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4 **THE DETERMINANTS OF SUPPLY CHAIN ALLIANCE PERFORMANCE:**
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7 **AN EMPIRICAL STUDY**
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THE DETERMINANTS OF SUPPLY CHAIN ALLIANCE PERFORMANCE: AN EMPIRICAL STUDY

This paper assesses relationship characteristics in supply chain alliances and their effects on alliance performance in supply chain in the context of manufacturing firms drawing on the theory of social exchange and goal interdependence. The results from AVAS analysis show that relationship stability, trust of supplier, relational capital and commitment exert significant effects on the performance of supply chain alliances. These results offer implications for researchers examining the performance of supply chain alliances. Research limitation and future research are discussed.

Key words: AVAS, supply chain, alliances, performance.

1. Introduction

With the growing importance of supply chain management, management scholars are paying paramount attention to buyer-supplier relationship. Managing interorganizational relationships to create closer linkages and greater cooperation is generally regarded as providing significant potential for corporate success (Landeros and Monczka, 1989). A strong buyer-supplier relationship requires a stable relationship in order to realize long-term benefits. Firms that form strong relationships with suppliers can better align their interests and goals with those of their suppliers (Lamming and Hampson, 1996). The suppliers and buyers along the supply chain heavily rely on cooperation to survive in intensive competitive environment characterized by rapid product obsolescence and evolving customer needs. These firms pursue growth mainly through effective cooperation and working jointly with their partners, which in turn results in more new product offerings,

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3 enhanced new skills, and dissuaded competition (Varadarajan and Cunningham, 1995).
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5 However, these firms still face problems in achieving their growth. First, evolving market
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7 needs make products obsolete quickly, firms face more intensive competition than ever
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9 before. Second, imbalanced information and lack of resources have been one of the
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11 reasons causing the ineffectiveness of supply chain relationship. “Looseness” has been
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13 used to describe the problems these firms face (Luo, 2005). Several studies have
14
15 suggested that cooperative alliance is a potential strategy to offset this looseness for the
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17 improvement of supply chain relationship because it requires a reasonably open exchange
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19 of information to maintain the relationship and promote success for both sides of the
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21 exchange dyad (Mentzer, Min, and Zacharia, 2000; Weitz and Jap, 1995). Empirical
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23 studies have found that alliances allow firms to share financial risk, improve service
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25 quality, increase productivity, and reduce costs (e.g., Moore, 1998).
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34 **2. Theoretical Background of the Study**

