

Sourcing from home, the EU, or transcontinental: A ranking-based stated preference experiment on the purchaser's preferences

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ABSTRACT,

The most significant paradigm shift in modern business management consists of the change that organizations no longer exist as stand-alone entities, but as supply chains. (Lambert & Cooper, 2000) Based on location, the principal-agent theory, and the social capital theory this paper investigates, via two ranking based preference experiments, which attributes are of most value for these organizations concerning their supply chains. The results of the ranking experiment are imported to SPSS and via a conjoint analysis and two simulations the most preferred attributes are pointed out.

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Keywords

Sourcing, Principal-agent theory, Social capital theory, Conjoint analysis, Preferred statement, Ranking-based preference experiment, Simulation

1. INTRODUCTION: CHALLENGES WITHIN THE SUPPLY CHAIN

The most significant paradigm shift in modern business management consists of the change that organizations no longer exist as stand-alone entities, but as supply chains. (Lambert & Cooper, 2000, p.65) Together with the constantly increasing Information and Communication Technologies (ICT), outsourcing and globalization, they significantly changed the challenges and strategies in management operations. (Claudino & Mendes dos Reis, 2014, p.489) Over the years, global sourcing has been increasing steadily, but has its own risks and complications. Associated problems might be cultural, political, legal or the longer distance. (Cho & Kang, 2001, p. 546) Even though global sourcing has been widely practiced over the last two decades and is seen to achieve competitive advantage, (Jin, 2005, p.277) recent papers state that the world is currently moving towards an era of deglobalization. (Garg & Sushil, 2021, p.433) The cause of this new trend could be that the global economy has amassed a critical number of megatrends and asymmetries, conflicts and contradictions and the desire for economic nationalism. (Poruchnyk et al., 2021, p.411) Another because that is argued, is that the COVID-19 pandemic tends to accelerate and intensifies processes of global fragmentation. (Abdal & Ferreira, 2021, p.202) Implementation of lean production and the pressure for sustainable operations, furthermore, have a profound influence on the relation between organizations and their suppliers. (Morris et al., 2004, p.130) This paper takes a closer look at the important parameters when working with a supplier. These parameters are based on location, the principal-agent theory, and the social capital theory. Derived from a ranking-based stated preference experiment and a conjoint analysis we try to answer the question: *'What are the preferred attributes of suppliers, chosen by businesses, located at home, EU or transcontinental based on a ranking-based stated preference experiment?'*

2. GEOGRAPHICAL DIFFERENCES: THREE DISTINCTIONS BETWEEN SUPPLIERS

Sourcing is defined as 'the process of fulfilling organizational buying needs by managing a supply base through strategic and transactional interactions with suppliers in alignment with corporate goals.' (Giunipero et al., 2019, p.1) Within this paper, we distinguish between three different geographically located suppliers. Suppliers which are from 'home', also called local or domestic, European suppliers and transcontinental suppliers.

'In this study, the term 'domestic sourcing' is used when customers and their suppliers are located in the same nation (e.g., a US-based firm procures components/labor/finished goods in the US)'. (Jin, 2005, p. 278) According to Williams et al. (2008, p.262) domestic sourcing is described as the use of networks within the hosts location. A third research indicates that local sourcing is characterized by a short and deterministic lead time, compared to overseas sourcing. (Yin et al., 2018, p.259) Reasons for local sourcing might be the proximity of the supplier, the costs, the ease of local suppliers, flexibility, reliability of delivery and the absence of tariff barriers. (Wei et al., 2012, p.364) In some cases local sourcing might not be the better option, mainly due to the lack of institutional frameworks in the host country. (Wei et al., 2012, p.365) Consequences by the lack of those frameworks could lead to high costs caused by factors such as; corruption in the host country, untrustworthiness of local

suppliers, bureaucracy of local governments and the ineffective protection of property rights in the host country. (Wei et al., 2012, p.365)

Because of competitive pressure from consumers and markets, companies are forced to improve the quality of their products and at the same time lower the cost. (Cho & Kang, 2001, p.542.) This requires suppliers which can perform qualitative products at a low cost, Asian and Eastern European countries therefore offer an attractive sourcing opportunity. (Cho & Kang, 2001, p.542) Global sourcing can therefore be interpreted as buying from suppliers that are located outside of the country the firm is located. (Körber & Schiele, 2021-b, p.4) The main reasons for companies to source products globally are, quality, cost reduction, availability (Cho & Kang, 2001, p.544) and access to technologies. (Körber & Schiele, 2021-b, p.4) Global sourcing additionally brings its own risks and challenges including; transportation delays, cultural and language barriers, foreign exchange rate fluctuations, tariff barriers, nationalism, lack of inventory management and other business practices and political and economic stability. (Cho & Kang, 2001, p.546)

To further elaborate on the distinction between geographical differences of suppliers, global sourcing is divided in continental (E.U.) and transcontinental sourcing. (Körber & Schiele, 2021-a, p.2) Transcontinental sourcing, also called remote sourcing, indicates that a firm's suppliers are located in another continent. (Schiele et al., 2021, p.57) Since we look at the different sourcing strategies from a European perspective, continental sourcing relates to sourcing within the E.U. (Körber & Schiele, 2021-a, p.5) Within transcontinental sourcing substantial differences apply regarding to; time-zone differences, legal framework differences and cultural factors tend to have a larger influence. (Körber & Schiele, 2021-a, p.5) Continental sourcing contains advantages by the benefit of having the same legal area and none or only small currency fluctuations. (Körber & Schiele-a, 2021, p.5) Factors that increased the continental sourcing within the E.U. are; the introduction of the Euro, the Shengen agreement, which is a treaty that let European countries abolish their national borders to create a trade free area, (Schengen VisaInfo, 2021) and the new EU membership of central and eastern European countries. (Körber & Schiele-a, 2021, p.5) In total, EU members traded more goods with traded more goods continental, with other member states than transcontinental, so outside the EU. (Körber & Schiele, 2021-a, p.5) Yet, within the last 15 years this continental trading seems to decrease, member states lost the importance value of trading within the EU and transcontinental trading increased. (Körber & Schiele, 2021-a, p5)

Beside all the advantages and disadvantages of the difference in location of the supplier, literature identifies three groups of variables that could also determine the choice of the location of the supplier. (Wei et al., 2012, p.367) These variables are strategy, characteristics, and country of origin. (Wei et al., 2012, p.367) The size, age, autonomy and learning ability of a company effect the preference of local or international sourcing, where a small company, with high autonomy and several years of experience is expected to prefer local sourcing. (Wei et al., 2012, p.368) The country of origin, could also affect the choice in the location of the supplier, for example EU countries, the UK and the US are way more globally focused than Japan, which has suppliers being part of a Keiretsu (Wei et al., 2012, p.369) (the Keiretsu is a group of Japanese businesses that are closely linked together, they have intertwined economic and social systems (Isobe et al., 2006, p.454)).

