

Supply Chain Linkages: Power, Benefits, and Risk Reduction

Pamela J. Zelbst

Sam Houston State University
Box 2056
Huntsville, TX 77341-2056
Office: 936-294-3840
FAX: 936-294-3612
MGT_PJZ@shsu.edu

Kenneth W. Green, Jr.

Sam Houston State University
Box 2056
Huntsville, TX 77341-2056
Office: 936-294-1234
FAX: 936-294-3612
kww004@shsu.edu

Victor E. Sower

Sam Houston State University
Box 2056
Huntsville, TX 77341-2056
Office: 936-294-1272
FAX: 936-294-3612
MGT_VES@shsu.edu

Pedro Reyes

Baylor University
Hankamer School of Business
One Bear Place #98006
Waco, TX 76798-8006
254-710-7804
pedro_reyes@baylor.edu

ABSTRACT

The impact of supply chain linkages on supply chain performance is explored. Linkage constructs for power, benefits, and risk reduction are defined and described and multi-item scales are developed for their measurement. The relationships of the linkages with supply chain performance are assessed. One hundred and forty-five manufacturing and service sector managers were surveyed. The measurement scales were assessed for reliability and validity and further assessed within a measurement model context. Study hypotheses were then tested using a multiple regression approach. Results for the combined sample indicate that power, benefits, and risk reduction linkages positively and significantly impact supply chain performance. Power is identified as the dominant linkage for manufacturers, and risk reduction as the most important within the services sector.

INTRODUCTION

Researchers have investigated supply chain performance from many different perspectives. For example, Bischescu and Fry (2009) researched supply chain performance in relation to decision making, Wang, Chang and Wang (2009) investigated supply chain performance in relation to product development strategy and Lau, Agussurja, Thangarajoo (2008) looked at real time supply chain control. Social exchange has been utilized in supply chain research to examine the stability and alliance performance (Yang, Wang, Wong & Lai, 2007), coordination of supply chains (Holweg & Frits, 2007) as well as competitive and cooperative positioning in supply chain logistics relationships (Klein, Rai & Straub, 2007) to name a few.

This research will examine the exchange relationship of supply chain networks in terms of the linkages that are created by supply chain relationships. Previous research indicates that three variables are important to these linkages and influence supply chain performance. In particular the supply chain linkages will be examined in terms of power (Cook and Emerson, 1978; Cook and Gilmore, 1983; Lawler, 1982), risk (Cook & Whitmeyer, 1992; Johannisson, 1987; Cannon, Reyes, Frazier and Prater (2008) and benefits (Cook and Emerson, 1978; Burke, 1997; Willer, 1999; Cannon, Reyes, Frazier and Prater, 2008; Polo-Redondo and Fierra, 2008; Im and Raj, 2008).

LITERATURE REVIEW AND HYPOTHESES

Generally, the supply chain linkages model described and tested here is based upon social exchange theory. A discussion of social exchange theory and its particular application to the model as well as discussion of each of the model components (power, benefits, risk reduction, and supply chain performance) and support for the study hypotheses follow in this section.

Social exchange

Exchange theory is the conceptualization of interaction, structure and order (Cook & Whitmeyer, 1992). In terms of exchange relations, exchange theory has a long history in anthropology and more recently has been adopted by some sociologists (Cook & Whitmeyer, 1992). Markosky, Skvoretz, Willer, Lovaglia and Erger (1993, p. 197) stated that, “exchange theory was developed to predict negotiated distribution of resources in a class of networks consisting of interrelated individual(s) or corporate actors.”

Social exchange theory then examines structures created as a result of activities, such as supply chain driven activities (Willer, 1999). The resulting structures are effectiveness seeking (horizontal structure) and efficiency seeking (vertical structure) depending upon the phase of development (Walters & Rainbird, 2003). The linkage between activities and structures is the need that is created for some resource as a result of the benefit that is sought by the supply chain members (Willer, 1999; Burke, 1997; Cook & Emerson, 1978). According to Willer (1999, p. 21), “exchange theory recognizes the efficacy of structure and focuses its investigation on finding the conditions in structures that produce different behaviors.”