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36 The cooperative alliances formation between suppliers and buyers can be explained
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38 by two broad streams of explanations. The first suggests that the partner firms along
39
40 supply chain form strategic cooperative alliances to acquire needed resources, learn new
41
42 technical skills, and share information (Varadarajan and Cunningham, 1995; Eisenhardt
43
44 and Schoonhoven, 1996). Informed by social exchange theory, this explanation indicates
45
46 that social relations are formed and maintained because the partner firms offer reciprocal
47
48 benefits to one another over time (Gouldner, 1960). If they did not, the relations would
49
50 cease to exist (Lawler, Thye, and Yoon, 2000). Recently, researchers have emphasized
51
52 the role of social capital obtained through social network and organizational linkage (e.g.,
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3 Eisenhardt and Schoonhoven, 1996). In cooperative alliances, the partner firms are
4 closely integrated through voluntary, informal, and reciprocal bonds and resource is
5 exchanged (Das and Teng, 2000). The second explanation is drawn on goal
6 interdependence theory. According to Deutsch (1949), people's beliefs about how their
7 goals are related determine the way in which they interact, which in turn affects their
8 performance and group cohesiveness. In particular, when a situation is structured
9 cooperatively, there are positive correlations among team members' rewards.
10 Cooperative alliances between suppliers and buyers along supply chain allow the partner
11 firms to create perceptions of shared fate and promote supportive behavior, whereby each
12 partner looks out for the interests of the others. A successful alliance has a long-term
13 orientation requiring trust, loyalty, and a sharing of information, risks, and rewards
14 (Ellram and Cooper, 1990). These partners share past experiences and insights so that all
15 can benefit from others' experiences, which greatly improve the effectiveness of the
16 supply chain.
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36 Based on the theory of social exchange and goal interdependence theory, and
37 Venkatraman and Tanriverdi's (Venkatraman & Tanriverdi, 2004) four managing
38 processes for information and knowledge, namely creation, transfer, leverage, and
39 integration, I identify five characteristics of the relationship between supply chain
40 partners that facilitate the improvement of supply chain alliance performance: (i)
41 relationship stability, (ii) trust of suppliers, (iii) effective communication, (iv) relational
42 capital, and (v) relational commitment.
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53 Relationship stability plays a very significant role in the overall productivity of an
54 organization. Stability demonstrates consistency, steadiness, and effectiveness.
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3 Relationship stability in alliance is strongly related to short-term productivity
4 improvements and attaining long-term competitive advantage in the market place (Stuart,
5 1997). The ability of a business to improve its supply chain performance can be affected
6 by the quality of relationships formed with partners and suppliers (Hsu, 2005). A stable
7 collaboration alliance gives companies the advantage of betting out competitors in this
8 information and globalization world companies are based upon (Dyer and Singh, 1998).
9 Relationship stability is important in an alliance because when accomplished both
10 organization can concentrate on their core business and having the extra opportunities to
11 venture out into other markets (Anslinger, 2004). Statistic points out that the highest
12 reason alliances fail over time is because of shifts in one of the alliances strategic
13 directions. Trust of supplier has become the groundwork of a business transaction. The
14 presence of trust creates a better work environment for each side because it can reduce
15 the specification and monitoring of contracts, provide material incentives for cooperation,
16 and reduce uncertainty (Fynes and Voss, 2002). Trust among managers of different
17 organizations increase productivity because they can spend less time monitoring each
18 other and criticising one another, allowing them more time to work on a common goal
19 (Landry, 1998). An organization that trusts its supplier is more committed to and intends
20 to stay in the relationship (Anderson and Weitz, 1989; Morgan and Hunt, 1994).
21 Information sharing and trust with suppliers exert a direct positive effect on supply chain
22 proximity (Narasimhan and Nair, 2005). Both relationship stability and trust of supplier
23 are related to the creation process of information and knowledge of firms.

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Effective communication with suppliers is defined as the effectiveness of information sharing between a focal firm and its suppliers for coordination of business activities in a

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3 BSR (Sanders & Premus, 2005). Effective communication can help to enrich the
4
5 knowledge resources of a firm, by extending its access to information and knowledge of
6
7 its partner firms; it is related to the transfer process of information and knowledge.
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10 Relationship-centered organizations recognize the importance of maintaining strong
11
12 and enduring ties with key suppliers as markets become more dynamic and demanding.
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14 Relational capital can be defined as the value of a firm's network of relationships with its
15
16 customers, suppliers, alliance partners, and internal sub-units (Gulati and Kletter, 2005).
17
18 Relational capital involves the organization's relationships with its network of customers
19
20 as well as its network of strategic partners and stakeholders. Previous studies suggested
21
22 that relational capital creates a basis for learning and know-how transfer between partners
23
24 (Kale, Singh, and Perlmutter, 2000). Companies in today's world are treating a
25
26 company's network of relationships as assets. They focus their energy on a trust-based,
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28 mutually beneficial, and enduring relationship with internal and external constituencies.
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30 Relationship commitment is defined as "an exchange partner believing that an ongoing
31
32 relationship with another is so important as to warrant maximum efforts at maintaining it;
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34 that is, the committed party believes the relationship is worth working on to ensure that it
35
36 endures indefinitely" (Morgan and Hunt, 1994). Relational commitment in alliances
37
38 brings about mutual respect for buyers and suppliers and drives out the need for
39
40 competition from rivalries. Relational capital and commitment not only leverage but also
41
42 integrate the knowledge for supply chain alliances.
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50 Prior studies have fostered the understanding of cooperative alliances between
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52 suppliers and buyers. However, several research gaps remain. First, prior research on
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54 supply chain alliance has focused mainly on the effectiveness of alliances (Whipple,
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3 Frankel, and Daugherty, 2002). Relationship characteristics in supply chain alliances
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5 have received limited attention.
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8 Second, a majority of prior studies have focused their attention on alliances in general
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10 business relationships with only a few showed their interests in logistics industry. It has
11
12 become a common practice among partner firms that logistics service providers were
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14 used to handle all or part of a firm's logistics activities (Daugherty, Stank, and Rogers,
15
16 1996; Lai, 2004). These logistics firms become crucial in economic growth. Yet, little
17
18 research has assessed the driving forces which lead to the relationship improvement
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20 between suppliers and buyers in supply chain alliances.
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24 Third, little prior research has linked the relationship characteristics in supply chain
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26 alliances with alliances performance. Relationship characteristics in alliances are thought
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28 to influence performance because they provide opportunities for learning, acquiring,
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30 sharing, and innovating over time (Krogh, Nonaka, and Aben, 2001; Madhavan and
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32 Grover, 1998). Given the potential attractiveness of cooperative alliances to the suppliers
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34 and buyers, it is important to examine the link between relationship characteristics in
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36 supply chain alliances and alliance performance. This study contributes to the literature
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38 by examining the above gaps.
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46 **3. Research Method**