3. THEORETICAL FRAMEWORK: DISCUSSING RELATED THEORIES AND THE STATED PREFERENCE EXPERIMENT

3.1 Related theories: an understanding of Social Capital Theory and the Principal Agent Theory

3.1.1 Social Capital Theory

According to Nahapiet and Ghoshal (1998, p.243), Social Capital is defined as 'the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit'. Another definition given by Hitt & Duane (2002, p.5) 'Social capital involves the relationships between individuals and organizations that facilitate action and create value'. As stated by Chang & Hsu (2016, p.722) Social Capital is an important factor in determining subjective well-being and it explains pro-social behavior like the exchange of knowledge and information. There are numerous dimensions of Social Capital, but the most common classification divides it into three aspects. (Chang & Hsu, 2016, p.722) Which are; Structural capital, which refers to interaction between individuals. (Chang & Hsu, 2016, p.722) Cognitive capital, which refers to the exchange of information and knowledge to create a shared collective vision and interpretations. (Chang & Hsu, 2016, p.722) And lastly, relational capital, which refers to the relationship and a feeling of trust between individuals within the collective. (Chang & Hsu, 2016, p.722)

Hitt & Duane (2002, p.5-6) elaborate on another dimension of Social Capital. They state that strategic leaders must not only focus on Social Capital within their organization (internal), but also be concerned with Social Capital outside the organization with different settings (external). 'External social capital is concerned with the relationships between strategic leaders and those outside the organization with whom they interact to further the firm's interests.' (Hitt & Duane, 2002, p. 6) because of the competitive landscape of the 21st century, relationships outside the organization have become of great importance to all kind of firms. (Gulati et al., 2000, p.205) To keep a competitive advantage in this landscape, firms often need resources which they do not possess themselves. (Ireland et al., 2002, p.430) Therefore they need to form alliances with other firms and often operate in a network of relationships. (Gulati et al., 2000, p.205) So the performance of a firm is affected by the ability of the strategic leader to develop and integrate the firms external Social Capital with the internal Social Capital. (Hitt & Duane, 2002, p.6) The most important factor for creating external Social Capital within alliances is trust among the partners. (Hitt et al., 2016, p.255) furthermore, for an alliance to be successful, both partners must benefit from the relationship and be sensitive to each other's needs. (Hitt & Duane, 2002, p.7)

3.1.2. Principal-Agent theory

'Principal-agent theory describes the agency relationship in which one party (the principal) delegates work to another (the agent) who conducts the work in line with a mutually agreed-on contract' (Chaney, 2019, p.75) Nevertheless, because the two parties have different interests and have incongruent goals, two information problems might occur, whereof one is pre-contractually and the other, post-contractually. (Chaney, 2019, p.75) The first information problem (pre-contractually) also

called adverse selection, occurs because the agent possesses information about its true quality and performance, whereas the principle does not have this information. (Chaney, 2019, p.75) the second information problem (post-contractually) also named moral hazard, occurs when the principal selects an agent which does not perform according to previously made agreements. (Chaney, 2019, p.75) Because of the information asymmetry and the principal not being able to monitor the agent properly, the principal is in an unfavorable position where he is not able to distinguish the high-quality from the low-quality agents and hidden actions can take place. (Chaney, 2019, p.75)

In the basis, the Principal-Agent theory addresses divergent interest between cooperative parties (i.e., principles and agents) such as firms' owners and managers and purchasing managers and their suppliers. (Solomon et al., 2021, p.466) Solomon et al. (2021, p.466) states that the Principal-Agent theory has proven itself as being a robust theory that steers the behavior of economic actors.

Jensen and Meckling (1967, p.308) define the Principle-Agent theory as 'a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision-making authority to the agent.' If both parties within the contract are profit maximizer the chances are real that the agent will not always act in the best interest of the principal. (Jensen and Meckling, 1967, p.308) The principle can limit these divergences by establishing incentives for the agent or monitoring his activities, bonding cost can also be spent to prevent the agent from acting against the principles interest. (Jensen and Meckling, 1967, p.308) Looking at these provisions, it is almost impossible for the principle to let the agent work in his best interest with zero costs. (Jensen and Meckling, 1967, p.308) The costs for these provisions are also named agency cost and consist mainly out of three components: the monitoring expenditures by the principle, the bonding expenditures by the agent and the residuals. (Jensen and Meckling, 1967, p.308)

3.2 Stated Preference Experiment: statement of potential preferences

Science aims to increase our understanding of everything around us by obtaining knowledge, one way of obtaining this knowledge is by conducting experiments. (Soldatova & King, 2006, p.795) An experiment is defined as the observation of one variable, given that the levels of one or more variables are manipulated. (Henser et al., 2012, p.100) These manipulations do not happen on random order, but we rather design these manipulations by using statistical methods to determine what changes and when they happen. (Henser et al., 2012, p.100)

When conducting an experiment, traditionally you look at the 'revealed preference' which means information that actually happened. (Sanko, 2001, p.7) 'Stated preference' on the other hand is not information that is actually there, but a statement about a possible outcome/preference. (Sanko, 2001, p.7) As Merino-Castelló (2003, p.4) states; 'revealed preference data are obtained from the past behavior of consumers while stated preference data are collected through surveys.'. Stated preference data, under certain circumstances, give advantages over revealed preference. (Merino-Castelló, 2003, p.4)

Stated preference methods are developed by research from many different disciplines. (Sanko, 2001, p.4) Origins from stated preference methods are traced back to the 1960's from studies in the mathematical psychology area. (Sanko, 2001, p.4) Within these works they looked at how the process of decision making was influenced by individuals combining information. (Sanko, 2001, p.4) It can be said that the paper of Luce and Tukey started

the methods by introducing the term 'conjoint' measurement, by 'conjoint' they meant 'united'. (Sanko, 2001, p.4) With this they wanted to show that the measurement was a weighted combination of various aspects. (Sanko, 2001, p.4)

Amongst academics there is considerable confusion about the differences and similarities of stated preference methods. At first sight, conjoint analysis and discrete choice experiments seem to be very similar. Often, the two approaches are indeed considered similar. However, Louviere et al. (2010, p.58) argue that, in fact, they are not the same. According to them, researchers mistakenly assume similarity between the two methods.

Merino-Castelló (2003) made a paper in which she clarifies the differences and similarities of the stated preference methods. Within the last few years, multiple stated preference techniques developed to obtain consumers preferences, all these techniques use surveys to let respondents indicate their preferences about one or more hypothetical options. (Merino-Castelló, 2003, p.5) In figure 1 you can see the division of the different stated preference techniques.

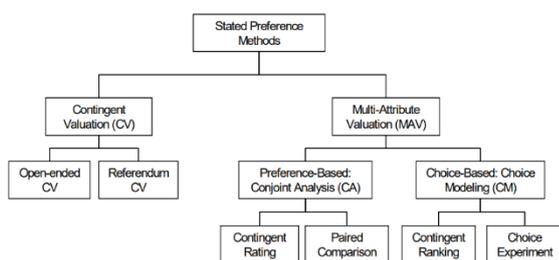


Figure 3.6. The Family of Stated Preference Methods

Figure 1 (Merino-Castelló, 2003, p.5)

3.2.1 Contingent Valuation

Contingent valuation estimates consumer preference by a direct survey approach. (Merino-Castelló, 2003, p.5) Within this questionnaire, a hypothetical market is described, in which the product itself, the context and the way it is financed is provided. (Merino-Castelló, 2003, p.6) After this, the respondents are asked what their maximum willingness to pay, or minimum willingness to accept is. (Merino-Castelló, 2003, p.6)

The way it is described above is called the open-ended CV and is the original form. (Merino-Castelló, 2003, p.6) The second form of CV is the referendum or dichotomous choice elicitation. (Merino-Castelló, 2003, p.6) Within this form the respondents are only given the option to answer, 'yes' or 'no', because of this the preference data gathered is encoded in binary codes. (Merino-Castelló, 2003, p.6)

3.2.2 Multi-attribute valuation

Multi-attribute valuation methods analyze more than one attribute simultaneously, including techniques are survey-based methodologies for modelling preferences which describe goods in terms of their attributes and the different levels these attributes can take. (Asioli et al., 2016, p.175) Two different kind of techniques have been suggested: '(i) preference-based approaches which require the individual to rate or rank each alternative product and (ii) choice-based approaches which make the consumer to choose one among several alternative products.' (Merino-Castelló, 2003, p.8) Overall, preference-based approaches are labeled with the general term of conjoint analysis, while choice-based approaches be given the name of choice modelling, (Merino-Castelló, 2003, p.10) or choice-based conjoint analysis. (Karniouchina et al., 2009, p.341) One of the main differences between these two is the form of utility function. (Merino-Castelló, 2003, p.9) Preference-based approaches make use of a deterministic utility function, (Merino-

Castelló, 2003, p.9) which assumes that the choice of the participants if fully explained by the given attributes. (Behrens et al., 2012, p.4) On the other hand, choice-based approaches make use of the random utility function. (Merino-Castelló, 2003, p.9) This function believes that participants preference is not only explained by deterministic components but also by random error. (Cascetta, 2009, p.90) Within these two different techniques of multi-attribute valuation, there are four main variants of measuring preference. (Merino-Castelló, 2003, p.10)

