

**Ranking of Interaction Antecedents in determining Adaptations/ Innovation within the Buyer-Seller Relationship: A Pair-wise comparison approach**

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***Abstract***

Interaction between the buyer and seller has emerged as an important resource for firm adaptations and innovation. However, business relationship research tend to assign equal weight to antecedents and fail to consider their interdependencies and interactions. To overcome this limitation, the paper proposes a pair-wise comparison approach to obtain expert opinion for the assigning of weights to these antecedents. This approach follows the framework provided by the Analytic Hierarchy Process (AHP). A conceptual framework, based on the IMP interaction model, linking the elements of trust, commitment, closeness/ co-operation, power/dependence and exchange to buyer-seller interaction is developed. A hierarchy-structure like construct is then designed to represent the relationship between these interaction antecedents with adaptations/ innovation. Taking the dimensions of the trust element as example, the paper illustrates how pair-wise comparison can be used to assign weights to these dimensions and rank them according to importance and by extension the antecedents to interaction found in the conceptual model. The pair-wise comparison approach provides an additional avenue for testing the robustness of the IMP Interaction model. It is a convenient tool for developing higher order relationships and has the potential for use in both cross-sectional and longitudinal studies across different cultures, industries and even networks.

**Keywords:** Interaction, Adaptations/ Innovations, Pair-wise comparison, AHP

**Background**

Interaction between firms and their suppliers/customers within the supply chain has been recognized as a prime factor for innovation success (Doloreux, 2004; Fatimah, 2001; Roy, Sivakumar and Wilkinson, 2004; Koschatzky, 1999; Laage-Hellman, 1997;

Eisenhardt and Tabrizi, 1995). This is a departure from previous thinking that only the producer or manufacturer is the source of innovation and has placed the buyer-seller relationship dyad as a functional source of innovation (von Hippel, 1988). As such, interaction between the buyer and seller has emerged as an important resource for firm competitiveness and organizational strategy (Beardsley, Johnson and Manyika, 2006; Krapfel, Jr., Salmond and Spekman, 1991; Dyer and Singh, 1998; Turnbull and Valla, 1986). Much of this importance lies in the collaborative nature of such relationships with antecedents such as trust, commitment, cooperation, and power/dependence forming the atmosphere of the relationship (Hakansson, 1982; Campbell, 2001).

Business relationship research focusing on the relationships between antecedents and consequences tend to assign equal weights to these antecedents. This approach however fails to recognize the ongoing interactions and interdependence between the contributory antecedents and to give clear indications of the relative importance of each factor in contributing towards a higher-order relationship (Wray, Palmer and Bejou, 1994). An alternative would be for the researcher to focus on only a few of these components and conceptualize their relationships such as that between trust and commitment. This limitation to business relationship research is brought about by the use of parametric statistics such as regression analysis, which presupposes the normal distribution of the population, and hence the need to assume equal weight amongst determining factors (e.g. Cannon and Perreault Jr., 1999; Nielson, 1998; Blankenburg, Eriksson and Johanson, 1996; Metcalf, Frear and Krishnan, 1992). A similar argument forwarded in the field of innovation research is that the measurement of attributes by means of perceived questionnaires that are evaluated using subjective indicators deviate easily, based on the subjective cognizance of the person who replies to the questionnaire, because the relative importance of the different dimensions is not considered (Liu, 2005).

We propose the use of a non-parametric pair-wise comparison approach for the assigning of weights to the antecedents of buyer-seller interaction so as to ascertain their relative importance based on the framework provided by the Analytic Hierarchy Process (AHP) (Saaty, 1994). The use of a non-parametric technique allows for the assumption of a free distribution of weights amongst the antecedents. In this aspect, the AHP method provides a comprehensive, logical and structural framework that allows for the understanding of complex weighting problems by decomposing the problem into a hierarchical structure of multiple factors and multiple solutions. A pair-wise comparison approach is then used to collect judgments from a group of experts to assess and allocate weights to these multiple factors. The same pair-wise comparison approach used in the AHP could be adopted in business relationship research involving multiple factors in their constructs. By allocating weights to the determinant factors it would be possible to evaluate their impact on the dependent variable based on their degree of importance. The different weights assigned to the factors would thus provide an added dimension in evaluating data collected through survey-based research.

This research identifies the elements of trust, commitment, closeness/ cooperation, power/dependence and exchange found in the IMP interaction model as determinants of interaction that result in adaptations and innovation carried out within successful buyer-seller relationships (Campbell, 2001; Hallén, Johanson and Seyed-

Mohamed, 1991; Hakansson, 1982 ). A hierarchy-structure like construct is designed to represent the relationship between the interaction determinants and adaptation/ innovation. This paper then evaluates the use of the pair-wise comparison approach adopted from the AHP for use in the assigning of weights to these determinants. At the end a discussion is carried out to identify implications and further research.

