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Patterns of Supply Chain Integration in a Service Setting: Antecedents and Relationship Effectiveness

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ABSTRACT

Using three process dimensions of integration, we study patterns of supply chain integration, how they are supported, and how they influence the relationship effectiveness. Hypotheses are developed using the Transaction Cost Theory, and tested with data from 171 pharmacies. Knowledge of factors that facilitate integration should help improve pharmacy-wholesaler relationships.

KEYWORDS: Buyer-supplier relationship, Supplier integration, Transaction cost theory, Survey research, Cluster analysis

INTRODUCTION

In today's global, competitive environment, firms experience heightened pressures to quick, on-time delivery of customized quality products at a competitive price (Kathuria et al., 2010), and they increasingly turn to external supply chain partners in an effort to enrich their competitive capabilities. Aligning with the supply chain partners to create well-coordinated business processes is a key factor in improving efficiency and responsiveness to gain a competitive edge in the marketplace (Ragatz et al, 1997). In a contemporary competitive and turbulent environment, the key to managing the supply chain is not to manage different functions or products but to manage the supply chain processes (Davenport, 1993; Zhao et al, 2008). SCI is a heavily researched topic, and periodically researchers have attempted to review and synthesize the extant literature (cf., Croom et al, 2000, Chen & Paulraj, 2004; Fabbe-Costes & Jahre, 2008; Leuschner et al, 2013). The focus of this paper is on external, upstream process integration in a service organization. In particular, our focal service firm is a pharmacy in the pharmaceutical supply chain, which has not been the focus of many SCI studies, with the exception of Rossetti, Handfield, and Dooley (2011).

THE RESEARCH SETTING AND OBJECTIVES

Pharmaceutical wholesalers strive to create competitive advantage by forging close integrated relationships with the pharmacies (Jambulingam, Kathuria and Nevin, 2009, 2011). Some of the large pharmacy chains, such as Consumer Value Stores (CVS), Walgreens, and Rite Aid, are now developing their own warehouses and buying directly from the manufacturers thus bypassing the wholesalers. In addition, the growth of mail-order pharmacies, who also buy

directly from the manufacturers, is posing a challenge to the wholesalers' business. Further, pharmaceutical manufacturers are trying to bypass the wholesalers by using third party logistics companies such as FedEx and UPS (Shah, 2004). Simultaneously, regulators are demanding increased transparency and cost/price disclosures from wholesalers, as well as greater insights into true cost drivers associated with pharmaceutical distribution (Scott, 2005). These trends are putting pressure on the wholesalers to integrate with pharmacies and to maintain effective relationships with them. In this paper, we study integration from the pharmacy's vantage point where a wholesaler is the 'supplier.' We contend that integration does not progress in a linear fashion (low to high) on all dimensions simultaneously, but rather companies choose to integrate differently using a distinct combination of the multiple aspects of integration with the ultimate goal of being fully integrated on all dimensions. We apply a clustering approach to examine different patterns of integration, and investigate the role of some organizational and environmental factors that shape up distinct patterns of integration. Finally, we examine how different patterns are related to the success, productivity, and effectiveness of the relationship.