47 **3.1. Sample and Data Collection**

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49 Data were collected in Shanghai by means of a questionnaire sent to top 500
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51 manufacturing firms. In this study, the CEO/general manager and senior manager of the
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53 firms is the key informant (Kumar, Stern, & Anderson, 1993). The key informant
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approach has been widely used in empirical studies (e.g., Morgan & Hunt, 1994; Sen & Egelhoff, 2000; Stump & Heide, 1996) because of the key informants' knowledge of the firm, access to strategic information, and familiarity with the environment of the firms (Aguilar, 1967). A limited pilot study was undertaken to ensure that respondents had no difficulties in completing the questionnaire (Greenley, 1995). They were mailed a questionnaire and a letter explaining the purpose of this study and offered the research results if respondents returned the completed questionnaire. Table 1 shows the profile of the respondent firms. The firms surveyed cross different industries including electronics, mechanical engineering, telecommunication, chemicals, pharmaceuticals, construction, automobile manufacturing, new materials and energy, and others.

TABLE 1 Profile of the Respondent Firms

<i>Sample Firm Characteristics</i>	<i>Percentage</i>
<i>Number of employees</i>	
1-400	42.3%
401-800	10.2%
801-1200	6.6%
1201-1600	5.1%
1601-2000	4.4%
2001 or above	24.1%
Unknown	7.3%
<i>Industries</i>	
Chemicals	10.7%
Electronics	6.3%
Telecommunication	8.2%
Mechanical Engineering	28.4%
Pharmaceuticals	21.7%
Construction	12.1%
Automobile manufacturing	6.5%
New materials & energy	3.4%
Others (e.g., Textile, etc.)	2.7%

Follow-up phone calls were made to all potential respondents who had not returned the surveys after four weeks. A comparison of the early-responding firms with the late-

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3 responding firms showed that these groups did not differ in terms of number of
4 employees, sales revenue, and years in business in this study. As a result, 137 usable
5 questionnaires were returned, yielding an effective response rate of 27%. This response
6 rate is similar to those obtained by others who have surveyed top management (e.g.,
7 Geletkanyez, 1997).
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14 3.2. Measures

