

## **POWER INFLUENCES IN THE SUPPLY CHAIN**

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### **Abstract**

Inter-firm power often plays a critical role in the supply chain. This research seeks to expose the detrimental and beneficial effects of power on the ability to build integrated, high performance buyer-supplier relationships. In doing so, the research highlights the need for power awareness and promotes the benefit of effective power management.

## **SUPPLY CHAIN INTEGRATION**

The concept of logistics has evolved since the 1970's as the strategic coordination of traditional corporate cost centers such as purchasing, manufacturing, transportation, and warehousing. The objective of such coordination is to recognize functional synergies within the firm to better fulfill customer requirements. Over the last decade, such coordination efforts have expanded beyond the singular firm to inter-firm integration within the supply chain, the composite network of firms which play a role in delivering a value package to the ultimate customer. Effective integration of the supply chain conceptually allows participants to recognize a significant competitive advantage derived from enhancements in responsiveness and cost reduction, leading to improved performance and profitability.

### **U.S. Automotive Industry**

The U.S. automotive industry provides a convincing example of the significance of supply chain management to strategic competitiveness. From the invention of the automobile, U.S. auto manufacturers had once been able to maintain worldwide dominance in the industry, enjoying monopolistic market share and profits. In the 1970's, however, Japanese manufacturers began to wrestle away market share with high quality, fuel efficient vehicles that could be delivered to the U.S. at prices considerably lower than that of the American competition. The Japanese manufacturers derived the source of such competitive advantage from tight control of the supply chain through the *keiretsu* which allowed them to develop best-in-class practices in such key industry drivers as product development, vehicle quality, cost reduction, and cycle times. In their attempt to regain market share and profitability throughout the 80's and 90's, U.S. manufacturers have emulated the keiretsu coordination strategy through integration with

suppliers. The current competitive state of the automotive industry necessitates the use of supply chain management as a critical driver for competitive positioning within the industry, and such integration pressures will continue to expand into the next decade.

## **POWER IN THE SUPPLY CHAIN**

Despite the still maturing comeback of the U.S. auto manufacturers, supply chain integration efforts in the automotive industry have tended to be driven more by issues of power and control rather than mutual, win-win intentions. Specifically, the industry retains an *imbalance of power* as five manufacturers account for almost 90% of the market share (Table 1),<sup>1</sup> yet the base of supplier firms numbers in the thousands. Such an oligopolistic environment has allowed the manufacturers to authoritatively transfer responsibilities for cost reduction, product development, and inventory management back to the suppliers, forcing them to comply with strict performance guidelines or face replacement. Industry-wide cost-cutting efforts have instigated manufacturer consolidation (such as the Chrysler Corporation and Daimler-Benz AG merger), further elevating the degree of power asymmetry in the industry and thus, placing more pressure on suppliers to yield to power influences.

<INSERT TABLE 1>

Historically, manufacturers in the automotive industry have followed varying approaches to the balance of cooperation and competition in their purchasing policies. General Motors has tended to take a competitive approach as typified in the early 1990's with their purchasing head Ignacio Lopez dictating nonnegotiable cost reductions to suppliers. While this policy

successfully generated significant savings for GM, many practitioners argue that such benefits were overshadowed by supplier resentment and a lack of synergistic improvement.<sup>2</sup> Manufacturers such as Honda and Chrysler, however, have taken a more relational approach. Honda tends to seek a more collaborative relationship with its Tier I suppliers by dispatching Honda resources to supplier site for extended joint improvement efforts, encouraging enhanced communication, and sharing of cost reduction benefits.<sup>3</sup> Driven by its Extended Enterprise approach, Chrysler (now DaimlerChrysler) has achieved considerable success through its Supplier Cost Reduction Effort (SCORE) program to drive mutually beneficial cost reduction and product improvement.<sup>4</sup> Like GM, Honda and Chrysler each enjoy a significant purchasing power advantage, yet each tends to de-emphasize this leverage, focusing on a more relational supply chain orientation.

Many practitioners would consider power to be an omnipresent, unmanageable part of everyday business. Given a firm such as General Motors which sources \$70 billion annually, there may be little motivation for a power holding firm to regulate its authority and likewise little hope for a supplier to escape the wrath of this power. Nonetheless, inter-firm power retains the potential to upset the mutuality of supply chain relationships and subsequently presents a barrier to the win-win integration process so frequently promoted in the current literature base. Thus, it is the contention of this paper that supply chain strategy or research which does not account for the influences of power can not be entirely realistic or implementable.