THEORETICAL BACKGROUND AND HYPOTHESES

Most studies define integration in a generic fashion—as information sharing, level of partnership (collaborative relationships) or how closely one works with suppliers. Over the years, the concept of integration has evolved from the development of shared operational activities (Frohlich and Westbrook, 2001) to a more strategic collaboration between supply chain partners (Flynn et al., 2010). For this study, we conceptualize that integration in a supply chain can occur at three levels, but our focus is on the processes—transactional, operational, and strategic. First, the two firms can integrate transaction processes to cut cycle time, duplication of efforts, and errors. Transaction processes include product ordering, returning goods, fulfillment, and billing and payment. Currently transactional integration is becoming the basic requirement in supply chain relationships. At the second level, customers and suppliers integrate the supply chain operational processes. Examples include the processes of inventory management, financial management, employee training, and information systems management. The third level of integration is strategic, where two firms link higher level processes that are crucial for the strategic success of both firms. The firms need to take a total supply chain perspective, focusing on jointly producing superior end-customer value. In the supply chain context, this raises some questions. Should firms be integrated at all three levels? If so, do all firms strive to be high on all three levels/dimensions or do they choose a certain combination? What factors lead to supply chain process integration? The purpose of this research is to a) identify the course of integration by a clustering methodology, b) identify antecedents to supply chain integration, and c) to examine the effects of integration in terms of relationship effectiveness. Several characteristics of the relationship encourage its evolution and the tendency toward supply chain integration. Since the supply chain is trying to become an efficient system, transaction cost theory appears to be an appropriate theory to be used to identify the motivating factors for supply chain process integration.

Transaction Cost Theory

Transaction Cost Theory (TCT) views integrated relationships as a response to certain conditions of the exchange that would increase transaction costs (Heide 1994). Thus, transaction costs create the motivation for a firm to develop integrated processes as a way to minimize transaction costs (Das et al., 2006). The exchange conditions are marked by asset specificity (transaction-specific investments), environmental (external) uncertainty, and behavioral (internal) uncertainty. Asset specificity refers to assets, both physical and human,

that are idiosyncratic in nature and cannot be easily redeployed to another relationship. These dedicated investments increase the switching costs and makes a firm vulnerable. In order to safeguard these investments and limit the risk of opportunistic exploitation, the firm should develop mechanisms to protect itself. The dimension of external uncertainty describes the nature of the decision environment in which the exchange occurs. Given the basic assumption of bounded rationality of humans, it is impossible to ascertain all contingencies of the future and incorporate in agreements made *ex ante*. The limits of *ex ante* agreements create an adaptation problem when unique contingencies present themselves. Thus, it is important to put appropriate mechanisms in place to permit adjustments as and when needed. The last dimension is internal uncertainty or performance ambiguity. Mechanisms developed to reduce performance ambiguity can minimize the evaluation problem. Thus the primary objective of the transaction cost theory is to increase the efficiency in the transaction by devising a governance mechanism that would minimize safeguarding, adapting and evaluation problems in the exchange. The theory's primary goal is to create a coordinated system that is efficient. It could be as well achieved by the strategic partnerships or relationships. In this study, we measure integration processes and not the structure.

Antecedents to Supply Chain Integration

Researchers have been curious to understand what motivates the supply chain partners to integrate. We contend that the exchange conditions underlying the TCT drive buyers and suppliers to integrate their supply chain processes as follows:

Asset Specificity

Asset specificity is the core determinant in the transaction cost logic developed by Williamson (1975, 1983, 1985). Humans are assumed to be opportunistic in their behavior. Opportunism poses a problem to the extent that a relationship is supported by specific assets (asset specificity) whose values are limited outside of the focal relationship. Essentially, the need to protect specific assets creates a safeguarding problem since market competition no longer serves as a restraint on opportunism. Thus firms that have invested high levels of assets specific to a relationship will become very integrated in order to safeguard their assets. Thus:

H1: Asset specificity will be higher for the more integrated firms.

Environmental Uncertainty

Environmental uncertainty has been studied by SCI researchers (cf., Chen and Paulraj, 2004; Wong et al, 2011), but not as an antecedent to integration. Environmental uncertainty refers to "unanticipated changes in circumstances surrounding an exchange" (Noordewier, John and Nevin 1990, p. 82). While dynamism encourages firms to form higher levels of integration, complexity has just the opposite effect. Thus environmental uncertainty–dynamism ("the rate at which changes in the environment occur") and environmental uncertainty–complexity ("the degree to which the respondents perceived the environment as simple or complex," p.257) are hypothesized to have positive and negative effects respectively on supply chain process integration.

H2: Firms that perceive a high degree of environmental dynamism will be more integrated with their supply chain partners.