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17 All scales used a seven-point scoring format ranging from “Strongly Disagree” to
18 “Strongly Agree,” unless otherwise mentioned. Some items were adapted and re-worded
19 to fit the present context. The measures in this study were drawn on several sources.
20 Relationship stability in supply chain alliance was adopted from Johnson, Sohi, and
21 Grewal (2004). Trust of supplier was measured by six items adapted from Doney and
22 Cannon (1997). For effective communication, the measure developed by Humphreys, Li,
23 and Chan (2004) was used reflecting the degree of communication with the firm’s
24 supplier on product information, specification and quality requirement, and feedbacks at
25 timely and frequently manner. For relational capital, the measure was adapted from Kale,
26 Singh, and Perlmutter (2000). For relational commitment, the measure was drawn from
27 Anderson and Weitz (1992) and Morgan and Hunt (1994). Alliance performance in
28 supply chain was measured by four items adopted from Emden, Yaprak, and Cavusgil
29 (2005). Innovation capability and cost efficiency are two control variables controlling for
30 the supply chain capability to harness organizational intelligence to increase innovation
31 and cost efficiency. Innovation capability was measured by four items developed by
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Calantone, Cavusgil, and Zhao (2002) and cost efficiency by Swink, Narasimhan, and Kim (2005).

In Table 2, I present the correlation matrix of all measures and their reliability coefficients. Cronbach's coefficient alpha (α) is a widely used measure of scale reliability (Cronbach, 1951). All of the scales are specified as having acceptable reliability.

Table 2: Correlation Matrix for Measurements

	Stability	Trust	Communi	Capital	Commit	Innovation	Cost	Perf
Stability	<i>0.87</i>							
Trust	0.28**	<i>0.94</i>						
Communi	0.28**	0.69**	<i>0.91</i>					
Capital	0.40**	0.77**	0.72**	<i>0.95</i>				
Commit	0.23**	0.56**	0.50**	0.58**	<i>0.68</i>			
Innovation	0.26**	0.64**	0.68**	0.63**	0.59**	<i>0.87</i>		
Cost	0.01	-0.02	-0.01	-0.09	0.02	0.1	<i>0.88</i>	
Perf	0.27**	0.29**	0.27**	0.25**	0.03	0.26**	-0.05	<i>0.68</i>

Notes: The coefficient alpha for each measure is on the diagonal (and in italics).

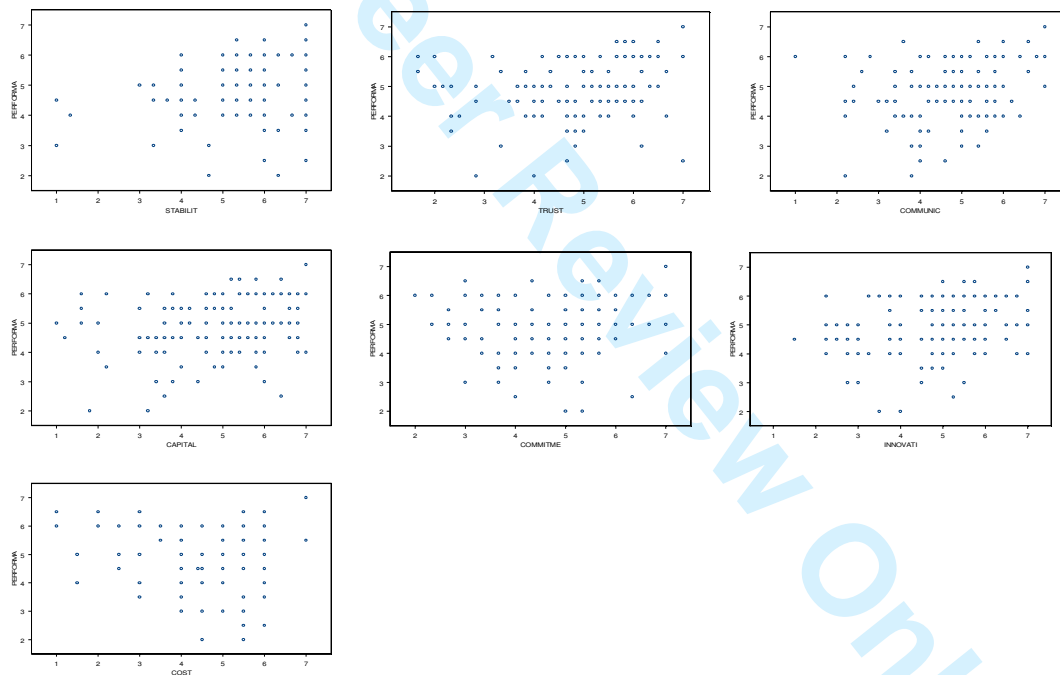
** Correlation is significant at the 0.01 level (2-tailed).