### **Buyer-Seller Interaction as determinant of Innovation**

The IMP Interaction Approach by Hakansson and the Industrial Marketing and Purchasing (IMP) Group (1982) posits that the relationship between the buyer and seller can be forged and profiled through the linking of activities, sharing of resources and the bonding of actors of the two firms; thus making it possible to measure the level of buyer-seller interaction (Hakansson, 1982; Hakansson and Snehota, 1995). Based on ethnographic interviews of 878 buyers and sellers from 318 firms in France, Sweden, Western Germany, Italy and the United Kingdom, the group believed that a model based on cooperation rather than the traditional buyer-seller adversarial model was a more realistic representation of the data that they collected.

The IMP Interaction model

Figure 1 below presents the basic model of the IMP Interaction Approach taken from Hakansson and the IMP Group (1982). It depicts the actors (party A and B) in an exchange process involving resources and activities. Surrounding the exchange elements of products and services, finance, information and sociality and the interaction process (which includes adaptations), is the atmosphere of the interaction consisting of power/dependence, cooperation, closeness and expectations (Hakansson, 1982).

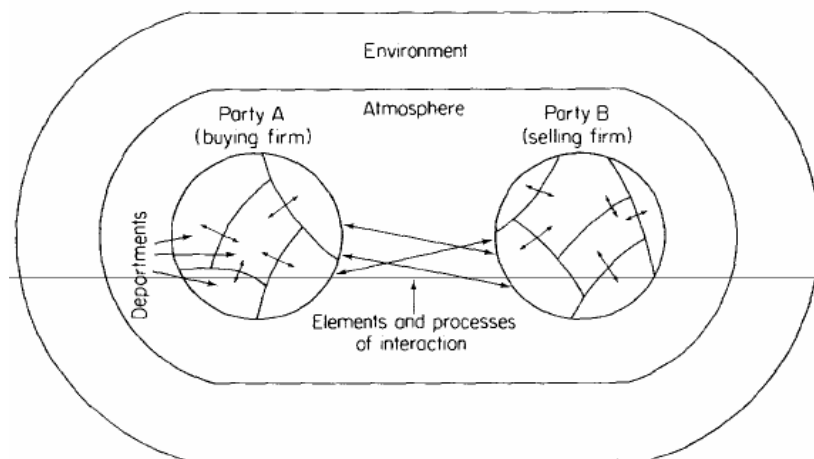


Figure 1: Main elements of the Interaction Model (Source: Hakansson, 1982)

More recent studies have interpreted the interaction atmosphere to also include

trust, commitment, mutual goals, performance satisfaction and IT Adoption. A table comparing the constructs/ dimensions used in the original IMP Interaction model with some of the more recent published papers referencing the model is provided in Table.1 on next page.

Table 1 Summary table of constructs/dimensions used in IMP Interaction research

Author (Year)	Constructs / Dimensions of IMP Interaction
Hakansson (1982)	Power/ dependence, Co-operation, Closeness, Expectations  Product/ service exchange, Information exchange, Financial exchange, Social exchange  Institutionalization, Adaptations
Metcalf, Frear and Krishnan (1992)	Product exchange Information exchange Social exchange Co-operation Adaptation
Wilson (1995)	Atmosphere- Commitment, Trust, cooperation, mutual goals, interdependence/ power imbalance, performance satisfaction,  Process – adaptation, non-retrievable investment, shared technology, summative constructs, structural bonds, social bonds
Nielson (1998)	Closeness, Trust in customer, Commitment in relationship, Information sharing, Relationship specific asset, Joint working
Campbell (2001)	Atmosphere – power/dependence, trust, commitment, co-operation/ closeness  Interaction process – exchange (product, information, finance, social), mechanisms (adaptations, contact patterns, bargaining/ negotiations)
Roy, Sivakumar and Wilkinson (2004)	IT adoption Commitment Trust

Trust and commitment especially has been a popular element of study in the recent constructs appearing in four of the five studies cited (Wilson, 1995; Nielson, 1998; Campbell, 2001; Roy, Sivakumar and Wilkinson, 2004) while cooperation and closeness have been grouped together in two of the cited constructs (Nielson, 1998; Campbell, 2001). The atmosphere element of expectations although forwarded in the initial model by Hakansson (1982) has not been a subject of study in any of the five studies quoted here. Mutual goals, performance satisfaction and IT Adoption have only appeared once.

The variable must appear at least twice (once in the study and a second time elsewhere) for it to be considered for this paper's conceptual model.

Some of the studies segregate the atmosphere of the interaction from the elements and processes of interaction while others do not. Campbell (2001) for instance, further refined the interaction process into exchange (product, information, finance, social) and mechanisms that include adaptations as a component. This differs from Hakansson (1982) in that the exchanges are treated as elements to the interaction whilst adaptation is an interaction process.