3.2.2.1 Conjoint Analysis

'Conjoint Analysis is a generic term used to describe several ways to elicit preferences.' (Louviere et al., 2010, p.58) It is a method that simulates the decision-making process of a party, by forcing them to repeatedly decide between options with different characteristics. (Green et al., 2001, p.57) Within this family of conjoint analysis there are two variants of measuring preference: (i) contingent rating and (ii) paired comparison. (Merino-Castelló, 2003, p.10) Within contingent rating, participants are presented with different scenarios and assumed to score the alternatives. (Álvarez-Farizo, 2001, p.686) Paired comparison takes it one step further, respondents get a set of two choices and need to choose their preferred alternative and indicate the strength of preference by a score. (Merino-Castelló, 2003, p.11)

3.2.2.2 Choice-based Conjoint Analysis

Choice-based conjoint analysis is a consolidation of decompositional conjoint analysis with a discrete-choice model, respondents typically get profile descriptions of companies which vary on multiple attributes and their accessory levels. (Green et al., 2001, p.64) The two variants that belong to choice-based conjoint analysis are: (i) choice experiments and (ii) contingent ranking. (Merino-Castelló, 2003, p. 11) Choice experiments, also called discrete choice experiments, (Louviere et al, 2001, p.57) consists of a series of alternatives and respondents should choose their preferred option. (Louviere et al., 2001, p.62) The idea of contingent ranking is to give a set of alternatives which consist of a given number of attributes with different levels, the specified alternatives are then ranked on preference by the respondent. (Slothuus et al., 2002, p.1602)

3.3 Ranking-based Experiment: (dis)advantages compared to other preference techniques

Because we want to compare more than one attribute simultaneously in our experiment, we have a huge advantage using the multi-attribute valuation, instead of the contingent valuation where you can only examine one attribute. (Cascetta, 2009, p90) The difference between preference-based and choice-based approaches is that with the former respondents are evaluating a series of products based on their features, the latter differs in that respondents are asked to select one ore more of a series of products. (Merino-Castelló, 2003, p.8) Choice-based approaches are therefore based on a more realistic task that respondents perform daily, choosing the best option within a group of alternatives. (Merino-Castelló, 2003, p.8) The advantage of contingent ranking in comparison with contingent rating is, that the latter only rates one alternative at a time without being able to compare them with the other alternatives. (Merino-Castelló, 2003, p.11) The paired comparison method combines elements of the choice experiments with the contingent rating method, so has advantages of the latter. (Merino-Castelló, 2003, p11) But it still only compares two choices, (Merino-Castelló, 2003, p.11) with the contingent ranking method you can compare more alternatives. (Slothuus et al., 2002, p.1602) And finally,

with the contingent ranking method you can gather more statistical information than choice experiments. (Merino-Castelló, 2003, p.12) One disadvantage of the contingent ranking method is that one of the alternatives must be in the respondent's current feasible choice set. (Merino-Castelló, 2003, p.11) Because, if there is no status quo included, respondents are being forced to choose one of the alternatives as such, which might not be their preference at all. (Merino-Castelló, 2003, p.11-12)

4. METHODOLOGY: RANKING-BASED STATED PREFERENCE EXPERIMENT WITH CHOICE CARDS

4.1 Choice cards: conducted using the ORTHOLAN Command

To perform our contingent ranking-based stated preference experiment we conducted choice cards for the respondents to rank. These choice cards needed multiple attributes from the location, the principal-agent theory, and the social capital theory, all with different levels. In general, there are no restrictions as it comes to the number of attributes included in a choice-based conjoint analysis, though in practice most experiments have less than 10. (Mangham et al., 2008, p.153) This is to ensure that respondent consider all attributes, the greater the number of attributes, the greater the cognitive challenge to complete the experiment. (Mangham et al., 2008, p.153) When the attributes are chosen, attribute levels need to be assigned. (Mangham et al., 2008, p.154) These levels should be realistic and meaningful, they should reflect situations that might be experienced by respondents. (Mangham et al., 2008, p.154) An overview of the chosen attributes with the corresponding levels can be found in appendix 1, there are three general attributes, three attributes concerning the principal-agent theory and four concerning the social capital theory. In total there are ten attributes, nine of them have two levels and one has three levels. If we would use a 'full factorial' design, where all possible combinations of attribute levels are used, we would have ($3^1 \cdot 2^8$) 768 scenarios. (Sanko, 2001, p.15) To calculate the number of combinations, you need to raise the number of levels to the power of the number of attributes. (Sanko, 2001, p.15) If there are attributes with different levels, you simply multiply the raised values. (Sanko, 2001, p.15) You can imagine that it is not possible to easily rank 768 different scenarios. The most used solution to reduce the number of combinations is 'fractional factorial design'. (Sanko, 2001, p.16) Within this design some of the interactions are ignored, except for the main effects. (Sanko, 2001, p.16) This can be done via SPSS's ORTHOPLAN command. (Sanko, 2001, p.16) 'ORTHOPLAN will generate cases in the active dataset, with each case representing a profile in the conjoint experimental plan and consisting of a new combination of the factor values. By default, the smallest possible orthogonal plan is generated.' ('Overview (ORTHOPLAN command),' n.d.) Orthogonality aims at avoiding collinearity between the different attributes used. (Sanko, 2001, p.23) In other words, this means avoiding inter-attribute correlation between the different attributes. (Mangham et al., 2008, p.153) When this does happen, it prevents an accurate estimation of the main effect of the attributes toward the dependent variable. (Mangham et al., 2008, p.153) Even though we could limit the number of games drastically with the fractional factorial design, after testing the experiment ourselves, ten attributes per choice card was still too much and would give a decent cognitive challenge. So, to limit the number of attributes on the choice cards, we decided to conduct a series of experiments. (Sanko, 2001, p.30) By dividing the attributes over two experiments, the cognitive challenge of participating in this experiment reduces. Mangham et al., 2008, p.153) At least one attribute should be included in both

experiments, to be able to compare the preferences over the attributes being explored. (Sanko, 2001, p.30) We decided to have three general attributes, which are included in both experiments, location, price, and quality. The other attributes are divided by theory, so experiment 1 has the attributes belonging to the principal-agent theory and experiment 2 has those of the social capital theory.

4.1.1. Experiment 1: principal-agent theory

Experiment 1 consist of 6 attributes in total, the first one, location, is the dependent variable because we want to investigate if the location of the supplier has influence on the cooperation. This attribute is divided in the three levels, 'local', 'E.U'. and 'transcontinental'. The price and the quality of the supplier both have the levels 'ideal' and 'poor', these levels should be interpreted from the side of the business. So is the price or quality delivered by the supplier ideal or poor in the eyes of the buying company. The fourth attribute used in this experiment is that of the capability of the monitoring of the supplier, this is an important aspect of the principal-agent theory (Jensen and Meckling, 1967, p.308) and the corresponding levels are 'yes' and 'no'. Supplier transparency is the next attribute, this indicates the information flow (Chaney, 2019, p.75) between the two cooperating companies and has the two corresponding levels 'yes' and 'no'. Finally, the final attribute is about different performance in the past. This implies that the supplier performed in a negative way during the cooperation (Jensen and Meckling, 1967, p.308), so here the level 'yes' has a negative load and the level 'no' a positive one.

By using the ORTHOPLAN command by SPSS (Sanko, 2001, p.16) the following formula was formed.

SET SEED 6000.

ORTHOPLAN

/FACTORS=Location 'The location of the supplier' (1 'Local' 2 'E.U.' 3 'Transcontinental') Price 'The price of the supplier' (1 'Ideal' 2 'Poor') Quality 'The quality of prod provided by '+

'supplier' (1 'Ideal' 2 'Poor') Monitoring 'If the supplier can be monitored' (1 'Yes' 2 'No')

Transparency 'If the supplier is transparent' (1 'Yes' 2 'No') Previous_performance 'Previously '+

'performed differently' (1 'Yes' 2 'No')

/REPLACE

/MINIMUM 18.