Supply chain performance

While organizational managers are ultimately held accountable for the performance of their particular organizations, the success of their organizations depends heavily upon the success of the supply chains in which the organization participates as a partner. Today's managers must both manage efficiently and effectively at the organizational level and also at the supply chain level. Heizer and Render (2006) propose that effective supply chain management depends on the ability to develop long-term, strategic relationships with supply chain partners. Such effective supply chain management maximizes value to the ultimate customers of the supply chain in terms of both satisfaction with the product and/or services and a relatively low total cost of the product and/or service. For purposes of this study, we take the extended view of the supply chain from "supplier's supplier to ultimate customer" and incorporate within our measure of supply chain performance the ability to satisfy the ultimate customer in terms of both quality and cost.

Supply chain linkages

Stinchcombe (1975) found that units within a group can be identified or defined by what they lack that the other members can furnish. Using Stinchcombe's findings and extrapolating from Levi Strauss's (1969) study these units form into subgroups that need each other and are a system of exchange such as supply chains. Stinchcombe (1975) and Freeman (1977) both identify that these subgroups will have a point of centrality and form a sort of boundary. These points of centrality act as a governing body and will be balanced by the specialty of the desired resource (Stinchcombe, 1975).

Emerson (1972) identified a network of exchange as consisting of:

- 1) A set of actors (persons or corporate groups),
- 2) A distribution of valued resources among those actors,
- 3) For each actor a set of exchange opportunities with other actors in the network,
- 4) A set of historically developed and utilized exchange opportunities called exchange relationships,
- 5) And a set of network connections linking exchange relations into a single network.

At minimum an exchange network must be dyadic in nature with a point of centrality and an upstream or downstream member (Freeman, 1992). Emerson (1972) stated that exchanges are limited to actions contingent on rewarding reactions from others. This implies that the relationship at a minimum is two sided, mutually dependent, and allows for mutually rewarding transactions or exchanges. Further these mutually rewarding transactions or exchanges relationships are identified by Willer (1999) as a social exchange.

Power

Cook and Emerson (1978) found that exchange theory includes the level of power that the participants bring to the transaction. These authors define power as the capacity to exploit while Lawler (1992) defines power as a control related outcome of an exchange. Extrapolating from either of these definitions, the exploitation of a valued resource can increase the power of the upstream or downstream member possessing the resource.

The purpose of an exchange is to improve an individual's or organization's welfare (Hildenbrand, 1968). Hildebrand identified two basic ingredients, commodities and agents. The first ingredient is the commodities involved in the exchange. Commodities are defined by Hildenbrand (1968) as anything that may be used or consumed. The second ingredient identified is an agent. An agent is characterized by three elements:

- 1) The consumption set of an organization,
- 2) Preferences,
- 3) And the organization ignition resources.

Further, groups are held together by the mutual benefit of the exchange (Spread, 1984). Extrapolating from that finding, for a group to maintain its cohesiveness, the group must enter into win-win situations. The win-win situation is identified as balance by Cook (1987). According to Cook (1987, p. 217), "exchange relations are balanced if the two actors involved in (the) exchange are equally dependent upon one another." However as Johnsen and Ford (2008) state these linkages (relationships) are characterized as asymmetric because some supply chain members are larger and more powerful than others. Stolte and Emerson (1977, p. 120) state, "an exchange relation is a relation of mutual dependence and reciprocal (although not necessarily equal) power." Extrapolating from these authors, a win-win situation is a relationship in which the corporate actors are equally dependent upon each other and power is reciprocal but not necessarily equal.