H3: Firms that perceive a low degree of environmental complexity will be more integrated with their supply chain partners.

Behavioral Uncertainty

Behavioral uncertainty concerns the difficulty of observing and measuring the performance of transacting parties and the adherence of these parties to the contractual arrangement, thus creating performance evaluation problems. In channel conditions where vertical integration does not exist, does difficulty in performance assessment increase the likelihood of supply chain integration? Transaction cost theory suggests that under conditions of higher behavioral uncertainty, greater levels of buyer-supplier integration should be in place in order to reduce the evaluation problems of the transacting parties. Thus:

H4: Firms that perceive higher behavioral uncertainty will be more integrated with their supply chain partners.

Supply Chain Integration and Relationship Effectiveness

As buyers integrate with their suppliers, a strong bond or partnership develops between the two parties. Suppliers, and in our particular case the wholesalers, develop a better understanding of the buyers' (pharmacies') needs. As a result, wholesalers can successfully anticipate and meet the pharmacies' changing requirements. By developing a good understanding of the pharmacies' needs, wholesalers can be more productive in their operations and can also provide a high level of 'customer service' to the pharmacies. The pharmacies, in turn, can provide a better service to their patient customers, cut costs and increase profitability, which further enhances the wholesaler-pharmacy relationship. We examine how patterns of supply chain integration are related to performance in the form of buyer-supplier relationship effectiveness. For this reason, we use a clustering approach as recommended by Harland et al. (2007) and used by other researchers, such as Flynn et al. (2010) and Danese (2013). We contend that as the extent of integration increases, the wholesaler-pharmacy relationship will become successful, productive and effective.

H5. The relationship effectiveness will be higher for more integrated firms.

METHODOLOGY

The study design is a cross-sectional, survey-based study. In this section, we discuss the data collection method, followed by a sample design, pretest procedure, and data analyses.

Data Collection Method

A mail survey was designed to gather data from key informants. Obtained data include: constructs of supply chain process integration, asset specificity, environmental uncertainty (dynamism and complexity), behavioral uncertainty, and pharmacy and respondent characteristics. Each response includes *self-reports* on the informant's knowledge of and involvement in the firm's purchasing decision process. One key informant was used from each pharmacy. A questionnaire was mailed to the pharmacies along with a cover letter and self-addressed stamped return envelope. A follow-up post card was mailed to enhance the response rate. All potential survey respondents were requested to evaluate one of their suppliers. Telephone prescreening was conducted to (1) identify the key informant, (2) seek prior commitment to participate in the mail survey, and (3) identify the supplier that served as the referent for that pharmacy's response. Phone calls were made until 600 prospective respondents were contacted. No monetary rewards were given to the respondents but instead a

summary report of the study was offered to them if they provide their addresses in the space provided in the questionnaire.

Construct Development

The first step in designing the data collection form is specifying the domain of the constructs to be measured. The constructs used in this study are a) Supply chain process integration, b) antecedents—asset specificity, behavioral uncertainty, environmental dynamism, and environmental complexity, and c) relationship effectiveness. The specific measures used to operationalize each are listed in the Appendix and their correlations are reported in Table 1.

Table 1. Correlation Matrix

	Asset Specificity	Envir. Dynamism	Envir. Complexity	Behavioral Uncertainty	Transactional Integration	Operational Integration	Strategic Integration
Asset Specificity	1.00						
Envir. Dynamism	-0.08	1.00					
Envir. Complexity	-0.10	0.43 [a]	1.00				
Behavioral Uncertainty	0.17	-0.17	-0.16	1.00			
Transactional Integration	0.42 [a]	-0.15	0.03	0.34 [b]	1.00		
Operational Integration	0.42 [a]	-0.21 [c]	-0.13	0.10	0.51 [a]	1.00	
Strategic Integration	0.32 [b]	-0.19 [d]	-0.02	0.04	0.45 [a]	0.81 [a]	1.00

Note: p-values: a (<0.001), b(<0.01), & c(<0.05). All others were insignificant at 0.1 level.