The 'sed seed' function reflects the set of random numbers producing different results in choice cards this does not need to be a specified number, it should be positive a beneath 2.000.000. (IBM, n.d.-c) The 'seed' number was changed till we had 18 different choice cards, so no identical ones. The minimum number of games conducted from this formula by the fractional factorial design is 16, we changed the minimum to 18, to have 6 choice cards for each location. (IBM, n.d.-a, p.9) This formula conducted the information for 18 choice cards, which can be found in appendix 2. From this information we made clear and easy to use choice cards, an example of these choice cards which we used in the experiment can be found in appendix 3.

4.1.2. Experiment 2: social capital theory

The first three attributes of the second experiment are the same as the first one. In total, this experiment contains of 7 attributes, the first social capital theory attribute is that of the joint IT platform for communication. (Chang & Hsu, 2016, p.722) This attribute asks if the buying company and the supplier have some sort of IT platform by which they can communicate, the corresponding levels are 'yes' and 'no'. The next attribute lets the company reflect on the relation with the supplier and if this is 'ideal' or 'poor' from his point of view. (Hitt & Duane, 2002, p. 6) Cultural barriers, the third social capital theory attribute, consists of difficulties within communication with the supplier based on different language, culture, or religion. (Chang & Hsu, 2016, p.722) Within this attribute the level 'yes' contains a negative load and the level 'no' a positive one. The last attribute of this experiment asks the company if they are, in their opinion, attractive for the supplier. (Hitt & Duane, 2002, p.7) In other words, does the supplier benefits from the relation. The corresponding levels are 'yes' and 'no'. This last attribute is rather a principal-agent theory attribute instead of a social capital theory attribute. This is done to prevent overlap of attributes, which could prevent the estimation of the main effects (Mangham et al., 2009, p.153), between the different principal-agent theory attributes.

By using the ORTHOPLAN command by SPSS (Sanko, 2001, p.16) the following formula was formed.

```
SET SEED 15000.
ORTHOPLAN
  /FACTORS=Location 'The location of the supplier' (1 'Local' 2
'E.U.' 3 'Transcontinental') Price 'The price of the supplier' (1
'Ideal' 2 'Poor') Quality 'The quality of prod provided by '+
'supplier' (1 'Ideal' 2 'Poor') Joint_platform 'Joint IT platform
for comm.' (1 'Yes' 2
'No') Relationship 'Definition of the relationship with supp' (1
'Ideal' 2 'Poor') Culture
'Cultural barriers' (1 'Yes' 2 'No') Buyer_attractiveness 'Are we
attractive for the supplier'
(1 'Yes' 2 'No')
/REPLACE
/MINIMUM 18.
```

The numbers for 'set seed' and 'minimum' are explained in section 4.1.1. This formula conducted the information for 18 choice cards, which can be found in appendix 4. From this information we made clear and easy to use choice cards, an example of these choice cards, which we used in the second experiment can be found in appendix 5.

4.2 Analysis: conducting a conjoint analysis on SPSS

To analyze the given preferred rankings that respondents conducted in the experiment, the IBM SPSS CONJOINT command is used. 'Conjoint analysis is the research tool used to model the consumer's decision-making process' (IBM, n.d.-b, p.1) This command enables you to measure the value placed on attributes and levels by individual respondents or by the whole group of respondents. (IBM, n.d.-a, p.1) Because we conducted two different experiments, two conjoint analysis will be made. The files that we made for the choice cards information via the ORTHOPLAN command, can be used as the plan file in the CONJOINT command. (IBM, n.d.-a, p.22) The conjoint analysis requires two files to perform the analysis, these are the plan and data file. (IBM, n.d.-a, p.14) The plan file consists of the choice cards made by the ORTHOPLAN command and the data file consists of the results made by the respondents (this contains the

rankings). (IBM, n.d.-a, p.15) Since we did a ranking experiment, we need to use the subcommand 'rank' to show SPSS in which preference the data were recorded. (IBM, n.d.-a, p.15-16) To get a result for the average importance value for the respondents, we need to put a 'subject' subcommand in our formula (IBM, n.d.-a, p.17) This command specifies a variable from the data to be used as an identifier, in our case the participating companies from A to N. (IBM, n.d.-a, p.17) Lastly, we use the 'factor' subcommand to specify the expected relationship between the levels of the attributes. (IBM, n.d.-a, p.17) In our formula we use the discrete and linear relation of levels. The discrete model indicates that the attribute levels are categorical and that there is no need to make assumptions about the relationship. (IBM, n.d.-a, p.17) The linear function does indicate a possible relation between the attribute and the given ranks. (IBM, n.d.-a, p.17) The linear relation can be specified with 'less' or 'more', more indicates that the higher values of an attribute are preferred with less it is the other way around. (IBM, n.d.-a, p.17) The specification of the subcommand linear, does not affect the utility estimates they only identify the respondents whose ranks do not match the expected direction. (IBM, n.d.-a, p.17) In our formulas the variables are defined with level 1='Yes' and 2='No', as well as 1='Ideal' and 2='Poor'.

For experiment 1 the following formula is used to conduct the conjoint analysis:

```
CONJOINT                PLAN                =
'C:\Users\wiebk\OneDrive\Documenten\IBA\Thesis\choice
cards exp 1.sav'
/DATA                  =
'C:\Users\wiebk\OneDrive\Documenten\IBA\Thesis\results
experiment 1.sav'
/SEQUENCE = V2 To V19
/SUBJECT = V1
/FACTORS = Location (discrete) Price (Linear less) Quality
(Linear less) Monitoring (linear less) Transparency (linear less)
Previous_performance (linear more)
```

The file, 'C:\Users\wiebk\OneDrive\Documenten\IBA\Thesis\choice cards exp 1.sav', used for the conjoint plan contains the choice card information as stated in appendix 2. The file used for the Data, 'C:\Users\wiebk\OneDrive\Documenten\IBA\Thesis\results experiment 1.sav', are the results of the preferred rankings made by the respondents which can be found in appendix 6. The sequence are the numbers of the ranked possibilities, these are 18 options starting from V2 till V19. V1 is the list with companies, from A to N, which are the subjects. Within the factor's subcommand, you can find the attributes for experiment 1 with the corresponding relationships between the attribute levels.

For experiment 2 the same formula is conducted to get to the conjoint analysis.

```
CONJOINT                PLAN                =
'C:\Users\wiebk\OneDrive\Documenten\IBA\Thesis\cards exp
2.sav'
/DATA                  =
'C:\Users\wiebk\OneDrive\Documenten\IBA\Thesis\results
experiment 2.sav'
/SEQUENCE = V2 To V19
```

/SUBJECT = V1

/FACTORS = Location (discrete) Price (Linear less) Quality (Linear less) Joint_platform (linear less) Relationship (linear less) Culture (linear More) Buyer_attractiveness (linear less)

The file used for the conjoint plan again resembles the choice card information which can be found in appendix 4 and the file used for data, which contains the preferred rankings made by the respondents can be found in appendix 7. All other things are equal to the explanation given by the formula for experiment 1, but with the corresponding attributes of experiment 2.