Freeman (1977) identified that the exchange relationship could be measured on the basis of the linkages. Researchers (Cook and Emerson, 1978; Cook and Gilmore, 1983; Lawler, 1982) identified power as a measure of these linkages. Amaeshi, Osuji and Nnodim (2008) further state that power is a critical factor in supply chain relationships.

H1: Power positively impacts supply chain performance.

Benefits

Supply chain activities are distinguished by linkages that are created based on a need for a resource or service that the various organizations of the supply chain provide. Cook and Emerson (1978) and Burke (1997) examined linkages and looked at the exchange of resources in relation to the dependence that is created. Willer (1999) argues that it is not necessarily a dependence that is created but a system of mutual gain or benefit. One benefit that is sought is efficiency (Cannon, Reyes, Frazier and Prater, 2008). While Polo-Redondo and Fierro (2008) found that internal standardization of an organization's processes can benefit supply chain relationships, it would stand to reason that other benefits could be gained by standardizing within

the supply chain network. For example, supply chain members may benefit from gained efficiencies by a standardization of policies and procedures within the supply chain network. In addition, Im and Raj (2008) explains the potential benefits to inter-organizational relationships of exploration and exploitation in order to sustain long-term performance, which could then extend to successful supply chain relationships. For example, knowledge gains, learning and innovation are some of the benefits of these relationships. These types of relationships can lead to benefits that result in win-win situations for all supply chain members.

H2: Benefits positively impact supply chain performance.

Risk Reduction

Sociologists explain the existence of groups such as channel partners and supply chain members by examining the subject from the position that most groups have a point of centrality which is thought to be in the more powerful position (Cook & Whitmeyer, 1992). The point of centrality of organizations would be the organization that acted upon downstream or upstream opportunities (Eden, 2002). However, when viewed abstractly within the realms of business, logistics or supply chain requirements or advantages may be rationales that explain the existence of these groups.

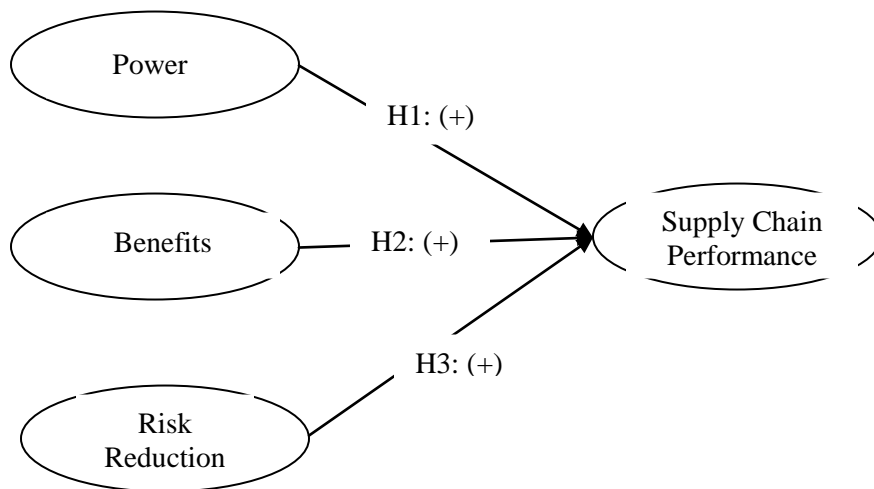


Figure 1: Supply Chain Linkages Model with Hypotheses

According to Cook and Whitmeyer (1992), exchange theory focuses on the ties between members of these groups or networks. These linkages are created by the need to fulfill a requirement for some resource. These resources can be material, informational or symbolic. Groups or networks are often used to gain access to resources that might otherwise be difficult to obtain (Johannisson, 1987). These types of resources are difficult or costly to obtain and thus create a need. This need, created because of the scarcity of resources is motivation for organizations to coordinate between each other (Johannisson, 1987). Extrapolating from these findings, the scarcity of resources creates a risk. Organizations may become members of a supply chain to reduce risk. Cannon, Reyes, Frazier and Prater (2007) further posit one of the linkages that impacts supply chain performance is the desire to reduce risk.