Sample Design

The population for this study is a random sample of all community pharmacies in U.S. Including all of the community pharmacy types in the study is believed necessary to provide the variability necessary to the key construct under study (i.e., process integration). The sampling frame is the current list of pharmacies obtained from each state department of licensing and regulation.

Pretests

Before mailing the main survey, two pretests were conducted. In pretest one, the questionnaire with the initial list of measures was administrated directly to selected pharmacies. Before administering the second pretest, homogeneity of the scales was improved and the wording of questions was clarified, as needed. The response rate from the second pretest was close to expected. Preliminary tests showed that the performance of the measurement scales was satisfactory.

Data Analysis

The data analysis consisted of six sections: (1) data coding and cleaning, (2) checking for non-response bias, (3) descriptive analysis for constructs, pharmacies, and respondent

characteristics, (4) measures' validation procedure, (5) identifying clusters of firms with varying degrees of integration, and (6) testing the hypotheses. A coding sheet was prepared based on the sequence of questions on the questionnaire. Using the coding scheme the data were coded in ACCESS application software and imported into SPSS. Then the data were checked for miscoding and missing data. Unusable responses were eliminated. Missing data were treated as system missing in SPSS. To assess the possibility of non-response bias in the data, a test using the extrapolation procedure suggested by Armstrong and Overton (1977) was performed. Absence of significant difference indicates that the sample does not suffer from non-response bias. Lastly, preliminary descriptive statistics of the pharmacy and respondent characteristics were undertaken to validate the representativeness of the sample for generalizability purposes. Prior to testing substantive hypotheses, the measures were subjected to a series of validity checks. The Cronbach's alpha for all scales were 0.70 or above, thus meeting the minimum threshold (See Appendix). After the initial analysis, the item set was subjected to confirmatory factor analysis to establish unidimensionality. As suggested by Gerbing and Anderson (1988), we estimated a measurement model in which every item was restricted to load on its hypothesized factor, and the underlying factors initially were inter-correlated. Separate measurement models were tested for the antecedents and outcome variables. The measurement model was estimated by maximum likelihood using LISREL.

RESULTS

The three process dimensions of supply chain integration, namely transactional, operational and strategic, were cluster analyzed to identify patterns of integration. The data were cluster analyzed using Ward's method with the squared Euclidean distance measure in SPSS. This study used several rules of thumb as guides for determining the appropriate number of clusters, as employed in similar studies (cf., Kathuria, 2000). The three-cluster model best met the above criteria. The null hypothesis that the three clusters are equal across all defining variables was rejected at the 0.0001 level of significance. Table 2 presents the cluster means, standard errors, group numbers from which this group was significantly different at the 0.05 level of significance or less, and the relative ranking of the focus on three types of integration within each group. The F-statistics indicate strong evidence that one or more of the cluster means differed from another on all three defining variables, at the 0.0001 level of significance. Further, the Scheffe pairwise comparison of the mean difference, at the 0.05 level of significance or less, indicated that 33% of the group means were different from all of the other two group means and 67% were different from one of the three groups. The three clusters are named: Transactionally Integrated(Cluster1), Mildly Integrated(Cluster 2); and Extensively Integrated(Cluster3). The above results support our contention that supply chain partners place a varying degree of emphasis and attention to the three aspects of supplier integration—transactional, operational and strategic. The subsequent hypotheses were tested using ANOVA.

