, the names of the three most frequently-dealt-with suppliers were written on card number 1, 5 and 8. The less frequent three were put on card number 4, 6, 9 and card 2, 3, 7 are for the once-off suppliers. Pre-test results show that five-trials' exercise is appropriate to elicit reasonable amount of information while minimising respondents' fatigue. Hence five trials were conducted in each interview. Each trial consisted of three cards being drawn while the interviewee was asked "What are the similarities and differences of these two suppliers from the third one?" Constructs were elicited from the five trials.

After the elicitation of constructs, each supplier was rated on the 1-5 scale on each construct. Five indicates very good and

one means very bad. The rating result indicates the relative importance of constructs in the interviewee's mind. It also explains the differences between the 3 groups of suppliers.

Twenty-one purchasing employees from the textile industry in China participated in this study. Organizational size varied from 50 employees to 1500 employees, with the majority having 300-600 employees. Their yearly production value varied from several million to several hundred million Chinese yuan.

IV. RESULTS

Thirty-three constructs were elicited from the twenty-one interviews. To show the constructs of supplier selection across all respondents, table 2 lists all the constructs and the relevant frequency.

constructs	Average normalized variability	counts	frequency
Guanxi	34.6	6	28.6
Gender	33.7	2	9.5
Flexibility	31.2	1	4.8
Problem-solving methods	28.8	10	47.6
Authorization	26.5	1	4.8
Match	25.6	2	9.5
Renqing	21.8	2	9.5
Service	19.9	6	28.6
Term of payment	18.4	6	28.6
Credibility	17.5	9	42.9
Delivery	16.9	15	71.4
Quality	16.4	21	100
Price	16.2	17	81
Honest	15	1	4.8
Extra help	14.5	4	19
Service attitude	13.4	3	14.3
Acquittance	13.2	1	4.8
Ganqing	12.4	1	4.8
Ownership	12.4	2	9.5
Size	10.3	1	4.8
Salesperson's ability	10.2	1	4.8
Communication	9.7	3	14.3
Factory's internal situation	9.1	1	4.8
Trust	6.5	1	4.8
Private guanxi	6.2	1	4.8
Capability	6.15	2	9.5
Consistency	6.1	9	42.9
Salesperson's image	4.9	1	4.8
Quick service	3.7	1	4.8
Cooperation	2.6	1	4.8
Technology	2.6	2	9.5
Employees	0.7	1	4.8

Machines and facilities	0.7	1	4.8
-------------------------	-----	---	-----

Table 2: Constructs and frequency

This study used frequency of 25 percent and above to determine common constructs (Lemke, Goffin, & Szwejczewski, 2003). Therefore, nine factors with quality, price and delivery being the first three were deemed to be important, as shown in table 2 (Light grey factors).

A construct's frequency count is a good indicator of its importance in the supplier selection process but "it does not uncover the relative importance of the constructs to the respondents as it ignores the values of the repertory grid" (Lemke, Goffin, & Szwejczewski, 2003, p.25). In this study, the values of the repertory grid are the ratings of elements against each construct. Lemke, Goffin, & Szwejczewski (2003) suggested using variability to quantify the relative importance of a construct. The variability of a construct is a measure of the spread of its ratings compared to all the other constructs. "The higher the variability of a construct is, the greater is its importance to the respondent" (Lemke, Goffin, & Szwejczewski, 2003, p.25).

The variability of each construct was calculated using the software INGRID which is an interactive web tool available on the internet (<http://www.psyc.org/grids/ingrid1.html>). Based on the variability given, the average normalized variability index of each construct was manually calculated (Goffin, 2002). The results are presented in table 4.

As shown in table 2, two requirements were used in identifying the critical constructs across the whole sample. The first is that there should be a sufficient number of respondents mentioned these constructs (reflected by counts and frequency). The second one is that the constructs should have the power to differentiate between the three supplier groups (reflected by variability index). Following these guidelines, eight constructs were identified to be the criteria used by purchasers and they are: **guanxi, problem-solving methods, service, term of payment, creditability** (known as Xinyong in Chinese), **delivery, quality** and **price** in ranking order.

V. CONCLUSIONS

The main objective of this study is to examine the criteria, or factors that were used by buyers in their supplier selection. Eight factors including guanxi, problem-solving methods, service, term of payment, credibility, delivery, quality and price are found to be significant. Although the literature has emphasized on objective factors such as quality, price etc, this study shows that subjective factors such as guanxi and problem-solving methods are very important and their importance in the decision making process even out-weights the objective factors due to their higher variability.

Consistent with the marketing literature, price, quality etc are important characteristics that every supplier should have in order to be considered from the buyers' point of view. However, once short-listed, it is guanxi, ganqing etc that make them finally selected by the purchaser.

Result of this study has implications to both suppliers and purchasers. For suppliers, they can use the result in the developing of their offerings to buyers. Good quality, reasonable price enable them to be considered by the buyers while they still need to develop guanxi with the buyers if they really want to get the business contract. From the buyers' perspective, the result helps them in the evaluation of suppliers for selection and retention purpose.