H3: Risk reduction positively impacts supply chain performance.

METHODOLOGY

Data Collection Process

Data were collected via an on-line data service during the summer of 2008. Of the 300 individuals who accessed the survey, 145 completed the supply chain linkages and supply chain scales. Ninety-one of the respondents represented the manufacturing sector, and the remaining 54 represented the services sector. Respondents have been in their current positions for an average of 5.6 years and represent organizations with an average of 27,533 employees and average annual revenues of \$1.48 billion.

Measurement scales

The supply chain linkages construct incorporates three dimensions: power, benefits, and risk reduction. The power, benefits, and risk reduction scales were developed specifically for this study. The theorized model (Figure 2) incorporates a measure of supply chain performance developed by Whitten and Green (2008). The study scales are presented in Appendix 1.

Non-response bias was assessed by comparing the responses of early and late respondents using a common approach described by Lambert and Harrington (1990). One hundred and four of the study respondents were categorized as early respondents and 41 were categorized as late respondents based on whether they responded to the initial or follow-up request to participate. A comparison of the means of the demographic variables (years in current position, total number of employees in organization, and total sales revenues for the organization) was conducted using one-way ANOVA. The comparisons resulted in statistically non-significant differences. An additional comparison of the means for the summary variables (power, benefits, risk reduction, and supply chain performance) indicated that the second wave means for the supply chain linkages variables were significantly less than those for the first wave. The first wave is more heavily weighted with respondents from the manufacturing sector than is the second wave. To evaluate whether there are systematic differences in supply chain linkages in the manufacturing versus the service sectors responses from each sector were also analyzed separately. There were no significant differences noted for the supply chain performance summary variable means.

Based upon these results, there is some concern related to non-response bias. Common method bias may lead to inflated estimates of the relationships among variables, when data are collected from single respondents (Podsakoff and Organ, 1986). As Podsakoff and Organ (1986) recommend, Harman's one-factor test was used to examine the potential bias. Substantial bias is indicated when either a single factor or one 'general' factor explains a majority of the total variance (Podsakoff and Organ, 1986). Results of the factor analysis with varimax rotation identify three factors combining to account for 78% of the total variance. The first factor accounted for only 32% of the total variance. While the supply chain performance and power related items loaded on separate factors, the benefits and risk reduction items loaded on a third single factor. A chi-square difference test was subsequently conducted on the benefits and risk reduction scales with a significant result indicating that while the scales load together they exhibit discriminant validity. Based on this analysis, common method bias is not a significant problem in this data collection.

RESULTS

Measurement Scale Assessment

Garver and Mentzer (1999) recommend computing Cronbach's coefficient alpha to assess scale reliability, with alpha values greater than or equal to 0.70 indicating sufficient reliability. Alpha scores for all of the measurement scales exceed the .70 level. Alpha values for power, benefits, risk reduction, and supply chain performance are .923, .897, .924, and .972, respectively. The study scales are sufficiently reliable.

Ahire et al. (1996) recommend assessing convergent validity using the normed-fit index (NFI) coefficient with values greater than 0.90 indicating strong validity. Garver and Mentzer (1999) recommend reviewing the magnitude of the parameter estimates for the individual measurement items to assess convergent validity. A strong condition of validity is indicated when the estimates are statistically significant and greater than or equal to .70. NFI values for the power (.96), risk reduction (.98), and supply chain performance (.96) scales exceed the .90 threshold, and parameter estimates for each of the individual items exceed the .70 threshold, with values of .84 or greater for all items in the three scales. The NFI of .79 for the benefits scale does not meet the recommended level. The four items in the benefits scale are, however, all significant with one parameter estimate slightly below the recommended level at .69.