Table 2. Focus of Integration by Clusters

	Transactionally Integrated n = 43 Cluster #2	**Mildly Integrated** n = 106 Cluster #1	**Extensively Integrated** n = 22 Cluster #3	**F = Value** (p = probability)
Transactional Integration	**Hi**	**Lo**	**Hi**	
Cluster Mean	3.70 (1)	1.88 (2,3)	3.80 (1)	F = 171.10
Std. error	.067	.065	.159	p < .0001
Rank	1	1	1	
Operational Integration	**Lo**	**Lo**	**Hi**	
Cluster Mean	1.53 (3)	1.36 (3)	3.47 (1,2)	F = 131.36
Std. error	.065	.049	.194	p < .0001
Rank	2	2	2	
Strategic Integration	**Lo**	**Lo**	**Hi**	
Cluster Mean	1.52 (3)	1.37 (3)	3.67 (1,2)	F = 129.13
Std. error	.072	.060	.173	p < .0001
Rank	2	2	1	

Hypotheses H1 is supported as asset specificity is higher for the more extensively integrated group of pharmacies. Hypothesis H2 is not supported as environmental dynamism is not higher for the extensively integrated firms. Contrary to expectations, it is in fact lower for the highly integrated firms. It is possible that companies that are extensively integrated perceive environment to be less dynamic because they feel in control of the exchange environment because they are integrated on all three dimensions—transactional processes, operational processes, and strategic processes. Hypothesis H3 is supported as environmental complexity is lower for the highly integrated firms as compared to the mildly integrated firms as well those that are only partially (transactionally) integrated. Hypothesis H4 is not supported as behavioral uncertainty is not significantly higher for the more extensively integrated cluster. It is a surprising finding as all three clusters perceive behavioral uncertainty to be quite high. Hypothesis H5 is supported as the effectiveness of suppliers is rated significantly higher by the extensively integrated group of pharmacies, compared to the other two.

DISCUSSION, CONCLUSIONS AND IMPLICATIONS

The primary purpose of this study was to understand the factors that influence supply chain process integration in creating superior value in the supplier-pharmacy context. In order to identify the influential determinants of supplier integration, we used the transaction cost theory as the basis. Identifying the influential factors in the model should enable the supply chain members to manage the relationships better, thus improving the quality of distribution and eventually quality of care to the patients. In response to the emerging importance of integration between firms, we investigated the extent to which retail pharmacies view themselves as integrated with their suppliers (i.e., wholesalers). The clustering approach is effective in examining the intricate relationships between the antecedents of supplier integration and the extent of integration, as well as its effect on relationship effectiveness, as it simultaneously takes into account all three dimensions of supplier integration—transactional, operational, and

strategic. Buyers' investment in the equipment and training specific to a supplier's products and procedures, seem to contribute to a more integrated relationship. Perceived instability of the market, competition, sales volume, prices, and market share, etc., seem to inhibit buyer-supplier integration. The suppliers that tend to ingrate more with the buyers are also considered committed and responsible. More highly integrated relationships also seem to contribute to more productive, effective and successful buyer-supplier relationships. The focus on a single industry certainly offers deep insights into various relationships, but it also limits generalizability. The theory is tested in a unique context. The pharmaceutical supply chain is somewhat unique due to the product, directed nature of the demand, and stringent regulation by the government. Also, changes in technology and third-party payer influences are important factors that may limit the generalizability of the findings. Pharmacists who have limited management training often manage independent pharmacies. Thus their perceptions could differ from those who are more highly trained in management. Yet, this study will provide valuable information from the practical standpoint of pharmacy professionals. Healthcare reform has put increased emphasis on medication use and therapy management, which renders the role of pharmacies even more significant. Resource-constrained pharmacies can benefit from close alignment with suppliers in order to be more responsive and cost efficient. The results of this study can benefit the wholesale and retail distribution industry in several ways. First, identifying influential factors for integration may help wholesale suppliers to manage the channel proficiently. Next, the literature has often measured integration as either in a hierarchical fashion (vertical integration) or relational context (strategic partnerships), but this study operationalized integration based on the alignment of processes at three levels—transactional, operational and strategic.