After running the conjoint analysis, you get multiple outcomes, which are; the utility scores, coefficients, relative importance values, correlations and reversals. (IBM, n.d.-a, p. 32-35) The utility table shows the utility estimate scores of all the attribute levels and their standard error, higher utility values indicate greater preference and negative values mean lower utility. (IBM, n.d.-a, p.32) The conjoint utility, for example for a specific choice card, can be calculated by adding up the utilities of the levels that are on that choice card. (Wittenberg et al., 2017, p.459) The coefficients table shows the linear regression coefficients for the factors specified as 'linear', these coefficients are used to calculate the utility estimates. (IBM, n.d.-a, p.33) The range of utility for each level, provides a measure of how important the level or attribute is to the overall preference. (IBM, n.d.-a, p.33) Attributes with greater utility ranges have more significant role in the overall value than those with smaller ranges, the table of relative importance shows these importance values. (IBM, n.d.-a, p.33) The importance values represent percentages and are calculated for each attribute separately by dividing them by the total sum of the utility for all attributes. (IBM, n.d.-a, p.33) Next, the correlations table shows two statistics, the Pearson's R, and the Kendall's tau. (IBM, n.d.-a, p.34) These statistics provide information about the correlation between the estimated and the observed preference of the respondents. (IBM, n.d.-a, p.34) Lastly, the conjoint analysis calculates a table of reversals. (IBM, n.d.-a, p.35) Within this table the conjoint command keeps track of the respondents that showed preference for the opposite of the expected relationship. (IBM, n.d.-a, p.35)

After conducting the conjoint analysis with the obtained data from the experiment, we can run simulations by adding choice cards that were not included in the choice cards ranked by the respondents. (IBM, n.d.-a, p.35) These simulation cases can be added in the data file, the status must be changed from design to simulation after this you can run the normal conjoint analysis again. (IBM, n.d.-a, p.35) The results of this analysis are the same as the previous one, except two new tables are added: the preference scores of simulations and the preference probabilities for simulations. (IBM, n.d.-a, p.36) The former gives the total estimated utility of the stimulation cases and the latter provides the predicted probabilities of choosing each simulation case as the preferred one by three different models: the maximum utility model, the BTL (Bradley-Terry-Luce) model and the logit model. (IBM, n.d.-a, p.37) The maximum utility model determines the probability by dividing the number of respondents predicted to choose the case by the total number of respondents. (IBM, n, d,-a, p.37) In the end this model shows the probability that (future/simulated) respondents will choose a certain case as the preferred one. (IBM, n, d,-a, p.37) BTL models determine the probability as the ratio of a respondents profile utility to that for the simulation cases. (IBM, n.d.-a, p.37) Lastly, logit models are like the BTL but differs in the use of the natural log of the utilities instead of the utilities. (IBM, n.d.-a, p.37)

Since we mainly focus on location in this paper, for both experiments we conducted 6 simulation cases. The first three

cases differ in the location attribute, further they are all equal in that they represent the expected best preferred levels. The next three cases also only differ in the location attribute, further they are all equal in that they represent the expected worst preferred levels. Further the division of the attribute levels among the simulation cases looks like.

1=local

2=E.U.

3=Transcontinental

4=Local

5=E.U.

6=Transcontinental

4.3 Data collection: performing interviews combined with the experiment

To gather our data, we worked as a group of six people together to get the most possible reactions. The aim was to get interviews and experiments from 5 companies each, together that sums up to 30 interviews and experiments. This is easier then to find 30 companies on your own. For this research we did not make use of the interview answers, but only the experiment part. Since there are two different types of experiments conducted half of the group did my experiment during the interviews. For the experiment we made the choice cards which can be found in appendix 3 and appendix 5. For the physical interviews I printed all the cards to put them on a table and rank them in order of preference. Since Corona was still active during our research period, I also made an online version of the ranking experiment. I did this via a site called www.questionpro.com, because of this site I could make easy to use online experiments. After the experiments were conducted the site gave clear results which I could put into an excel sheet.

5. RESULTS: MOST PREFERRED ATTRIBUTES OF SUPPLIERS

5.1 Experiment 1: with Principal Agent Theory attributes

In the end we had 14 respondents who participated in the preference first experiment. The rankings they provided, are stated below in appendix 6. After conducting the conjoint analysis, we look at the overall statistics of the 14 respondents. The first graph that comes up is that of the utility. The utility graph of experiment 1 is in appendix 8. In this graph you can see the attributes with three corresponding levels, and the utility estimate for every level. The higher the utility estimate, the more the level is preferred by the respondents. (IBM, n.d.-a, p.32) When the utility is negative, the level is less of a preference for the respondents. (IBM, n.d.-a, p.32) As you can see in appendix 8, the highest utility preference is that of the level Local for the attribute location, with 0.667 points. And within this attribute you can see that E.U. scores a lower utility with 0,0026 points, so a lower preference than local and even a negative utility for Transcontinental with -0.0893 points. For the attribute price, both levels have a negative utility so less of a preference. But as you can see the Ideal price is much closer to zero than the Poor price, so the Ideal price is way more preferred than the Poor price. For the quality both levels are also negative, but you see the same phenomena as with price that the Ideal level is way more preferred than the Poor one. For the attributes transparency and monitoring you have again the same situation. Something interesting is happening for the last attribute, since the expected

preferred level should be no. But this has a lower preference than yes, the utility is still negative but the preference for a supplier that performed differently in the past is higher. With all these utility estimates we can calculate the utility for all the choice cards. (IBM, n.d.-a, p.32) This is done by starting with the constant, which is at the bottom of the utility graph, and add up all the utility estimates of the levels matching that choice card. (IBM, n.d.-a, p.32) In appendix 9 you can see all the utility estimates of the given choice cards from experiment 1. The card with the highest utility estimate is choice card 16, this choice card is Local; has an ideal price; ideal quality; can be monitored; is transparent; and did perform different in the past. The top three most preferred choice cards are 16, 15 and 7, these resemble the locations Local, E.U. and Local. The choice card with the lowest utility estimate is card 4, with location Transcontinental; poor price; poor quality; no monitoring; no transparency; but did not perform different in the past. The lowest three choice cards are 4, 17 and 1, which resemble the locations Transcontinental, E.U. and Transcontinental.

The second graph that comes out of the conjoint analysis, is that of the importance values. As can be seen in appendix 10, the attribute that has the highest score is quality, with 30,091 points. Second is the location with 19,340 points, closely followed by price with 19,113 points. Then comes previous performance with 12,530 points and transparency and monitoring with 9,979 and 8,945 points. These points show how much the attributes are valued in importance by the respondents. (IBM, n.d.-a, p.33-34)

In appendix 11, you can see two correlations between the observed preference and the estimated preference of the respondents in the experiment. The Pearson's R is with 0.927 very close to one, so very close to a perfect positive linear correlation between the observed and estimated preference. The significance level is close to 0, which gives us enough evidence to say that the correlation is not zero. Kendall's tau gives a correlation of 0.791, which is lower than the Pearson's R, but still moderately strong to a positive relation. The significance level is also very close to zero which gives us enough evidence to say that the correlation is at least not zero.

The last graph which came out of the conjoint analysis can be seen in appendix 12, this is the number of reversals. This means that respondents have chosen opposites. (IBM, n.d.-a, p.35) So they favored the least optimal level above the more favorable option. (IBM, n.d.-a, p.35) This happened in experiment 1 a total of 16 times. For previous performance and monitoring, respondents chose 5 times for each of the attributes for the opposite level. They preferred no monitoring and different previous performance above the ability to monitor the supplier and steady performance. For transparency this happened four times at for quality two. With the price all the respondents chose the ideal price above the poor price. When the reversals are high the correlation between the estimated and observed preference will decline.

5.2 Experiment 2: with Social Capital Theory attributes

For experiment 2 we also had 14 respondents who finished the experiment. Their rankings are shown in appendix 7. We also conducted the conjoint analysis for this experiment and again are looking at the overall statistics of the experiment instead of the individual results. In appendix 13 we can see the utilities of the experiment. As can be seen the level local has a very high utility estimate with 2.179, the E.U. on the other hand a negative utility of 2.512 and Transcontinental is slightly preferred with 0.333. Further the attributes price, quality and buyer attractiveness are

positive, so these attributes are favored by the respondents. The joint IT platform, relationship and culture are less preferred attributes. What stands out is that for the attributes price, quality and buyer attractiveness, respondents prefer the least optimal level the most. Joint IT platform stands out because this has a very large negative value. For this experiment we can also calculate the utility estimate of all the choice cards in the experiment by taking the constant utility and add up the level utility estimates. (IBM, n.d.-a, p.32) These can be found in appendix 14. The choice card with the highest value is card 3 with a value of 14.554. This supplier is local; has poor price; poor quality; has a joint IT platform; has an ideal relation; does have cultural barriers and is not attractive for the supplier. The top three choice cards are 3, 8 and 7. All three are located locally. The three least preferred choice cards are 10, 11 and 17. These are local and from the E.U.