Discriminant validity was assessed using a chi-square difference test for each pair of scales under consideration, with a statistically significant difference in chi-squares indicating validity (Garver and Mentzer, 1999; Ahire et al., 1996; Gerbing and Anderson, 1988). All possible pairs of the study scales were subjected to chi-square difference tests with each pairing producing a statistically significant difference.

Predictive validity was assessed by testing whether the scales of interest correlate with other measures as expected (Ahire et al. 1996, Garver and Mentzer 1999). A review of the correlation matrix (see Table 1) for study summary variables indicates that all variables are positively and significantly correlated, as expected, indicating sufficient predictive validity.

Koufteros (1999) recommends that the individual scales be incorporated together in a measurement model and that this model be subjected to an additional confirmatory factor analysis and that relative chi-square, non-normed fit index (NNFI), and comparative fit index (CFI) values to assess fit when the sample size is relatively small. Relative chi-square values of less than 2.00 and NNFI and CFI values greater than .90 indicate reasonable fit (Koufteros, 1999). Results of the analysis indicate that the measurement model fits the data well with an NNFI of .92, and a CFI of .93. The relative chi-square of 3.81 is somewhat higher than the recommended value of 2.00. Kline (1998) recommends relative chi-square values of less than 3.00, while Marsch and Hocevar (1985) discuss a somewhat less stringent cut-off of 5.00. The individual measurement scales are considered sufficiently reliable and valid and the fit of the measurement model is considered sufficient to support further analysis.

A. Descriptive Statistics

Variable	Mean	Std. Dev.
SC Linkages – Power (SCL-PW)	4.52	1.43
SC Linkages – Benefits (SCL-BF)	4.37	1.27
SC Linkages – Risk Reduction (SCL-RR)	4.36	1.29
Supply Chain Performance (SCP)	4.68	1.41

B. Correlations

Variables	PW	BF	RR	SCP
Power (PW)	1			
Benefits (BF)	.683**	1		
Risk Reduction (RR)	.725**	.854**	1	
Supply Chain Performance (SCP)	.685**	.718**	.743**	1

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

C. Regression Results

Dependent Variable: Supply Chain Performance

	Standardized Coefficients			Collinearity Statistics	
Independent Variables	Beta	t-value	Sig.	Tolerance	VIF
Power	.275	3.556	.001	.459	2.179
Benefits	.244	2.387	.018	.263	3.805
Risk Reduction	.335	3.091	.002	.233	4.285

Table 1: Descriptive Statistics, Correlations, and Regression Results for Combined Sample (n = 145)

Correlation and regression analyses results

A multiple regression approach was taken to test the three study hypotheses. First, the sample was analyzed with the descriptive statistics, correlations, and regression analysis results displayed in Table 1. The results support all three study hypotheses. All of the supply chain linkages variables (power, benefits, and risk reduction) are positively and significantly correlated with supply chain performance at the .01 level. Results of the multiple regression analysis with the three linkages variables as independent variables and supply chain performance as the dependent variable indicate that power and risk reduction are positively and significantly related to supply chain performance at the .01 level. The benefits variable is also positively and significantly related but at the .05 level. The R^2 for the regression model is .613 indicating that the linkages variables combine to explain 61% of the variation in supply chain performance.