A wealth of power research (see literature review) examines power influences from the marketing channel perspective with a considerable amount focusing on the auto industry. It is

not judicious, however, to extend the findings from such research not only to other industries but even to different echelons (e.g. supplier-manufacturer) within the supply chain of the same industry due to differences in the power environments. In the case of the automotive industry, the relationship between manufacturer and dealer tends to of co-dependency, and dealer consolidation over the last decade has created a fairly equitable power struggle between the two parties. On the other hand, despite the current push toward relational integration, supplier-manufacturer relationships in the auto industry tend to be extremely competitive, and the manufacturers maintain a relatively lop-sided power advantage over suppliers. Thus, while the marketing channel power research might provide a sensible foundation for power research, it is naïve to assume that the findings from such can be directly applicable to other relationships in the supply chain, even in the same industry.

For these reasons, research is needed on the supplier-manufacturer side of the automotive industry as well as other industries to ensure the topic of power is rigorously and holistically covered by supply chain literature. Based on an analysis of the automotive industry, this paper seeks address this void with an investigation of power influences in supplier-manufacturer relationships from the view of the supplier. The research first seeks to define and evaluate specific sources of power within the industry then shed practical evidence as to how such power sources affect critical supply chain relationship elements. Finally, the research seeks to reveal how this power-affected relationship influences the performance of the chain. By accomplishing such goals, the research attempts to offer practical insight for the implementation of supply chain integration in addressing three critical research questions:

- *How does inter-firm power affect integrated relationships within the supply chain?*
- *How does a power-affected supply chain relationship affect the performance of the chain?*
- *Can supply chain management exist in the presence of power asymmetry, and if so, what role does power play in supply chain strategy?*

## **Literature Review: Supply Chain Integration**

It is argued by some that a key driver in the decline of U.S. competitiveness in the international marketplace has been fueled by a lack of emphasis on intangible benefits such as supplier relations.<sup>5</sup> Traditionally, U.S. manufacturers have maintained a distant, competitive supply chain environment with large supplier bases in order to obtain low cost bids.<sup>6</sup> Over the past two decades however, firms have looked toward a more relational attitude of sharing information and planning within the chain to position the entire chain as a source of strategic competitive advantage.<sup>7</sup> There has subsequently been a maturing assemblage of partnership research with both a general inter-organizational focus<sup>8</sup> and a logistics concentration.<sup>9</sup>

The potential benefits of these integrated supply chain relationships (Table 2) stem primarily from reductions in uncertainty and costs for partners as well as increases in responsiveness derived from functional synergies. Carter and Narasimhan highlight enhanced material flow and product development as well as improved flexibility, quality, service, and innovation.<sup>10</sup> Sources which attempt to verify partnering benefits generally find that such rewards tend not to be realized until several years after alliance formation, hinting at the necessary long-term nature of the relationship.<sup>11</sup>

<INSERT TABLE 2>

Though no quantifiable boundary exists between a transactional and an integrated relationship, several key elements make the integrated relationship unique including *trust*,<sup>13</sup> *cooperation*,<sup>14</sup> and *commitment*.<sup>15</sup> (See Table 3 for relationship element definitions.) Furthermore, though *conflict* may be an omni-present factor in any relationship,<sup>16</sup> the ability to manage and resolve conflict (*conflict resolution*) remains a necessary factor for the long term survival of the relationship. Given these critical relationship elements, the research described in this paper sought to measure the latent concept of the strength of an integrated supply relationship by evaluating perceived levels of trust (high), cooperation (high), commitment (high), conflict (low), and conflict resolution (high) present in the buyer-supplier relationship.