In the second graph we see the importance values again. For this experiment location has the highest value with several 35.121, this is almost the double amount of any other attribute. Second comes joint platform with 17.787 points, third buyer attractiveness with 11.546 points. Quality is next with 10.602 point of value. After that you have culture, price, and relationship with 9.903, 8.644 and 6.997 points.

Appendix 16 shows the correlation values between the observed and estimated preferences. Pearson's R is with 0.851 still high, which indicates a moderately high, positive correlation. The Kendall's tau on the other hand is with 0.595 considerably low and does not really show a strong correlation. Both significant levels are close to zero, which indicates that we have enough evidence to say that both values are at least not zero.

As expected, are the number of reversals high. As can be seen in appendix 17, there are a total of 45 reversed ranked levels. The most are within culture, so 12 respondents chose cultural barriers above no cultural barriers. Next up is quality, 9 respondents preferred poor quality over ideal quality. For a shared third place are buyer attractiveness and price with each 8 respondents who chose reversed for these attributes. Also 7 respondents choose a poor relationship over an ideal relationship. And finally one respondent preferred not to have a joint IT platform above the opportunity to have this. This high number of reversals explains the low correlation between the estimates and the observed preference.

5.3 Simulations of both experiments with different locational attributes

Firstly, we will focus on the simulation outcomes of experiment 1. In appendix 18 you can find the table with the preference scores of the simulation. As can be seen, the level 'local' has in both cases the highest score followed by the E.U. and lastly transcontinental. The score decreases with 0.44 points when going from local to E.U. and decreases with 1.119 when going from E.U. to transcontinental. When going from local to transcontinental the score decreases with 1.559 points of utility. The preference probabilities of simulation table can be found in appendix 19. Since the BTL and logit are only based on 5 out of 14 respondents, these do not give an overall probability. The order of the maximum utility is firstly case 1 with a probability of 39,3%, second case 3 with a probability of 28,6%, third case 6 with a probability of 14,3%, fourth case 2 with a probability of 10,7%, fifth case 5 with a probability of 7,1% and lastly, case 4 with a probability of 0%. This percentage shows the probability that respondents chose the specific case as preferred.

The simulation outcomes of the second experiment can be found in appendix 20 and 21. Within the preference scores of the

simulation of experiment 2, the level 'local' again scores the highest utility. This time only, transcontinental is on the second place instead of the E.U. When going from local to E.U. the utility score decreases with 4.69 points. When going from local to transcontinental, the score decreases by 1.845. Lastly, the difference between E.U. and transcontinental is 2,845 points in utility. Within experiment 2 all respondents were included with the calculation of the BTL and the logit but since we cannot compare them with experiment 1, we will leave them as they are. The order of the maximum utility starts with case 4 with a probability of 57.1%, second case 1 with 25%, third a tie between case 2 and 5 with each 7.1%, fourth case 3 with 3.6% and lastly, case 6 with 0%.

What stands out between the two different experiments is, that within experiment 1 there are considerable differences between the three expected best preferred cases and the three expected worst preferred cases. The difference in utility between the locational level and the best and worst cases is 8.839 points. Within the second experiment the same difference is only 0.018 points.

6. CONCLUSION AND DISCUSSION

The choice cards with the highest utility within experiment 1 are two times local and one-time E.U. The three cards with the lowest utility are two times transcontinental and one-time E.U. From this you could say that the most preferred location within experiment 1 is local, then E.U. and the least preferred is transcontinental. For the second experiment the three cards with the highest utility are all three located locally, the three least preferred card are two times E.U. and one time local. Here you could also say that local suppliers are the most preferred and E.U. and transcontinental come next. This is backed up by the utilities of the different levels. In experiment one local has the highest value with 0.667, followed by E.U. with 0.226 and transcontinental is even negative by 0.893 points. In the second experiment the level local is very preferred with a value that is higher than two, on the other hand the E.U. is very negative with 2.512 and transcontinental is slightly preferred with 0.333. With these utility estimates you could say that the most preferred location is local, then transcontinental and then E.U., because of the large negative utility in experiment two.

Within experiment 1 the most favored attributes are quality, location, and price. These are valued closely together. Within experiment 2 location is far off the most valued attribute and the others are far below, but in second place there are joint platform and buyer attractiveness.

Within experiment 1 there are not a lot of reversed answers and the correlation of the observed preferences and the estimated preferences are strong. This shows that the respondents took all the attributes into account and acted most of the time as estimated. For experiment 2 on the other hand, the correlation values are lower and there are a lot of reversed choices. This means that the observed preference and the estimated preference are not correlated closely. A reason for this, also because the location attribute is so high, could be that respondents valued the social capital theory attributes less so focused more on one attribute, that of location. Because of this they ranked less cautiously and did not pay that much attention to the other attributes in the choice card.

Within experiment 1 the respondents had reversal preferences for the attribute previous performance, this could be caused by the fact that the expected best preference within this attribute is the opposite of the others. Although looking at the table of reversals, the attribute monitoring and previous performance have the same

number of reversals. Since the attribute previous performance does not deviate in reversals, you could say that the reversed preference is because of the way the attribute is stated.

When looking at the simulations made for experiment 1 and 2, a lot becomes clear. When looking at the preference scores of experiments one, cases 1 and 4 with the level local has the highest utility followed by cases 2 and 5 with the level E.U. and thirdly the cases 3 and 6 with the level transcontinental. But there is a difference of 8.839 points between the expected best preferred cases and the expected worst preferred cases, this indicates that location is not the only attribute considered. The maximum utility from experiment one shows that out of the group of 14 respondents, 6 would probably prefer case 1 the most, 4 would prefer case 3 the most, 2 respondents would prefer case 6 the most, cases 2 and 5 would be preferred the most by one respondent each and case 4 would be preferred by no one. In total cases 1, 2 and 3 are probably preferred the most by 11 respondents and cases 4, 5 and 6 by 3 respondents. This again shows that location is not the only attribute that plays a role in this experiment and that the other attributes are important within ranking the cards as well.

Within the second experiment cases 1 and 4 with the level local again have the highest utility, this time followed by cases 3 and 5 with the level transcontinental and lastly, the cases 2 and 4 with the level E.U. Only this time there is only a small difference of 0.018 between the utility scores of the expected best preferred cases and the expected worst preferred cases. This very small difference in opposite against the 8.839 of experiment 1 shows that for experiment 2 respondents only valued the attribute location when ranking the choice cards. This also explains why the number of reversals is so high, the correlation values are low, and the utility table shows very weird scores. The respondents only focused on one attribute, the location, and did not really care about the others so ranked those in random order. The maximum utility additionally shows that there is only a small difference in the probabilities for the difference in worst or best preferred cases and large differences when it comes to location.

When looking at the total preference of the simulation cases and the maximum utility something interesting is happening. For experiment 1, when looking at the total estimated utility of the cards, also the deterministic utility that is only based on the attributes (Behrens et al., 2012, p.4), local has the highest value followed by the E.U. and transcontinental as third. But looking at the maximum utility, local is again first but followed by transcontinental with the second highest probability and the E.U. as third. This difference is caused by the random utility that is connected with the choice based conjoint analysis. (Merino-Castelló, 2003, p.9) When only looking at the attribute (deterministic) utility the top three would be local, E.U. and transcontinental, but because of the random utility, the respondents maximum utility probability is different. Experiment 2 shows the same phenomena, the estimated preference of the simulation cases show that local has the highest deterministic utility, followed by transcontinental and the E.U. as third. Yet, the probability of the maximum utility shows that local is first, E.U. second and transcontinental third. These differences cannot be calculated by formulas and is just the random error that is connected with the choice of the respondents. (Cascetta, 2009, p.90)

So overall we can conclude that with these 2 experiment the attribute location is the attribute most valued when it comes to suppliers. Within experiment 1 the attribute location was not the only attribute valued when ranking the choice cards, the other attributes were also taken into consideration. At experiment 2, the only attribute that seemed important was location. All the

other attributes were ranked randomly. Having those results, we could say that the attributes corresponding to the principal-agent theory, so monitoring, transparency and performed differently, had more importance than the attributes corresponding the social capital theory. Within the social capital theory attributes there was one principal-theory attribute, the supplier attractiveness. Since this one is probably taken for granted together with the social capital theory attributes, this was the only attribute within the second experiment which had a positive utility. So, it was preferred more than the social capital theory attributes.