### The Conceptual Model

It is argued here that adaptation is a form of innovation and has often been mentioned in innovation literature (Totling and Kaufmann, 1999; DeBresson et al., 1996, (and in the literature cited there in); Eisenhardt and Tabrizi, 1995; Damanpour, Szabat and Evan, 1989). The interaction atmosphere of power/dependence, cooperation/closeness, trust, and commitment are grouped together along with the exchange processes (product, information, finance and social) to form the dimensions of buyer-seller interaction that result in adaptations/ innovation in the buyer-seller dyadic relationship. This interpretation of the IMP interaction model is presented in Figure 2 below:

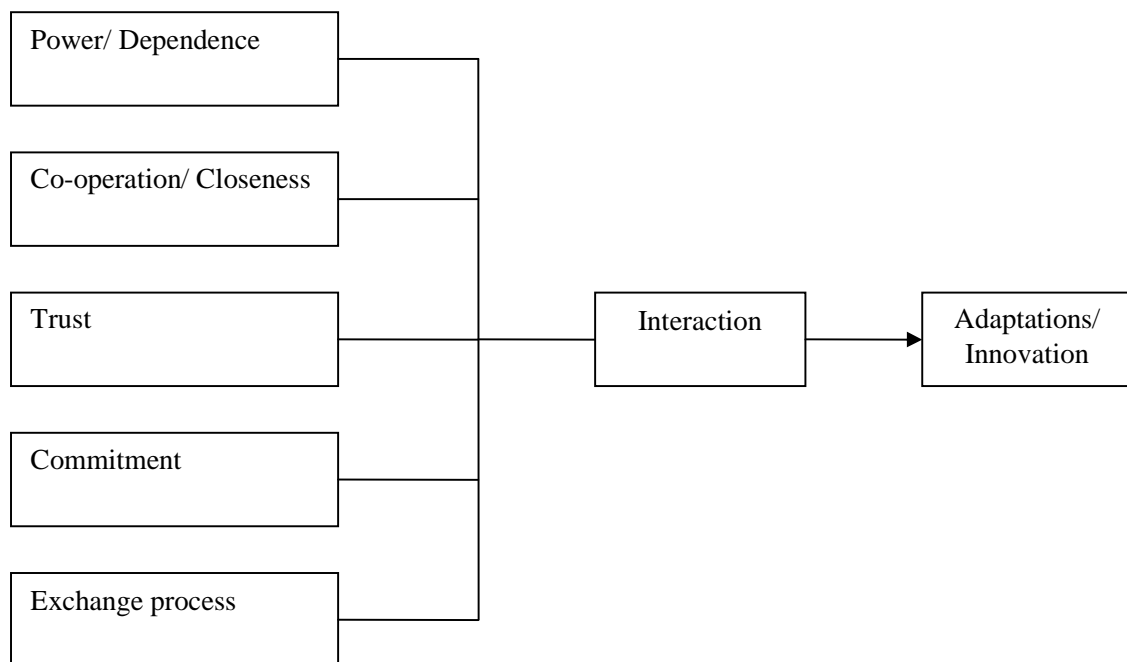


Figure 2: The determinants of adaptations/ innovation in buyer-seller relationships.

Although the various factors of interaction atmosphere and exchange process as depicted in Figure 2 are shown to be separate from each other, they are actually interdependent and interrelated. For instance, the elements of the interaction of product

exchange, social exchange, information exchange and finance exchange will have an impact on the level of commitment, the extent of trust, and closeness between the buyer and seller (Campbell, 2001) and trust will affect the level of commitment (Morgan and Hunt, 1994). This will be evident when we discuss the nature of the variables below:

#### Buyer-Seller Interaction

The main function of interactions between the buyer and seller is to communicate about, coordinate and adapt the activities and resources firms are allocating to and/or using in the relationship (Wynstra, Axelsson and van der Valk, 2006). The benefits of these interactions include that of more competitive product offerings, increased revenues, cost reduction, increased product quality and stronger long-term relationships (Metcalf, Frear and Krishnan, 1992; Hallen, Johanson and Seyed-Mohamed, 1991). At the core of this interaction is the exchange process that occurs between buyer and seller (Hallén, Johanson and Seyed-Mohamed, 1991). This exchange process has been identified as involving the exchange of products or services, finance, information and sociality (Håkansson, 1982). A direct result of these exchanges will be the feeling of mutual trust and co-operation between the buyer and seller. This in turn will lead to adaptations made by either firm in the elements exchanged or even the process of exchange itself (Metcalf, Frear and Krishnan, 1992). The atmosphere surrounding the interaction includes the other interaction elements of closeness/ cooperation and power/ dependence.