REFERENCES

- [1] Abratt, R.(1986). "Industrial Buying in High-Tech Markets", *Industrial Marketing Management* 15, pp.293-298.
- [2] Abramson, N. R., & Ai, J. X. (1997). "Using guanxi-style buyer-seller relationships in China: Reducing uncertainty and improving performance outcomes", *International Executive*, 39(6), pp.765-805.
- [3] Bharadwaj, N. (2003). "Investigating the decision criteria used in electronic components procurement". *Industrial marketing management*, 33, 317-323.
- [4] Billesbach, T. J., Harrison, A., and Croom-Morgan, S.(1991). "Supplier Performance Measures and Practices in JIT Companies in the U.S. and the U.K.", *International Journal of Purchasing and Material Management* 27, pp.24-28.
- [5] Bell, Duran (2000). "Guanxi: A nesting of groups". *Current Anthropology*, Chicago, Feb 2000. pp.132-139.
- [6] Chao, C., Dubas, K. M., and Mummalaneni, V. (1993). "An Assessment of Supplier Selection: Chinese Purchasing Managers' Criteria and their Implications for Western Marketers", *International Journal of Physical Distribution & Logistics* 23, pp.31-39.
- [7] Ellram, L. M., Zsidsin, G. A., Siferd, S. P., & Stanley, M. J. (2002). The impact of purchasing and supply management activities on corporate success. *Journal of Supply Chain Management*, 38(1), pp.4-20.
- [8] Fishman, T. C. (2005). "How China will change your business". Inc, Boston, Vol 27, Iss.3, pp.70.
- [9] Gao, Yunduan. "China's fabric market brisk". *Economic Information & Agency*, (2 Feb 2004). Available online at: http://www.tdctrade.com/report/mkt/mkt_040201.htm
- [10] Goffin, Keith. "Repertory Grid Technique". Sage publications 2002. Essential skills for management research. Partington, D. (Ed) pp.199-225.
- [11] Haydu, J. and Hodges, A. W (2004). "Developing new markets for turfgrass-sod in the United States". *Journal of American Academy of Business*, 4, 371-382.
- [12] Hirakubo, N. and Kublin, M. (1998). "The relative importance of supplier selection criteria: the case of electronic components procurement in Japan". *International journal of purchasing and materials management*. 32 (2), 19—24.
- [13] Hasen, K. (2001). "Purchasing decision behaviour by Chinese supermarkets". *The international review of retail, distribution and consumer research*. 11(2), 159-175.
- [14] Kelly, G. A. (1955). *The Psychology of Personal Constructs*. Norton, New York, NY.
- [15] Kannan, V. R. and Tan, K. C. (2003). "Attitudes of US and European managers to supplier selection and assessment and implications for business performance". *Benchmarking*, 10(5), 472-494.
- [16] Karande, K. Shankarmahesh, M. N. and Rao, C. P. (1997). "Marketing to public and private sector companies in emerging countries: a study of Indian purchasing managers". *Journal of international marketing*. 7(3), 64-83.
- [17] Lemke, F., Goffin, K., & Szweczewski, M. (2003). "Investigating the meaning of supplier-manufacturer partnerships: An exploratory study". *International Journal of Physical Distribution & Logistics Management*, 33(2), pp.12-23.
- [18] Lehmann, D. R., and O'Shaughnessy (1974). "Difference in Attribute Importance for Different Industrial Products", *Journal of Marketing* 38, pp.36-42.
- [19] Lehmann, D. R. and O'Shaughnessy (1982). "Decision Criteria Used in Buying Different Categories of Products", *Journal of Purchasing and Materials*, 18(1), pp.9-15.
- [20] Leung, TKP; Wong, YH & Wong, Syson (1996) "A study of Hong Kong businessmen's perceptions of the role 'guanxi' in the People's Republic of China". *Journal of Business Ethics*, Dordrecht. Vol.15(7), pp749-758.
- [21] Mummalaneni, V., Dubas, K. M., and Chao, C. (1996). "Chinese Purchasing Managers' Preferences and Trade-offs in Supplier Selection and Performance Evaluation", *Industrial Marketing Management* 25, pp.115-124.
- [22] Perreault, W. D., and Russ, F. A. (1976). "Physical Distribution Service in Industrial Purchase Decisions", *Journal of Marketing* 40, pp.3-10.
- [23] Poirier, C. C., & Bauer, M. J. (2000). *E-supply chain*. San Francisco, CA: Berrett-Koehler.
- [24] Porter, A. M. (1999). "Taking Control of 'Indirect' Corporate Spending." *Purchasing*, (127:3), pp.55-60.
- [25] Preis, M. W. (2003). "The impact of interpersonal satisfaction on repurchase decisions". *Journal of supply chain management*, 39(3), 30-38.
- [26] Qu, Zhonghua & Brocklehurst, Michael (2003). "What will it take for China to become a competitive force in offshore outsourcing? An analysis of the role of transaction costs in supplier selection". *Journal of Information Technology*, 18, 53-67.
- [27] Smith, M. E., Thorpe, R., & Holman, D. (1996). "Using repertory grids in management". *Journal of European Industrial Training*, 20(3), pp.3-30.
- [28] Silva, R.V.D, Davies, G. and Naude, P. (2002). "Assessing customer orientation in the context of buyer/supplier relationships using judgmental modelling". *Industrial Marketing Management*, 31, 241-252.
- [29] Wathne, K. H., Biong, H., and Heide, J. B. (2001). "Choice of Supplier in Embedded Markets: Relationship and Marketing Program Effects". *Journal of Marketing*, 65(2), pp.54-66.
- [30] Wind, Y., Green, P. E., and Robinson, P. J. (1968). "The Determinant of Vendor Selection: The Evaluation Function Approach", *Journal of Purchasing* 4, pp.29-42.
- [31] Wilson, E. L. (1994). The relative importance of supplier selection criteria: A review and update. *International Journal of Purchasing and Materials Management*, pp.35-41.