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9. APPENDICES

Appendix 1: *choice card attributes with corresponding levels*

<i>Attributes</i>	<i>Levels</i>
<i>The location of the supplier</i>	- Local - E.U. - Transcontinental
<i>The price of the supplier</i>	- Ideal - Poor
<i>The quality of the product provided by the supplier</i>	- Ideal - Poor
<i>Supplier can be monitored</i>	- Yes - No
<i>Supplier is transparent</i>	- Yes - No
<i>Supplier performed different in the past</i>	- Yes - No
<i>Joint IT platform for communication</i>	- Yes - No
<i>The relation with the supplier</i>	- Ideal - Poor
<i>Are there cultural barriers</i>	- Yes - No
<i>Are we attractive for the supplier</i>	- Yes - No

Appendix

Appendix 2: choice card information for experiment 1

Location	Price	Quality	Monitorin	Transpare	Previous_	STATUS_	CARD_
Transcont	Ideal	Poor	Yes	Yes	Yes	Design	1
E.U.	Ideal	Ideal	No	Yes	No	Design	2
Local	Ideal	Poor	Yes	Yes	No	Design	3
Transcont	Poor	Poor	No	No	No	Design	4
Local	Poor	Ideal	No	Yes	Yes	Design	5
E.U.	Poor	Ideal	Yes	Yes	No	Design	6
Local	Ideal	Ideal	Yes	No	No	Design	7
Transcont	Ideal	Ideal	No	Yes	Yes	Design	8
E.U.	Ideal	Poor	Yes	No	Yes	Design	9
Local	Ideal	Poor	No	Yes	Yes	Design	10
Local	Poor	Ideal	Yes	No	Yes	Design	11
Transcont	Poor	Ideal	Yes	Yes	Yes	Design	12
Transcont	Ideal	Ideal	Yes	No	Yes	Design	13
Transcont	Ideal	Ideal	Yes	Yes	No	Design	14
E.U.	Ideal	Ideal	Yes	Yes	Yes	Design	15
Local	Ideal	Ideal	Yes	Yes	Yes	Design	16
E.U.	Poor	Poor	Yes	Yes	Yes	Design	17
E.U.	Ideal	Ideal	No	No	Yes	Design	18

Appendix 3: choice cards for experiment 1

Card ID	The location of the supplier	The price of the supplier	The quality of the product provided by the supplier	Supplier can be monitored	Supplier is transparent	Supplier performed different in the past
1	Transcontinental	Ideal	Poor	Yes	Yes	Yes

Appendix 4: choice card information for experiment 2

Location	Price	Quality	Joint_platform	Relationship	Culture	Buyer_attitude	STATUS	CARD_
Transcont	Ideal	Ideal	Yes	Poor	Yes	No	Design	1
E.U.	Ideal	Poor	Yes	Poor	No	Yes	Design	2
Local	Poor	Poor	Yes	Ideal	Yes	No	Design	3
Transcont	Ideal	Poor	No	Ideal	Yes	No	Design	4
Transcont	Ideal	Poor	Yes	Ideal	Yes	Yes	Design	5
E.U.	Ideal	Ideal	Yes	Ideal	No	No	Design	6
Local	Ideal	Ideal	Yes	Ideal	No	No	Design	7
Local	Ideal	Ideal	Yes	Ideal	Yes	Yes	Design	8
Local	Poor	Ideal	Yes	Poor	Yes	Yes	Design	9
E.U.	Ideal	Ideal	No	Ideal	Yes	Yes	Design	10
E.U.	Poor	Ideal	No	Poor	Yes	No	Design	11
E.U.	Poor	Poor	Yes	Ideal	Yes	Yes	Design	12
E.U.	Ideal	Ideal	Yes	Ideal	Yes	Yes	Design	13
Local	Ideal	Poor	No	Poor	No	Yes	Design	14
Transcont	Poor	Ideal	Yes	Ideal	No	Yes	Design	15
Local	Ideal	Ideal	No	Ideal	Yes	Yes	Design	16
Transcont	Poor	Ideal	No	Ideal	No	Yes	Design	17
Transcont	Ideal	Ideal	Yes	Poor	Yes	Yes	Design	18

Appendix 5: choice cards for experiment 1

Card ID	The location of the supplier	The price of the supplier	The quality of the supplier	Joint IT platform for comm.	The relation with the supplier	Cultural barriers	Are we attractive for the supplier
1	Transcontinental	Ideal	Ideal	Yes	Poor	Yes	No

Appendix 6: results ranking based preference experiment 1

Company/Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A	14	15	16	18	13	2	7	8	12	11	6	5	1	3	9	10	17	4
B	16	10	7	15	2	14	8	13	18	5	11	6	12	3	1	9	17	4
C	7	2	14	16	15	18	8	13	6	12	5	11	3	10	1	9	17	4
D	1	3	4	9	10	12	15	16	17	14	2	7	8	13	18	6	5	11
E	16	1	6	14	15	12	7	11	13	2	5	8	18	3	17	9	10	4
F	14	2	7	16	15	8	13	18	6	12	5	11	3	1	10	9	4	17
G	2	7	14	16	15	18	8	13	6	5	11	12	3	10	9	1	17	4
H	13	6	14	18	12	11	7	8	15	16	10	9	5	1	2	3	17	4
I	15	4	11	18	10	12	1	16	13	8	9	14	7	6	5	2	17	3
J	15	5	9	18	10	13	1	8	12	11	14	17	7	6	4	2	16	3
K	16	15	10	18	14	11	9	7	8	6	12	13	4	3	2	1	17	5
L	3	7	6	9	5	10	15	2	16	18	17	11	14	8	13	1	12	4
M	16	15	2	7	18	10	3	9	11	6	5	17	14	8	13	12	1	4
N	16	7	10	2	15	14	8	18	5	13	11	6	3	12	9	1	17	4

Appendix 7: results ranking based preference experiment 2

Company/Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A	7	8	6	13	18	16	10	1	9	11	15	17	14	5	4	2	12	3
B	7	8	16	6	13	10	1	18	15	17	11	9	14	2	5	4	3	12
C	13	8	7	6	16	10	18	1	15	17	11	9	4	5	14	2	12	3
D	8	13	16	10	7	6	15	18	17	1	9	11	5	4	12	2	14	3
E	8	16	13	10	15	17	7	6	9	18	11	1	12	5	3	4	14	2
F	8	13	6	7	16	10	18	1	15	17	9	11	5	4	2	14	12	3
G	7	6	8	13	16	10	18	1	9	11	17	15	14	2	5	4	12	3
H	8	16	18	15	14	3	1	2	9	7	10	17	4	13	11	6	12	5
I	7	12	17	11	10	6	5	1	14	3	15	18	2	9	13	8	16	4
J	3	9	16	10	11	4	1	2	15	5	14	17	6	12	13	7	18	8
K	3	9	17	11	10	1	2	4	12	5	15	18	6	13	14	7	16	8
L	6	7	2	14	9	13	3	8	11	10	12	16	1	18	15	5	17	4
M	8	13	7	6	10	16	2	14	11	9	3	12	1	18	17	4	15	5
N	8	7	16	13	6	18	10	1	15	17	9	14	11	5	2	3	4	12