4. Data Analysis

To model the relationship between alliance performance (*PERFORMANCE*), relationship stability in supply chain alliance (*STABILITY*), trust of supplier (*TRUST*), effective communication (*COMMUNICATION*), relational capital (*CAPITAL*), and relational commitment (*COMMITMENT*). I regressed *PERFORMANCE* against *STABILITY*, *TRUST*, *COMMUNICATION*, *CAPITAL*, and *COMMITMENT* using Ordinary Least Square (OLS) regression. Two control variables, innovation capability (*INNOVATION*) and cost efficiency (*COST*), were included in the regression model to reflect the impact of the characteristics of supply chain alliance on alliance efficiency.

The R^2 of the regression model is only 0.3694 and all independent variables except for *COMMUNICATION* and *INNOVATION* are insignificant at the 5% significance level. Furthermore, the plots of independent against the dependent variables (see Figure 1) cannot identify any suitable transformation for independent variables. The plots in Figure 1 also show that the relationships between dependent variable and independent variables are nonlinear.

Figure 1: Scatterplots of Dependent Variables against Independent Variables



One way to solve non-linear problems is to use *additive models* that replace the linear function by a non-linear function as follows:

$$y = \mu + \sum_{j=1}^N f_j(X_j) + \varepsilon \quad (1)$$

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3 A popularly used tool to find non-linear function f_j is the Alternating
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6 Conditional Expectation (ACE) algorithm developed by Breiman and Friedman (1985).
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9 ACE is a nonparametric tool using scatterplot smoothers in an iterative fashion to find the
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11 maximally correlated transformation of variables. Additionally, this algorithm allows one
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13 to transform the response variable y at the same time. Thus the relationship between the
14
15 dependent and independent variables are as follows:
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$$\theta(y) = \mu + \sum_{j=1}^N f_j(X_j) + \varepsilon \quad (2)$$

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23 Breiman and Friedman (1985), De Veaux and Steele (1989), De Veaux (1990)
24
25 and Sum et al. 1995) have demonstrated how ACE can be used to identify proper
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27 transformations needed for both dependent and independent variables. Although ACE is a
28
29 useful exploratory tool for determining which of the response and the predictor variables
30
31 are in need of non-linear transformation and what type of transformation is needed,
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33 Tibshirani (1988) argued that “it seems more suited for correlation analysis than
34
35 regression.” This is because there is no guarantee that the errors in the ACE transformed
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37 model will be normally distributed with constant variance. Tibshirani (1988) provided
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39 good examples of this phenomenon. Therefore, I will not apply ACE in this study to
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41 avoid the unreliability.
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47 Additivity and Variance Stabilizing Transformation (AVAS) algorithm proposed
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49 by Tibshirani (1988) is similar to ACE in the sense that it tries to find transformations,
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51 $\theta(y)$ and $f_j(x_j)$ to satisfy equation (2). However, AVAS differs from ACE in that it
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53 chooses $\theta(y)$ to achieve a special variance stabilizing feature --a balance between
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55 constant variance and maximal linear dependence. So AVAS is more suitable to find
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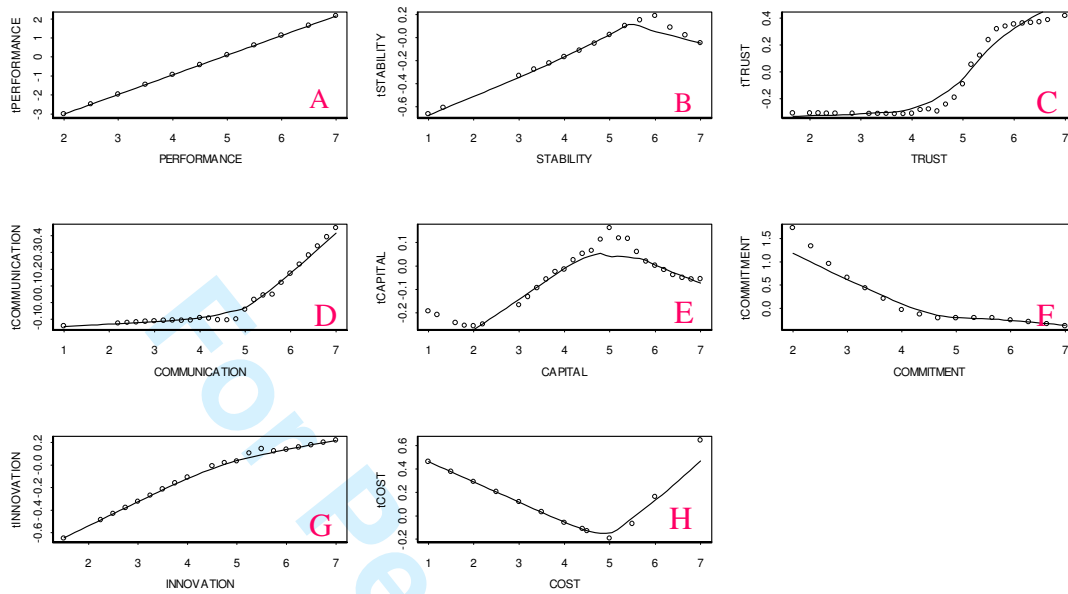
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3 transformation for regression rather than correlation. It can alleviate many anomalies that
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5 ACE suffers with regression (see examples in Tibshirani, 1988). Venables and Ripley
6
7 (1999) also reported AVAS to be more reliable than ACE.
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10 11 12 **AVAS Modeling**