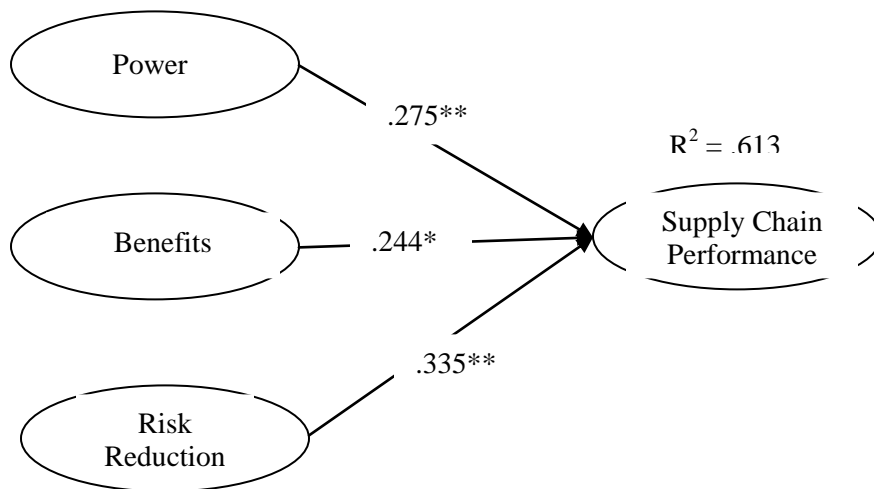


Figure 2: Supply Chain Linkages Model Results for Combined Sample with Beta Coefficients (** sig. at .01 level; * sig. at the .05 level)

To summarize, all linkages variables (power, benefits, and risk reduction) significantly impact supply chain performance when the combined sample is considered. When the sample is parsed, the power variable is identified as having the most significant impact in the manufacturing sector, and the risk reduction variable as the most significant within the services sector.

CONCLUSIONS

Heizer and Render (2006, p. 432) propose that the key to effective supply chain management is the ability to forge long-term, strategic relationships with supply chain partners for the purpose of “maximizing value to the ultimate customer.” The results presented support this general

proposition. More specifically, this study and the reported results identify the supply chain linkage variables of power, benefits, and risk reduction as important to the performance of the supply chain. The separate analyses of the manufacturing sector and services sector samples provides insight into the importance of the variables depending upon the type of organization and the organization's position within the supply chain. For the manufacturing sector, power is the dominant linkage; within the services sector, risk reduction dominates.

While the objective to investigate the relationships of the supply chain linkages variables to supply chain performance was accomplished, there are limitations to the study that should be noted. First, because the same data collection was used to assess the new linkages scales and to test the hypotheses, the study must be described as somewhat exploratory. The benefits scale in particular will require some revision for subsequent research applications. Additionally, some concern related to non-response bias should be noted. Time and financial resource limitations precluded additional third and fourth waves necessary to more clearly identify the presence of the bias.

REFERENCES

- Ahire, S. L., Golhar, D. Y., and Waller, M. A. (1996). Development and Validation of TQM Implementation Constructs. *Decision Sciences* 27(1), 23-56
- Amaeshi, K.M., Osuji, O.K. & Nnodim, P. (2008). Corporate Social Responsibility in Supply Chains of Global Brands: A Boundaryless Responsibility? Clarification, Exceptions and Implications, *Journal of Business Ethics* 81, 223-234
- Bichescu, B. C. and Fry, M. J. (2009). A Numerical Analysis of Supply Chain Performance Under Split Decision Rights, *Omega* 37(2), 358-379
- Burke, P. J. (1997). An Identity Model for Network Exchange. *American Sociological Review* 62(1), 134-150
- Cannon, A.R., Reyes, P.M., Frazier, G.V., and Prater, E.L. (2008). RFID in the Contemporary Supply Chain: Multiple Perspectives on its Benefits and Risks. *International Journal of Operations & Production Management* 28(5), 433-454
- Cook, K. S. (1987). Emerson's Contributions to Social Exchange Theory. In K.S. Cook (Ed.), *Social exchange theory*, 209-222. Newbury Park, CA: Sage Publications, Inc.
- Cook, K. S., and Emerson, R. M. (1978). Power, Equity, and Commitment in Exchange Networks. *American Sociological Review* 45(3), 721-739
- Cook, K. S., and Whitmeyer, J. M. (1992). Two Approaches to Social Structure: Exchange Theory and Network Analysis. *Annual Review of Sociology* 18. 109-127