#### Adaptations / Innovation

Adaptations within the buyer-seller relationship refer to the mutual adjustments made by the buyer and seller to their existing products, processes and organization in order to comply with the needs of their partner (Hallen, Johanson and Seyed-Mohamed, 1991). As adaptations may involve modifications to products or services, and to the manufacturing process, as well as changes in the exchange process to suit the relationship requirements, adaptations can be recognized as part of the innovative activities of a firm. This is because since innovation is a result of the various interactions between buyer and seller, the related innovative activities would include the adaptation, adoption, improvement, or inducement of complementary and auxiliary support techniques made by buyer and seller that can lead to the introduction of a new or improved product, process, material, market or organization (Hobday, 2003; Todtling and Kaufmann, 1999; DeBresson et al., 1996; Eisenhardt and Tabrizi, 1995; Damanpour, Szabat and Evan, 1989; Nelson and Phelps, 1966).

#### Power/ dependence

The question of how much power one company has over another and of how much they are dependent or independent of each other (depending on how this is perceived) is also related to the issue of control (Wilson, 1995; Håkansson, 1982). A company may be said to have power to exert control over another as in a large buyer /customer to its suppliers. It may choose to be independent and adopt arms-length transactions in dealing with suppliers but may find this approach to be less competitive compared to the business relationship approach. A buyer-supplier relationship governed

by trust and commitment would reduce opportunism costs and reap benefits in lower transaction costs and increased competitiveness (Dyer and Chu, 2003; 2000). However, doing so would involve investments in resources and the sharing of activities. The relationship with the supplier has changed to one of inter-dependence and power as a coercive force is replaced by cooperation and collaboration. Similar arguments may be used to discuss the power of the supplier over the buyer where it has resources the other needs (Hallen, Johanson and Seyed-Mohamed, 1991).

#### Cooperation/ closeness

The feeling of closeness between two organizations (the buyer and seller) is achieved when they have reached the stage of successful long-term relationship involving close cooperation between them. The two firms may be enmeshed in the social networks of each other at the business level as well as at the personal level to the extent that the term 'intimacy' may be used to describe their social relationships (Nielson, 1998). A close relationship has the benefit of optimal sharing of process, joint product development and other forms of adaptations, sharing of technical information and other strategic collaborations and competitive advantages based on close and frequent interactions on the two businesses (Hallen, Johanson and Seyed-Mohamed, 1991; Hakansson, 1982).

#### Trust

Trust is now considered a classic factor for long-term relationships and effective governance and has been a subject of study linking it to innovation (Clegg, 2002; Hattori and Lapidus, 2004; Bouty, 2000; Ryssel, Ritter and Gemunden, 2004). For innovation to flourish it is very important that there is a free flow of knowledge. Information and social exchange is a means of binding together the competencies of the two parties in the dyadic relationship of the buyer and seller. In such a situation trust plays a pivotal role in successful collaboration as it is used to overcome opportunistic behavior. It is the extent to which one partner may depend on another to look after its business interests and studies have shown that trust is a vital element of a business relationship and the intensity of interactions (Morgan and Hunt, 1994; Joshi and Stump, 1999; Sako, 1992). The degree of trust will determine the extent to which organizations are willing and able to interact (Athaide, Meyers and Wilemon, 1996). Whenever, two parties enter into collaborative innovation, it usually means that the two parties are committed to each other, with the pay-off being shared benefits from adaptations and innovation (Eisenhardt and Tabrizi, 1995). Trust can be further differentiated into the dimensions of partner's honesty, benevolence trust and competence trust (Kumar, Scheer and Steenkamp, 1995).

#### Commitment

Commitment can be defined as the customer's durable intention to develop and sustain the relationship with the supplier in the long term (Anderson and Weitz, 1992; Dwyer, Schurr and Oh, 1987; Morgan and Hunt 1994). Committed customers will offer more value to their suppliers through their contribution to the ongoing relationship. Indirect functions such as collaborative innovation and product development are also

likely to be fulfilled when partners are committed (Walter and Ritter 2003). Customer commitment can be described along three dimensions of affective commitment, expectation of continuity and willingness to invest in the relationship (Kumar, Scheer and Steenkamp, 1995). An aspect of commitment is reputation in that a company may wish to be perceived as being persistent, consistent and reliable. Commitment in buyer-seller relationships involves “stability and sacrifice” and allows the coordination advantages of vertical relationships and the entrepreneurial advantages of separate ownership (Anderson and Weitz 1992). It is demonstrated by a willingness to dedicate specialized assets for a particular relationship, thus demonstrating that the buyer and seller can be relied upon for future support. Commitments involve pledges, credible commitments, idiosyncratic investments, and the dedicated allocation of resources, which become specific to a relationship (Anderson and Weitz, 1992).