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14 The AVAS function in S-Plus™ (Mathsoft, 1999) was used in this study to develop the
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16 AVAS model. This function presents transformations in graphical form, not in analytical
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18 functions. However, the plots may still provide us with valuable information. For
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20 example, the plots can show the simple exploratory relationship between independent
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22 variable and dependent variables.
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27 S-Plus AVAS function gives out the transformed values automatically according
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29 to its AVAS algorithm. Figure 2 shows plots of original value (on x-axis) and
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31 transformed values (on y-axis) of both dependent variable (*PERFORMANCE*) and
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33 independent & control variables (*STABILITY*, *TRUST*, *COMMUNICATION*, *CAPITAL*,
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35 *COMMITMENT*, *INNOVATION*, and *COST*). The transformed values are denoted as
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37 *tPERFORMANCE*, *tSTABILITY*, *tTRUST*, *tCOMMUNICATION*, *tCAPITAL*,
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39 *tCOMMITMENT*, *tINNOVATION*, and *tCOST* respectively.
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45 **Figure 2: Plots of the original data against AVAS-transformed data**
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Note: Solid lines in each plot are Loess (Local Regression) smoothing curves. These lines indicate the generalized relationship of the original data to AVAS-transformed data.

In order to further investigate the relationship between these variables, I performed regression analysis on transformed variables $tPERFORMANCE$ against $tSTABILITY$, $tTRUST$, $tCOMMUNICATION$, $tCAPITAL$, $tCOMMITMENT$, $tINNOVATION$, and $tCOST$. The result of the analysis is shown in Table 3.

Table 3: Regression with AVAS transformed data (I)

Dependent Variable: $tPERFORMANCE$				
	Coefficient	Std. Error	t value	Pr(> t)
(Intercept)	0.0000	0.0699	0.0000	1.0000
$tSTABILITY$	1.0352	0.4502	2.2992	0.0231
$tTRUST$	1.0774	0.3181	303867	0.0009
$tCOMMUNICATION$	1.0939	0.6368	107179	0.0882
$tCAPITAL$	1.7631	0.7688	2.2932	0.0235
$tCOMMITMENT$	1.0717	0.2147	4.9921	0.0000
$tINNOVATION$	0.7294	0.5236	1.3929	0.1660
$tCOST$	1.2540	0.4342	2.8878	0.0046
Multiple R ² : 0.3694. P-value: 1.154e-010				