APPENDIX

Supply Chain Integration (Extent of use: 1-Never to 5-All the time)

ITEM	FACTOR LOADING
Transactional (Eigenvalue=2.08, %Variance=52.12, α =0.70)	
Electronic order tracking	0.815
On-line checking of product availability	0.759
On-line equivalent lookup	0.753
Online ability to report billing problems	0.527
Operational (Eigenvalue=5.10, %Variance=56.71, α =0.90)	
Demand forecasting	0.854
Assistance in managing procurement process	0.804
Total process cost reduction planning	0.781
Program for effective space mgmt	0.750
Assist in product mix determination	0.748
Monthly update on net sales volume	0.722
Assist in layout and design	0.679
Assist in creating JIT process	0.591
Strategic (Eigenvalue=3.67, %Variance=61.15, α =0.86)	
Strategic planning to improve coordination	0.893
Strategic planning to reduce costs	0.866
Sharing useful information	0.786
Local area competition analysis	0.723
Create network to compete for managed care products	0.718
Provide contract admin	0.682

Relationship Effectiveness α =0.92

1. The wholesaler carries out its responsibilities and commitments completely.
2. Our pharmacy carries out its responsibilities and commitments completely.
3. The relationship between our pharmacy and this wholesaler is productive
4. The time and effort spent in developing and maintaining the relationship with this wholesaler is worthwhile.
5. The relationship between our pharmacy and the wholesaler is effective.
6. The processes developed to coordinate activities between this wholesaler and us are very successful.

ANTECEDENTS:

ITEM	FACTOR LOADING
Asset Specificity α =0.85 (1=Strongly Disagree to 7=Strongly Agree)	
We have significant investments in equipment dedicated to our relationship with this wholesaler.	0.750
A lot of the tasks we perform in the procurement process require closely working with the wholesaler.	0.840
Our procurement systems has been tailored to meet the transactions with this wholesaler.	0.760
Most of the training our pharmacy staff has gone through is to learn the wholesalers procedures and routines.	0.796
We have made extensive adjustments in our pharmacy in order to deal effectively with this wholesaler.	0.774
Environmental Dynamism α =0.88 (1=Stable to 7=Unstable)	
Stability of prescription sales volume	0.906
Stability of local market trends	0.900
Stability of market shares	0.878
Stability of Pharmaceutical prices	0.602
Stability of overall conditions of the local market	0.701
Environmental Complexity α =0.62 (1=Easy to 7=Difficult)	
Monitoring market trends	0.594
Number of competitors in our market	0.413
Assessing marketplace competition	0.809
Managing third party contracts	0.494
Market in which we buy pharmaceuticals	0.772
Behavioral Uncertainty α =0.70 (1=Strongly Disagree to 7=Strongly Agree)	
Assessing performance of the supplier is a complicated matter	0.676
It is inadequate to evaluate this supplier based only on price	0.658
Evaluating the performance of this supplier requires extensive inspection.	0.843
Conducting performance evaluations of this supplier requires making sure they follow agreed upon procedures.	0.627

REFERENCES

Armstrong, J. Scott, and Terry S. Overton (1977), "Estimating Nonresponse Bias in Mail Surveys," *Journal of Marketing Research*, 14 (August), 396-403.

Chen, I. J., & Paulraj, A. (2004). Towards a theory of supply chain management: the constructs and measurements. *Journal of operations management*, *22*(2), 119-150.

Croom, S., Romano, P., & Giannakis, M. (2000). Supply chain management: an analytical framework for critical literature review. *European journal of purchasing & supply management*, *6*(1), 67-83.

Das, A., Narasimhan, R., & Talluri, S. (2006). Supplier integration—finding an optimal configuration. *Journal of Operations Management*, *24*(5), 563-582.

Davenport, H. Thomas (1993), *Process Innovation: Reengineering Work though Information Technology,* Boston, MA: Harvard Business School Press.

Danese, P (2013) Supplier integration and company performance: A configurational view, *Omega*, 1029-1041.

Fabbe-Costes, N., & Jahre, M. (2008). Supply chain integration and performance: a review of the evidence. *International Journal of Logistics Management, 19*(2), 130-154.