### Exchange

The exchange process involves the exchange of products and services and of financial exchange, not unlike normal business transactions. There is also the exchange in information, which is technical and organizational in nature and considered sensitive or strategic. This is underlined by social exchanges between members or actors of the two buyer and seller firms (Hakansson, 1982). Social exchanges are viewed as interaction processes where the interactions are any set of observable behavior on the part of at least two persons who respond and are affected by each other as part of an adaptation process (Hallen, Johanson and Seyed-Mohamed, 1991). Information exchange may involve comparison of cost data and information about technical improvements where there is joint product development and an exchange in products and services (Metcalf, Frear and Krishnan, 1992). This of course leads to joint learning or ‘interactive learning’ as mentioned by Lundvall (1998) carried out in a trusting environment where information shared is treated as confidential. Sharing of information may be conducted in both a formal and informal environment. Casual exchanges may lead to new insights and more detailed discussions that can then lead to innovation (Orr, 1990).

The interactions and interdependencies between the above variables are indeed complex but thus far the common approach in studying these relationships is to build conceptual models and test it using parametric techniques. An exception has been the study by Wray, Palmer and Bejou (1994) where neural network analysis was used to study relationship quality. This paper proposes a method of evaluating the inter-relationships amongst the interaction elements by a pair-wise comparison approach to assign weights to the elements so as to present them in a higher order relationship.

### **The AHP pair-wise comparison approach for ranking of interaction variables**

This section evaluates the use of the pair-wise comparison approach adopted from the AHP for use in the assigning of weights to determinants of interaction already derived in the previous section. In the process, a hierarchy-structure like construct is designed to represent the relationship between the determinants power/dependence, closeness/

cooperation, trust, commitment and exchange to buyer-seller interaction.

Developed by Saaty (1980) as a decision-making technique, the AHP method has been applied to a wide-range of large-scale projects and current decision-making problems and issues. In business relationship research the AHP method has been applied towards supplier selection (Chan, 2003; Davies, 2001) and other similar decision-making studies. There has not been any published works using the AHP for the setting of weights to business relationship variables for the establishment of higher order relationships but there are evidence of its use in other fields such as the ranking of the dimensions for organisational innovation (Liu, 2005) and measuring a manufacturing system's performance (Yurdakul, 2002).

The application of the AHP recognizes the knowledge of experts by making use of their subjective judgments, which are transformed into quantitative data, by using the pair-wise comparison approach. The AHP can compare quantitative as well as qualitative information. The AHP utilizes pair-wise comparisons to establish factor weights for decision models, establish priorities for a decision choice by way of ranking the importance of these variables, and generate accurate statistics to confirm its decision analysis. It is a superior decision-making methodology because it requires all of the factors in the decision environment to be directly compared with all other factors, providing a more inclusive consideration of the interaction and value of each factor relative to all other factors (Saaty, 1994).

The steps to be carried out in the pair-wise comparison of the interaction variables (adapted from Schniederjans (2004)) are discussed below:

#### Step 1. Establishment of the hierarchy model for ranking of variables and dimensions

In this step a hierarchy of the constructs, based on the conceptual model developed in the previous section, is established to help visualize the variables and dimensions or factors that must be weighted or used in the research (see Figure 3 on next page). The idea of the decision hierarchy is to establish the relationships of the dimensions and sub-dimensions. At the top of the decision hierarchy is the consequence of the study which in this case is adaptations/ innovation. At the next level is interaction and below it are the interaction dimensions of commitment, cooperation/ closeness, trust, power/ dependence, and exchange. Commitment, trust and exchange have further sub-dimensions at the fourth level. The model hierarchy stops at the fourth level but could be extended to the actual measures of the dimensions and sub-dimensions.