From the parameters shown in Table 3, following regression function can be constructed:

$$\begin{aligned}
 tPERFORMANCE = & 1.04tSTABILITY + 1.08tTRUST + 1.09tCOMMUNICATION + 1.76tCAPITAL \\
 & \quad \quad \quad (p=0.02) \quad \quad \quad (p=0.00) \quad \quad \quad (p=0.09) \quad \quad \quad (p=0.02) \\
 & + 1.07tCOMMITMENT + 0.73tINNOVATION + 1.25tCOST \\
 & \quad \quad \quad (p=0.00) \quad \quad \quad (p=0.17) \quad \quad \quad (p=0.00)
 \end{aligned} \tag{3}$$

The $R^2=0.37$. That is, 37% of the total variations in $tPERFORMANCE$ can be explained by the seven independent and control variables using this regression function. From Table 3, we can also see that $tCOMMUNICATION$ and $tINNOVATION$ are not significant at 5% significance level.

To include the significant variables only, I used backward deletion selection criteria to re-select variables that are significant at 5% level.

Table 4: Regression with the AVAS transformed data (II)

Dependent Variable: $tPERFORMANCE$				
	Coefficient	Std. Error	t Value	Pr(> t)
(Intercept)	0.0000	0.0714	0.0000	1.0000
$tSTABILITY$	1.0731	0.4591	2.3375	0.0209
$tTRUST$	1.4761	0.2882	5.1222	0.0000
$tCAPITAL$	1.8568	0.7731	2.4017	0.0177
$tCOMMITMENT$	0.9161	0.2048	4.4721	0.0000
$tCOST$	1.2790	0.4432	2.8859	0.0046
$R^2 = 0.3325$; P-value: 2.608e-010				

The result in Table 4 shows that $tSTABILITY$, $tTRUST$, $tCAPITAL$, $tCOMMITMENT$, and $tCOST$ are significant. The regression function with an R^2 of 0.33 is:

$$\begin{aligned}
 tPERFORMANCE^* = & 1.07tSTABILITY + 1.48tTRUST + 1.86tCAPITAL \\
 & \quad \quad \quad (p=0.02) \quad \quad \quad (p=0.00) \quad \quad \quad (p=0.02) \\
 & + 0.92tCOMMITMENT + 1.28tCOST \\
 & \quad \quad \quad (p=0.00) \quad \quad \quad (p=0.00)
 \end{aligned} \tag{4}$$

From Plot A in Figure 2, we can see that original alliance performance-- $tPERFORMANCE$ has a positive and linear relationship with transformed alliance performance -- $tPERFORMANCE$. Moreover, from equations (3) and (4), we can see that transformed independent variables ($tSTABILITY$, $tTRUST$, $tCAPITAL$, $tCOMMITMENT$, $tCOST$) have positive and linear relationship with transformed financial performance ($tFinance$). Hence, these transformed independent variables have positive and linear relationship with original $performance$. So we can simply regard y-axis in Figure 2 as

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3 original *performance*. Therefore, Plots B to H in Figure 2 actually depict the relationship
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6 between independent variables and dependent variable (*PERFORMANCE*) respectively.
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10 11 **5. Conclusion and Future Research**