Frohlich, M. T., & Westbrook, R. (2001). Arcs of integration: an international study of supply chain strategies. *Journal of operations management*, *19*(2), 185-200.

Flynn, B. B., Huo, B., & Zhao, X. (2010). The impact of supply chain integration on performance: a contingency and configuration approach. *Journal of Operations Management*, 28(1), 58-71.

Gerbing David. W. and James. C. Anderson (1988), "An Updated Paradigm of Scale Development Incorporating Unidimensionality and its Assessment," *Journal of Marketing Research*, 25 (May), 186-92.

Harland, C. M., Caldwell, N. D., Powell, P., & Zheng, J. (2007). Barriers to supply chain information integration: SMEs adrift of eLands. *Journal of Operations Management*, *25*(6), 1234-1254.

Heide, Jan B. (1994), "Interorganizational Governance in Marketing Channels," *Journal of Marketing*, 58 (January):71-85.

Jambulingam, T., Kathuria, R., & Nevin, J. R. (2011). Fairness-trust-loyalty relationship under varying conditions of supplier-buyer interdependence. *The Journal of Marketing Theory and Practice*, *19*(1), 39-56.

Jambulingam, T., Kathuria, R., & Nevin, J. R. (2009). How fairness garners loyalty in the pharmaceutical supply chain: role of trust in the wholesaler-pharmacy relationship. *International Journal of Pharmaceutical and Healthcare Marketing*, *3*(4), 305-322.

Kathuria, R. (2000). Competitive priorities and managerial performance: a taxonomy of small manufacturers. *Journal of Operations Management*, 18(6), 627-641.

Kathuria, R., Partovi, F. Y., & Greenhaus, J. H. (2010). Leadership practices, competitive priorities, and manufacturing group performance. *International Journal of Operations & Production Management,* 30(10), 1080-1105.

Leuschner, R., Rogers, D. S., & Charvet, F. F. (2013). A Meta-Analysis of Supply Chain Integration and Firm Performance. *Journal of Supply Chain Management*, *49*(2), 34-57.

Noordewier, Thomas G., George John, and John R. Nevin (1990), "Performance Outcomes of Purchasing Arrangements in Industrial Buyer-Vendor Relationships," *Journal of Marketing*, 54 (October), 80-93.

Ragatz, G. L., Handfield, R. B., & Scannell, T. V. (1997). Success factors for integrating suppliers into new product development. *Journal of Product Innovation Management*, *14*(3), 190-202.

Rossetti, C.L., Robert Handfield, Kevin J. Dooley, (2011) "Forces, trends, and decisions in pharmaceutical supply chain management*", International Journal of Physical Distribution & Logistics Management*, Vol. 41 Iss: 6, pp.601 – 622.

Scott, A. (2005) "Degussa voices concern about tightening of FDA regulations", *Chemical Week*, Vol.167 No.4 pp21

Shah, N. (2004) "Pharmaceutical supply chains: key issues and strategies for optimisation", *Computers & Chemical Engineering*, Vol.28 No.6/7 pp929-41

Williamson, Oliver E. (1975), *Markets and Hierarchies: Analysis and Antitrust Implications*, New York: Free Press.

Williamson, Oliver E. (1983), “Credible Commitments: Using Hostages to Support Exchange,” *American Economic Review,* 73 (September):519-40.

Williamson, Oliver E. (1985), *The Economic Institutions of Capitalism*, New York: The Free Press.

Wong, C. Y., Boon-Itt, S., & Wong, C. W. (2011). The contingency effects of environmental uncertainty on the relationship between supply chain integration and operational performance. *Journal of Operations Management*, *29*(6), 604-615.

Zhao, X., Huo, B., Flynn, B. B., & Yeung, J. H. Y. (2008). The impact of power and relationship commitment on the integration between manufacturers and customers in a supply chain. *Journal of Operations Management*, *26*(3), 368-388.