- Eden, L. (2002). Regional Integration and Foreign Direct Investment: Theory and Lessons from NAFTA. In M. Kotabe & P. Aulakh (Eds.), *Emerging Issues in International Business Research*, 15-36. Northampton, MA: Edward Elgar.
- Emerson, R. M. (1972). *Position and Power in Exchange Networks*. Seattle, WA: Institute of Sociology, University of Washington
- Emerson, R. M. (1987). Toward a Theory of Value in Social Exchange. In K.S.Cook (Ed.), *Social exchange theory*, 11-46. Newbury Park, CA: Sage Publications, Inc.
- Emerson, R. M., Cook, K. S., and Gillmore, M. R. (1983). Valid Predictions from Invalid Comparisons: Response to Heckathorn. *Social Forces*, 61(4). 1232-1247
- Freeman, L. C. (1977). A Set of Measures of Centrality Based on Between-ness. *Sociometry* 40(1). 35-41
- Freeman, L. C. (1992). The Sociological Concept of 'Group': An Empirical Test of Two Models. *The American Journal of Sociology* 98(1). 152-166
- Garver, M. S. and Mentzer, J. T. (1999). Logistics Research Methods: Employing Structural Equation Modeling to Test for Construct Validity. *Journal of Business Logistics* 20(1). 33-57
- Heizer, J. and Render, B. (2006). *Operations Management* (8th Edition). Pearson Education, Inc.: Upper Saddle River, NJ
- Hamblin, R.L. and Kunkel, J.H. (1977). Behavioral Theory in Sociology. In J.F. Stolte & R.M. Emerson. *Structural Inequality: Position and Power in Network Structures*, 117-138. Transaction, Inc. New Brunswick, New Jersey.
- Hildenbrand, W. (1968). The Core of an Economy with a Measure of Space of Economic Agents. *The Review of Economic Studies* 35(4). 443-452
- Holweg, M. and Frits, K.P. (2008). Theoretical Perspective on the Coordination of Supply Chains. *Journal of Operations Management* 26. 389-406.
- Im, G. & Rai, A. (2008). Knowledge Sharing Ambidexterity in Long-term Interorganizational Relationships. *Management Science* 54(7). 1281-1296
- Johannisson, B. (1987). Anarchists and Organizers: Entrepreneurs in a Network Perspective. *International Studies of Management and Organizations* 17. 49-63.
- Johnsen, R.E. and Ford, D. (2008). Exploring the Concept of Asymmetry: Typology of Analyzing Customer-supplier Relationships. *Industrial Marketing Management* 37(4). 471-483

- Kline, R. B. (1998). *Principles and Practice of Structural Equation Modeling*, Guilford Press, New York, NY.
- Klein, R., Rai, A. & Straub, D.W. (2007). Competitive and Cooperative Positioning in Supply Chain Logistics Relationships. *Decision Sciences* 38(4). 611-646
- Koufteros, X. A. (1999). Testing a Model of Pull Production: A Paradigm for Manufacturing Research Using Structural Equation Modeling. *Journal of Operations Management* 17(4). 467-488
- Lambert, D.M. and Harrington, T.C. (1990). Measuring Nonresponse Bias in Customer Service Mail Surveys. *Journal of Business Logistics* 11(2). 5-25
- Lawler, E. J. (1992). Effective Attachments to Nested Groups: A Choice Process Theory. *American Sociological Review* 57(1). 327-339
- Lau, H. C., Agussurja, L. and Thangarajoo, R. (2008). Real-time Supply Chain Control Via Multi-agent Adjustable Autonomy. *Computers & Operations Research* 35(11). 3452-3464
- Levi-Strauss, C. (1963). *Structural Anthropology*. Harper & Row: New York, N.Y.
- Levi-Strauss, C. (1969). *The Raw and the Cooked*. Harper & Row: New York, N.Y.
- Marsch, H. W. and Hocevar, D. (1985). Application of Confirmatory Factor Analysis of the Study of Self-concept: First and Higher Order Factor and Their Invariance Across Groups. *Psychological Bulletin* 97(3). 562-582
- Markovsky, B., Skvoretz, J., Willer, D., Lovaglia, M. J., and Erger, J. (1993). The Seeds of Weak Power: An Extension of Network Exchange Theory. *American Sociological Review* 58(2). 197-209
- Podsakoff, P. M. and Organ, D.W. (1986). Self-reports in Organizational Research: Problems and Prospects. *Journal of Management* 12(4). 531-544
- Polo-Redondo, Y. and Cambra-Fierro, J. (2008). Influence of the Standardization of a Firm's Productive Process on the Long-term Orientation of its Supply Relationships: An Empirical Study. *Industrial Marketing Management* 37. 407-420
- Spread, P. (1984). Blau's Exchange Theory, Support and the Macrostructure. *The British Journal of Sociology* 35(2). 157-175
- Stinchcombe, A. L. (1975). A Structural Analysis of Sociology. *The American Sociologist* 10. 57-64