Appendix 8: utility table from SPSS for experiment 1

Utilities

		Utility Estimate	Std. Error
Location	Local	,667	,500
	E.U.	,226	,500
	Transcontinental	-,893	,500
Price	Ideal	-3,554	,750
	Poor	-7,107	1,501
Quality	Ideal	-4,393	,750
	Poor	-8,786	1,501
Monitoring	Yes	-,625	,750
	No	-1,250	1,501
Transparency	Yes	-,393	,750
	No	-,786	1,501
Previous_performance	Yes	-,125	,750
	No	-,250	1,501
(Constant)		21,619	2,265

Appendix 9: calculated utility estimates per choice card

Location	Price	Quality	Monitorin	Transpare	Previous_	utility esti	CARD_
Transcont	Ideal	Poor	Yes	Yes	Yes	7,243	1
E.U.	Ideal	Ideal	No	Yes	No	12,005	2
Local	Ideal	Poor	Yes	Yes	No	8,678	3
Transcont	Poor	Poor	No	No	No	2,547	4
Local	Poor	Ideal	No	Yes	Yes	9,018	5
E.U.	Poor	Ideal	Yes	Yes	No	9,077	6
Local	Ideal	Ideal	Yes	No	No	12,678	7
Transcont	Ideal	Ideal	No	Yes	Yes	11,011	8
E.U.	Ideal	Poor	Yes	No	Yes	7,969	9
Local	Ideal	Poor	No	Yes	Yes	8,178	10
Local	Poor	Ideal	Yes	No	Yes	9,25	11
Transcont	Poor	Ideal	Yes	Yes	Yes	8,083	12
Transcont	Ideal	Ideal	Yes	No	Yes	11,243	13
Transcont	Ideal	Ideal	Yes	Yes	No	11,511	14
E.U.	Ideal	Ideal	Yes	Yes	Yes	12,755	15
Local	Ideal	Ideal	Yes	Yes	Yes	13,196	16
E.U.	Poor	Poor	Yes	Yes	Yes	4,809	17
E.U.	Ideal	Ideal	No	No	Yes	11,287	18

Appendix 10: *importance values from SPSS for experiment 1*

Importance Values

Location	19,340
Price	19,113
Quality	30,091
Monitoring	8,945
Transparency	9,979
Previous_performance	12,530

Averaged Importance Score

Appendix 11: *correlations from SPSS for experiment 1*

Correlations^a

	Value	Sig.
Pearson's R	,927	,000
Kendall's tau	,791	,000

a. Correlations between observed and estimated preferences

Appendix 12: *number of reversals from SPSS for experiment 1*

Number of Reversals

Factor	Previous_performance	5
	Monitoring	5
	Transparency	4
	Quality	2
	Price	0
	Location	0
Subject	1 Subject A	0
	2 Subject B	2
	3 Subject C	0
	4 Subject D	1
	5 Subject E	0
	6 Subject F	0
	7 Subject G	1
	8 Subject H	2
	9 Subject I	3
	10 Subject J	3
	11 Subject K	2
	12 Subject L	1

13	Subject M	0
14	Subject N	1

Appendix 13: utility table from SPSS for experiment 2

Utilities

		Utility Estimate	Std. Error
Location	Local	2,179	,741
	E.U.	-2,512	,741
	Transcontinental	,333	,741
Price	Ideal	,696	1,111
	Poor	1,393	2,222
Quality	Ideal	,982	1,111
	Poor	1,964	2,222
Joint_platform	Yes	-3,107	1,111
	No	-6,214	2,222
Relationship	Ideal	-,089	1,111
	Poor	-,179	2,222
Culture	Yes	-,929	1,111
	No	-1,857	2,222
Buyer_attractiveness	Yes	,571	1,111
	No	1,143	2,222
(Constant)		12,000	3,666

Appendix 14: calculated utility for the choice cards of experiment 2

Location	Price	Quality	Joint_plat	Relationsh	Culture	Buyer_att	utility esti	CARD_
3,00	1,00	1,00	1,00	2,00	1,00	2,00	10,939	1
2,00	1,00	2,00	1,00	2,00	2,00	1,00	7,576	2
1,00	2,00	2,00	1,00	1,00	1,00	2,00	14,554	3
3,00	1,00	2,00	2,00	1,00	1,00	2,00	8,904	4
3,00	1,00	2,00	1,00	1,00	1,00	1,00	11,439	5
2,00	1,00	1,00	1,00	1,00	2,00	2,00	7,256	6
1,00	1,00	1,00	1,00	1,00	2,00	2,00	11,947	7
1,00	1,00	1,00	1,00	1,00	1,00	1,00	12,303	8
1,00	2,00	1,00	1,00	2,00	1,00	1,00	12,91	9
2,00	1,00	1,00	2,00	1,00	1,00	1,00	4,505	10
2,00	2,00	1,00	2,00	2,00	1,00	2,00	5,583	11
2,00	2,00	2,00	1,00	1,00	1,00	1,00	9,291	12
2,00	1,00	1,00	1,00	1,00	1,00	1,00	7,612	13
1,00	1,00	2,00	2,00	2,00	2,00	1,00	9,16	14
3,00	2,00	1,00	1,00	1,00	2,00	1,00	10,226	15
1,00	1,00	1,00	2,00	1,00	1,00	1,00	9,196	16
3,00	2,00	1,00	2,00	1,00	2,00	1,00	7,119	17
3,00	1,00	1,00	1,00	2,00	1,00	1,00	10,367	18

Appendix 15: importance values from SPSS for experiment 2

Importance Values

Location	35,121
Price	8,644
Quality	10,602
Joint_platform	17,787
Relationship	6,997
Culture	9,303
Buyer_attractiveness	11,546

Averaged Importance Score

Appendix 16: correlations from SPSS for experiment 2

Correlations^a

	Value	Sig.
Pearson's R	,851	,000
Kendall's tau	,595	,000

a. Correlations between observed and estimated preferences

Appendix 17: number of reversals from SPSS for experiment 2

Number of Reversals

Factor	Culture		12
	Quality		9
	Buyer_attractiveness		8
	Price		8
	Relationship		7
	Joint_platform		1
	Location		0
Subject	1	Subject A	3
	2	Subject B	4
	3	Subject C	4
	4	Subject D	5
	5	Subject E	5
	6	Subject F	5
	7	Subject G	3
	8	Subject H	3
	9	Subject I	1
	10	Subject J	3
	11	Subject K	2
	12	Subject L	0
	13	Subject M	2
	14	Subject N	5

Appendix 18: *preference scores of simulations from SPSS for experiment 1*

Preference Scores of Simulations

Card Number	ID	Score
1	1	13,071
2	2	12,631
3	3	11,512
4	4	4,232
5	5	3,792
6	6	2,673

Appendix 19: *preference probabilities of simulations from SPSS for experiment 1*

Preference Probabilities of Simulations^b

Card Number	ID	Maximum Utility ^a	Bradley-Terry-Luce	Logit
1	1	39,3%	15,2%	15,3%

2	2	10,7%	16,1%	9,2%
3	3	28,6%	17,5%	23,0%
4	4	0,0%	16,0%	3,3%
5	5	7,1%	16,9%	15,7%
6	6	14,3%	18,3%	33,5%

a. Including tied simulations

b. 5 out of 14 subjects are used in the Bradley-Terry-Luce and Logit methods because these subjects have all nonnegative scores.

Appendix 20: *preference scores of simulations from SPSS for experiment 2*

Preference Scores of Simulations

Card Number	ID	Score
1	1	11,375
2	2	6,685
3	3	9,530
4	4	11,357
5	5	6,667
6	6	9,512

Appendix 21: *preference probabilities of simulations from SPSS for experiment 2*

Preference Probabilities of Simulations^b

Card Number	ID	Maximum Utility ^a	Bradley-Terry-Luce	Logit
1	1	25,0%	21,0%	27,4%
2	2	7,1%	12,6%	8,0%
3	3	3,6%	17,6%	5,0%
4	4	57,1%	20,2%	47,3%
5	5	7,1%	11,8%	6,8%
6	6	0,0%	16,8%	5,6%

a. Including tied simulations

b. 14 out of 14 subjects are used in the Bradley-Terry-Luce and Logit methods because these subjects have all nonnegative scores.