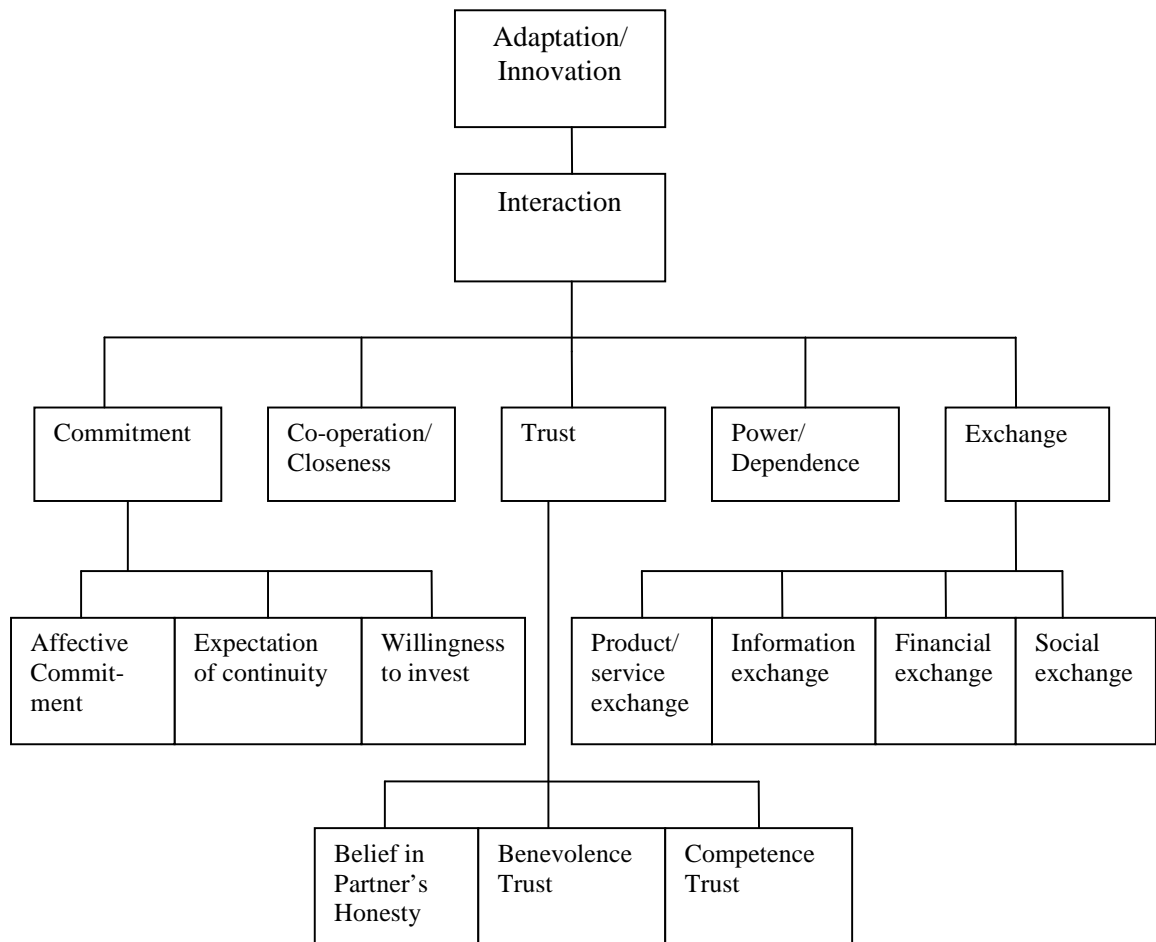


Figure 3. Hierarchy model for ranking of variables and dimensions of interaction

For the purpose of illustrating the pair-wise comparison approach for assigning weights to the factors, the paper will focus on the three sub-dimensions of trust namely belief in partner's honesty, benevolence trust and competence trust. The data set used here are all assumed randomly generated data.

Step 2. Establish the pair-wise comparisons of dimensions and sub-dimensions

In this step each factor or dimension/ sub-dimension is compared with all other factor or dimension/ sub-dimension, one factor/ dimension/ sub-dimension at a time. This is where the term pair-wise comparison comes from. The rating measure scale used for these comparisons forces the decision maker or expert to choose the most desirable alternative and rate the other alternatives on a range from "equally important" to the most desirable alternative of "absolute importance" as it relates to each of the factors. This same scale will be used for making comparisons between alternatives and uses a 1 to 9 rating system based on Saaty's (1980) original work as follows:

1. Equally important;

2. Equally to weakly more important;
3. Weakly more important;
4. Weakly to strongly more important;
5. Strongly more important;
6. Strongly to very strongly more important;
7. Very strongly more important;
8. Very strongly more important to Absolute more important; and
9. Absolute importance.

Based on the scale, a pair-wise comparison questionnaire could be designed as in table 2.1 below consisting of 18 scale columns; 9 scale columns to the left favouring the trust sub-dimension in column 1 and 9 scale columns to the right favouring the sub-dimension in column 2. The expert is asked to compare the trust sub-dimension in Column 1 against the sub-dimension in column 2 row by row. Table 2.1 illustrates the expert's decision when comparing the three trust sub-dimensions of 'Belief in partner's honesty', 'Benevolence trust' and 'Competence trust'. For example, for the first row decision, the expert decided that 'Benevolence trust' is weakly more important (number 3 on the scale above) when compared to 'Belief in partner's honesty' and subsequently ticks the 3rd scale column to the right of centre.

Table 2.1. Pair-wise comparison questionnaire for comparing trust dimensions.

<b>Column 1</b>	Absolute		Very Strong		Strong		Weak		Equal		Weak		Strong		Very Strong		Absolute		<b>Column 2</b>		
Belief in partner's honesty													/							Benevolence trust	
Belief in partner's honesty																		/			Competence trust
Benevolence trust																/					Competence trust

To begin explaining the computations for the assigning of weights to the three trust sub-dimensions of 'Belief in partner's honesty', 'Benevolence trust' and 'Competence trust', an initial matrix comparison table as in Table 2.2 could be used to show the factors that are being considered (rows) and the alternative comparisons needed (columns). Bearing in mind that the comparisons are to be made using the Saaty 1 to-9 scale, where the sub-dimensions are compared with each other, we begin with the easy comparison of each sub-dimension being compared with itself. They would all of course register a value of 1 for being equally important. These values can be entered into the comparison table to create a diagonal line that divides the upper and lower portions of the table as presented in Table 2.2.