- Walters, D. and Rainbird, M. (2004). The Demand Chain as an Integral Component of the Value Chain. *Journal of Consumer Marketing* 21(7). 465-475
- Wang, S., Chang, S. and Wang, R. (2009). Assessment of Supplier Performance Based on Product-development Strategy by Applying Multi-granularity Linguistic Term Sets. *Omega*, 37(1). 215-226
- Whitten, D. and Green Jr., K. W. (2008). Triple-A Supply Chains. Working paper.
- Willer, D. (1999). Network Exchange Theory. Praeger: Westport, Connecticut
- Yang, J., Wang, J., Wong, C.W.Y. and Lai, K. (2008). Relational Stability and Alliance Performance in Supply Chain. *Omega* 36. 600-608

APPENDIX

Appendix 1: Measurement Scales

Supply Chain Linkages

Please indicate the extent to which you agree or disagree with each statement as the statement relates to your organization's primary supply chain (1=strongly disagree, 7=strongly disagree).

Power ($\alpha = .923$)

1. My company has a great amount of influence over the suppliers of resources for our company.
2. My company has a great amount of influence over the buyers of our products.
3. My company has a great amount of influence over the cost of resources received from our suppliers.
4. My company has a great amount of influence over our competitors.

Benefits ($\alpha = .897$)

5. My company receives benefits other than resources from our relationships with suppliers.
6. My company receives benefits other than purchases from our relationships with buyers.
7. My company benefits from standardization of procedures with our suppliers.
8. My company benefits from the standardization of procedures with our buyers.

Risk Reduction ($\alpha = .924$)

9. My company's suppliers reduce the uncertainty we face.
10. My company's buyers reduce the uncertainty we face.
11. My company's suppliers reduce the risk we face.
12. My company's buyers reduce the risk we face.

Supply Chain Performance Scale ($\alpha = .972$)

Please indicate the extent to which you agree or disagree with each statement as the statement relates to your organization's primary supply chain (1=strongly disagree, 7=strongly disagree).

1. This organization's primary supply chain has the ability to deliver zero-defect products to final customers.
2. This organization's primary supply chain has the ability to deliver value-added services to final customers.
3. This organization's primary supply chain has the ability to eliminate late, damaged and incomplete orders to final customers.
4. This organization's primary supply chain has the ability to quickly respond to and solve problems of the final customers.
5. This organization's primary supply chain has the ability to deliver products precisely on-time to final customers.
6. This organization's primary supply chain has the ability to deliver precise quantities to final customers.
7. This organization's primary supply chain has the ability to deliver shipments of variable size on a frequent basis to final customers.
8. This organization's primary supply chain has the ability to deliver small lot sizes and shipping case sizes to final customers.
9. This organization's primary supply chain has the ability to minimize total product cost to final customers.
10. This organization's primary supply chain has the ability to minimize all types of waste throughout the supply chain.
11. This organization's primary supply chain has the ability to minimize channel safety stock throughout the supply chain.