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13 In this study, I investigated the impacts of relationship characteristics and alliance
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15 performance in supply chain. Through application of AVAS, I modeled the relationship
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17 between alliance performance and relationship stability, trust of supplier, effective
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19 communication, relational capital and commitment. Based on the results of the analyses, I
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21 found that several factors have a significant impact on alliance performance. These
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23 factors and their impacts on alliance performance are summarized below:
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26
27 (1) Relationship stability has a significant impact on alliance performance in
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29 supply chain. However, when relationship stability increases to a certain point, the
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31 performance starts to decrease with a relatively small slope.
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35 (2) The degree of trust of supplier in supply chain alliance significantly influences
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37 alliance performance. There exists a S-shaped relationship between the trust of supplier
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39 and alliance performance. When the level of trust of supplier is low, alliance performance
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41 increases at a low rate. When the level of trust reaches the middle point, performance
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43 increases quickly.
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47 (3) There is an inversed-U relationship between relational capital and alliance
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49 performance in supply chain. The moderate level of relational capital achieves the highest
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51 alliance performance.
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4 (4) At the beginning, the alliance performance goes down sharply when the level
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6 of relational commitment increases. But performance decreases at a much slower rate
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8 when the level of commitment is high.
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11 This study contributes to literature in logistics and operations management in
12
13 several ways. First, this study identified relationships between different characteristics of
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15 relationship and alliance performance. They are important issues which help us better
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17 understand the different factors affecting the performance of supply chain alliance
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19 including relationship stability, trust of supplier, effective communication, relational
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21 capital and commitment. On the other hand, the social exchange theory has been applied
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23 extensively to the logistics and operations management research to examine buyer-
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25 supplier relationships and performance in supply chain alliances. Furthermore, the results
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27 of this study shed light on the importance of managing relationship in supply chain
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29 alliances in terms of ensuring relationship stability, trust of supplier, relational
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31 commitment, and relationship stability.
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37 There seem to be several areas in need of further research. Although the results of this
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39 study identified non-linear relationship between relationship characteristics and alliance
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41 performance, the link between performance and effective communication appears
42
43 insignificant. In this regard, it would be useful to examine another dimension of supply
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45 chain alliance, such as learning performance in supply alliance, which has been regarded
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47 as a primary source of organizational renewal (Dougherty, 1992).
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51 Second, from the viewpoint of methodology, AVAS analysis was performed in
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53 this study. With this method, we had no knowledge what the relationship should be
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55 between relationship characteristics and supply chain alliance performance. Although
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3 AVAS has been employed in data mining, it would be interesting to develop hypotheses
4 and test them using linear regression model in traditional way to better understand the
5 connection between the relationship characteristics and alliance performance in supply
6 chain.
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12 Third and finally, the data collected here were based on the sample manufacturing
13 firms. As the success of supply chain alliance requires a supply chain-wide focus, it is
14 desirable to generation information from buyer-supplier dyads or even from different
15 layers in the supply chain. On the other hand, the small sample size and the cross-
16 sectional nature of this study might affect the interpretation of the research results. It is
17 useful for further research to replicate this research and with a longitudinal study to
18 document the evolution of the relationship building process in supply chain alliances to
19 augment the findings of this study.
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APPENDIX: Construct Measurement

Relationship stability

The relationship between your firm and your suppliers is:

1. Unstable--stable.
2. Short-term—long-term.
3. Insecure--secure.

Trust of supplier

1. Your supplier keeps promises made to your firm.
 2. Your supplier is always frank and truthful with you.
 3. You believe the information this supplier provides you.
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4. Your supplier is genuinely concerned that your business succeeds.
 5. When making decisions, your supplier considers your welfare as well as their own.
 6. Your supplier is trustworthy.

Effective communication

1. You provide the supplier with any information that might help them to plan for your needs.
2. You provide the supplier with feedback about how they are performing periodically.
3. You communicate the specifications and quality requirements clearly and accurately to the supplier.
4. The communication between you and your supplier occurs at different levels of management and cross-functional areas.
5. Exchange information between the supplier and your firm takes place timely and frequently.

Relational capital

1. Friendship with the focal buyer.
2. Reciprocity between the partners.
3. Cheating won't occur between the partners.
4. Trust between the partners.
5. Close interaction between the partners.

Relational commitment

1. Willing to make sacrifices to help buyer.
2. Willing to continue the relationship with partners.
3. Spend a higher amount of time and effort with buyer.

Alliance performance

1. Strength of your relationship with key alliance partners.*
 2. Stability of your alliances.
 3. Ability to sustain relationships regardless of changes in senior people.
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*the item has been deleted to increase the reliability.