Table 2.2. Diagonal comparisons Step 2 pair-wise table for comparison of trust dimensions.

Trust	Belief in Partner's Honesty	Benevolence Trust	Competence Trust
Belief in Partner's Honesty	1		
Benevolence Trust		1	
Competence Trust			1

Referencing the set of assumed random data filled out in table 2.1, the next step is to make comparisons between differing trust sub-dimensions. These values will go in the upper right portion of the comparison table. First, 'Belief in partner's honesty' is compared with 'Benevolence trust'. What is being rated is 'Benevolence trust', with respect or relative to 'Belief in partner's honesty'. As seen from table 2.1 the decision maker or expert thinks 'Benevolence trust' is a little more important than 'Belief in partner's honesty' and assigns a rating of "3" or "weakly more important" rating. When placing the rating values in the table (see table 2.3), always start with the row, then column for the comparison. So, the rating of "3" goes in the 'Belief in partner's honesty' row, and the 'Benevolence trust' column. Second, the expert compared 'Belief in partner's honesty' with 'Competence trust'. 'Competence trust' is given a rating of "9" or "absolute importance" compared to 'Belief in partner's honesty'. So, the rating of "9" goes in the 'Belief in partner's honesty' row, and the 'Competence trust' column as presented in table 2.3. Lastly, the expert thinks the 'Competence trust' rating is somewhere between the previous two ratings of "3" and "9" when comparing it to 'Benevolence trust'. So the rating given is a "6" or "Strongly to very strongly more important" and the rating of "6" goes in the 'Benevolence trust' row, and the 'Competence trust' column as presented in table 2.3.

Table 2.3. Between comparisons AHP Step 2 pair-wise table for comparison of trust dimensions.

Trust	Belief in Partner's Honesty	Benevolence Trust	Competence Trust
Belief in Partner's Honesty	1	3	9
Benevolence Trust		1	6
Competence Trust			1

To finish off Step 2, pair-wise comparison, are made to determine the rating in the lower portion of Table 2.3. The inverse rule is applied which simply means that the inverse of the related upper proportion values can be used for the related ratings of the lower values in the table. The complete table showing all pair-wise comparison values for the “trust” antecedent is presented in Table 2.4.

Table 2.4. Complete comparisons AHP Step 2 pair-wise table for comparison of trust dimensions.

Trust	Belief in Partner's Honesty	Benevolence Trust	Competence Trust
Belief in Partner's Honesty	1	3	9
Benevolence Trust	1/3	1	6
Competence Trust	1/9	1/6	1

### Step 3. Compute the trust sub-dimensions priorities

In this step the researcher uses the previously determined comparison ratings to compute a set of priorities for the individual trust sub-dimensions. This involves several small computation sub-steps. The completed comparison ratings for the trust antecedent sub-dimensions from Step 2 are converted into decimal form as presented in Table 2.5. The greater the number of places behind the decimal point, the greater will be the precision of the resulting values. At least 4 places should be used and the last value should be rounded up for values of 5 or more. The decimal values in each column are then summed up.

Table 2.5. Step 3 decimals and summation of all pair-wise comparison values

Trust	Belief in Partner's Honesty	Benevolence Trust	Competence Trust
Belief in Partner's Honesty	1.0000	3.0000	9.0000
Benevolence Trust	0.3333	1.0000	6.0000
Competence Trust	0.1111	0.1667	1
ColumnTotal	<b>1.4444</b>	<b>4.1667</b>	<b>16.0000</b>

The summed values from Table 2.5 are then divided back into the column values from which they came. The resulting ratios are the darkened values of this sub-step and are shown in Table 2.6.

Table 2.6. Step 3 ratios of column total pair-wise comparison tabled values.

Trust	Belief in Partner's Honesty	Benevolence Trust	Competence Trust
Belief in Partner's Honesty	1.0000/ 1.4444 = <b>0.6923</b>	3.0000/ 4.1667 = <b>0.7200</b>	9.0000/ 16.0000 = <b>0.5625</b>
Benevolence Trust	0.3333/ 1.4444 = <b>0.2308</b>	1.0000/ 4.1667 = <b>0.2400</b>	6.0000/ 16.0000 = <b>0.3750</b>
Competence Trust	0.1111/ 1.4444 = <b>0.0769</b>	0.1667/ 4.1667 = <b>0.0400</b>	1.0000/ 16.0000 = <b>0.0625</b>
Column Total	1.0000	1.0000	1.0000

In the final sub-step of Step 3 the priorities for each alternative is determined. This is accomplished by averaging the darkened ratio values in each row of Table 2.6.

Table 2.7. Step 3 Final substep pair-wise comparison priority calculations.

Trust	Priority Calculations	Resulting Priorities
Belief in Partner's Honesty	$( 0.6923 + 0.7200 + 0.5625 ) / 3 =$	<b>0.6583</b>
Benevolence Trust	$( 0.2308 + 0.2400 + 0.3750 ) / 3 =$	<b>0.2819</b>
Competence Trust	$(0.0769 + 0.0400 + 0.0625 ) / 3 =$	<b>0.0598</b>
Total		1.0000

Based on the factor priorities computed in Table 2.7 it is possible to rank the selection of the three trust dimensions. In this example of ranking the trust dimensions and using assumed weights, Belief in Partner's Honesty is first with a weight of 0.6583, Benevolence Trust is second with a weight of 0.2819, and Competence Trust third with a weight of 0.0598. In short, the larger the weighting, the higher the priority ranking is the trust dimension.

#### Step 4. Determine consistency ratios:

The pair-wise comparison approach based on the AHP method does more than produce weights for the ranking of determinants; it includes some additional analysis which permits researchers to investigate if the subjective ratings are consistent enough to justify using the results. In other words, AHP checks itself for internal reliability to make sure the ratings consistently make sense for the researcher to rely on the AHP analysis for ranking of factors. There are a number of sub-steps to generate the consistency ratios, the full statistical steps of which space do not allow to be shown here. However, for the sake of discussion the computed consistency ratio (CR) for the trust dimensions (using the assumed random data) came out to 0.0519.

The interpretation is that for values of  $CR > 0.10$  there exists sufficient inconsistency that a re-evaluation of the basic factors and alternatives (that is Step 2, and all the subsequent computations in the remaining steps) should be undertaken. Simply put, there is too much inconsistency to use the AHP method and new, more carefully made comparisons are needed before a decision should be made. For values of CR less than or equal to 0.10 the decision maker's ratings are relatively consistent and the AHP method can be used for making a decision. As can be seen in the CR of 0.0519, there is not a sufficient amount of inconsistency to challenge the existing solution or bother going to obtain additional ratings.

### **Discussion and Further Research**

The relative importance of the different trust dimensions developed highlights the strength of the pair-wise comparison ranking approach. The approach is further facilitated by the availability of user friendly software such as Expert Choice. In the theoretical framework presented in this paper it is shown that the approach can hypothetically be used to identify the ranking or weight of each component of the trust dimension and by extension the interaction determinants as well, namely trust, commitment, power/dependence, closeness/ cooperation and exchange. Thus, in the study relating to the consequence of adaptations/ innovation, it is possible to determine the relative importance and ranking of these antecedents towards successful adaptations/ innovation within the buyer-seller relationship dyad. The pair-wise comparison approach which is based on the AHP method also comes with the computation of consistency ratios which acts as the reliability check for the approach. Internal validity of research is also ascertained since the pair-wise comparison data is based on the opinion of experts. Based on the strength of these arguments it could be concluded that the pair-wise comparison approach provides for another avenue or dimension for testing the robustness of the conceptual model presented in this paper through its assumption of free distribution of weights amongst the antecedents. As this conceptual model is based on the IMP Interaction model, the implication is that the pair-wise comparison approach could also be used as an additional option for testing the robustness of the IMP model.

The pair-wise comparison approach could prove to be a useful tool in business relationship research. By assigning weights to the dimensions, sub-dimensions and even at the measures level, it is possible to rank the multiple variables of a complex conceptual framework. The analysis and findings is not just limited to relationship statistics and strength of the determinant factors but can also be used to arrange the factors in order of importance to the consequence of study be it innovation or performance value or others. The significance of the factors being studied is not just in the strength of relationship but also in its order of ranking. New variables when introduced could be compared to existing variables either on a cross-sectional or longitudinal study to observe changes in factor importance over time. If weights were to be assigned to the lowest level of the hierarchy i.e. to the measures of factors/ dimensions, by computing the product of the measure weights to the factor weights, a comparison could even be done with all other measures including with the measures of other factors.

As most of the determinants of buyer-seller interaction like trust, social exchange, cooperation and closeness are culture related, the rankings would provide an opportunity for researchers to carry out investigations across countries, cultures, industry sectors and even across networks. For instance, the pair-wise comparison framework can be used as a tool for comparing the relative importance placed on the different determinants arising from inter-cultural differences (Schoder and Haenlein, 2004). As the rankings lend itself to survey type research, the results could be generalized to the industry or country. Of course, the number of experts to use for the subjective opinions of factor weights have to be carefully considered. Liu (2005) in his study on organizational innovation used the expert opinion of only ten people who are academics and practitioners. What needs to be done now is to operationalize the hierarchy framework by conducting an empirical study supported by the pair-wise comparison approach.

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