<INSERT TABLE 3>

### **Risks of Supply Chain Integration**

Some authors such as Ramsay warn that integrated supply chain relationships are not always justified,<sup>17</sup> and Leavy cautions that firms may often overestimate integration benefits while ignoring potential shortcomings.<sup>18</sup> Such risks include *heavy reliance on a single partner*,<sup>19</sup> decreased competitiveness due to *complacency*,<sup>20</sup> and *over specialization* within the partnership.<sup>21</sup> Lambert, et al. add numerous partnership failure sources due to mismatched perceptions and poor execution.<sup>22</sup> One significant potential risk of supply chain integration concerns loss of relationship control due to *power* influences.<sup>23</sup> Specifically, power-created dependence can lead to opportunism by partners and subsequently dissolve many of the



relational elements that are necessary for the development of effective buyer-supplier relationships. Thus, power may potentially harm one or both partners in the dyad.

### **Literature Review: Inter-firm Power**

Defined, power is the ability of one firm (the *source*) to influence the intentions and actions of another firm (the *target*).<sup>24</sup> Power research holds strong roots in the social and political sciences and has since been explored in marketing channels literature. This research, however, has failed to test power effects in an integrated inter-firm environment, and few of such sources have examined power on the supplier-manufacturer side.

French and Raven provide early, influential inter-firm power research in the development of the bases of power (Table 4) which examine the perceived reasons why one party may hold authority over another.<sup>25</sup> *Reward* and *coercive* remain the most transparent and widely recognized of such power bases, indicating the ability of the source to mediate dividends (such as increased business or shared benefits from cost reductions) or punishment (such as decreased business or dictated cost reductions) to the target. Beyond such traditional sources, other power bases may also retain a prominent role in the supply chain. For one, *expert* power refers to the perception that one firm holds information or expertise (such as product or process leadership) that is valued by another firm. Another consequential base, *referent* power, implies that one firm desires identification with another for recognition by association (such as part of Chrysler's Extended Enterprise or Honda's BP Program). *Legitimate* power, which includes both its inherent and *legal* forms, represents the final two power bases and infers that the target believes in the right of the source to wield influence (such as via a sales contract).

<INSERT TABLE 4>

To facilitate power exploration, many researchers have attempted to simplify power research through dichotomization of the different bases into categories such as coercive/non-coercive, mediated/non-mediated, and economic/non-economic (Table 5).<sup>26</sup> The research proposed in this paper concentrates upon the mediated/non-mediated dichotomy because initial discussions with industry practitioners indicated that it best models the power environment of the automobile industry. Mediated power represents influence efforts that are deliberately engaged (or threatened) by the power source to guide target response and include coercive, reward, and legal legitimate bases. Non-mediated power sources (expert, referent, and legitimate bases) are not specifically exercised or threatened to manipulate the target. As will be demonstrated later, this mediated/non-mediated dichotomization is validated with factor analysis.

<INSERT TABLE 5>

### **Power Effects on the Distribution Channel Relationships**

Logistics researcher have applied the power source literature to the analysis of marketing channel relationships, finding that the different bases of power will affect inter-firm relationships in significant yet contrasting ways. For instance, Brown, et al. found that use of mediated (coercive, legal legitimate, reward) power will lower genuine *commitment* for the target due to the resentment over the subordinate situation. The same research found, however, that non-mediated (expert, referent, legitimate) power sources increase commitment.<sup>27</sup> Hunt, et al. found

a positive relationship between non-mediated power and *cooperation*,<sup>28</sup> and likewise, Skinner, et al. found that coercive power holds a negative association with cooperation.<sup>29</sup> Kumar, et al. found that both *trust* and *commitment* are increased with expanded interdependence<sup>30</sup> but like Anderson and Weitz, found that inter-firm asymmetry will defeat both trust and commitment.<sup>31</sup> Other research has found that the level of conflict between two firms is associated positively with mediated power and negatively associated with non-mediated power.<sup>32</sup> On the other hand, Wilkinson found that both mediated and non-mediated power contribute equally to the amount of conflict experienced in a relationship.<sup>33</sup>

The review of the marketing power literature indicates the significant and expansive effects of power upon inter-firm relationships, and such findings hold direct implications for the supply chain. If marketing channel research has found significant effects of power upon those elements (trust, cooperation, commitment, conflict, and conflict resolution) established as critical to effective supply chain integration, it is evident that power may play a consequential role in the formation and maintenance of supply chain relationships. Applying such a concept to a mediated/non-mediated dichotomization in the supply chain, two sets of power-effects research hypotheses are thus generalized as:

*H<sub>01</sub>: Mediated power bases (coercive, legal legitimate, reward) will have no effect upon the strength of the supply chain relationship.*

*H<sub>a1</sub>: Mediated power bases will have a significant **negative** effect upon the strength of the supply chain relationship.*

*H02: Non-mediated power bases (expert, referent, legitimate) will have no effect upon the strength of the supply chain relationship.*

*Ha2: Non-mediated power bases will have a significant **positive** effect upon the strength of the supply chain relationship.*

## **Power and Performance**

Performance is defined as the ability to effectively attain desired goals and objectives, and empirical research has demonstrated that integrated supplier-buyer relationships can significantly enrich performance.<sup>34</sup> Given that power may influence the inter-firm relationships driving supply chain integration, such power may thus also affect the performance of the chain. Thus, the next step in the investigation of supply chain power is to examine the consequences of a power-affected relationship upon chain performance. If performance is significantly dependent upon the relationship, the importance of power awareness is magnified.

In the marketing channels research, Etgar confirmed that channel member performance can be affected by power as well as countervailing power.<sup>35</sup> Brown et al. found that use of mediated power erodes performance of the target, while use of non-mediated power will improve the target's opinion of the source's performance.<sup>36</sup> Furthermore, Stern and Reve report that the power holders will enjoy higher profitability and that cooperation in the channel can increase overall profitability.<sup>37</sup>

Breaking down performance into that of the power source, power target, and the integrated supply chain as a whole, the following performance hypotheses are formed:

*Ho3: The strength of the power-affected supply chain relationship has no effect upon supply chain (source, target, and entire supply chain) performance.*

*Ha3: The strength of the power-affected supply chain relationship has a significant **positive** effect upon supply chain (source, target, and entire supply chain) performance.*

## RESEARCH METHODOLOGY

The above three sets of research hypotheses may be consolidated into a single generalized model to depict the implied causal relationships among the research variables (Figure 1). The paths for Hypotheses Ho1 and Ho2 examine the effects of the different power sources (mediated and non-mediated respectively) upon the strength of the supply chain relationship as measured by levels of commitment, cooperation, trust, and conflict. The Ho3 path explores the consequences of the power-affected relationship upon the performance of the entire supply chain as well as its individual constituents. Analysis of the significances of these paths will allow for testing of the research hypotheses and subsequently lead to insight into the effects of power in the supply chain.

<INSERT FIGURE 1>

Given the many linked, causal relationships represented within the research model, *structural equation modeling* was selected as the best tool for model evaluation. Structural equation modeling extends the concept of a single dependence-based regression equation to accommodate multiple dependence relationships simultaneously in one aggregate model.<sup>38</sup>

Thus, the research was able to utilize structural equation modeling to concurrently test all of the proposed research hypotheses.

## **Data Collection**

With its supply chain focus and distinguishable power structure, the automotive industry was targeted as an effective laboratory to test the research hypotheses. Meetings were held with both manufacturers and suppliers in the industry to verify the direction and value of the research. Based on this interaction as well as an extensive review of relevant literature, a survey instrument was developed from established power research<sup>39</sup> to measure each of the research variables. Each variable was assessed with at least four statements, all with 7 point Likert scales. (Appendix I gives examples of survey statements.) The survey content was then refined through iterative pilot testing with the industry experts who assisted with connotation, clarity, and flow.

The finalized survey instrument was mailed to high level executives (e.g. CEO, President, Vice-President, etc.) at 511 Tier I suppliers of the Chrysler Corporation and Honda of America. Chrysler and Honda were selected as the focus of the study based on their leadership of cooperative supply chain integration within the automotive industry as established through interviews with key industry practitioners and literature.<sup>40</sup> A cover letter accompanied the survey to explain the research objectives, establish confidentiality, and verify the research as an independent, academic project. The supplier executives were also promised a summary of the research results for their participation. A follow-up post card was mailed a week after the initial survey mailing to encourage response, and a second-round survey mailing was then conducted to non-respondents followed by a second-round reminder postcard. Subsequent data collection

efforts yielded usable returns from 180 suppliers for a response rate of 35.2% which compares favorably to similar academic surveys. *Non-response bias* was assessed via a sample of non-respondents as well as Chi-square goodness of fit tests,<sup>41</sup> and each of these methods indicated no such bias.

## **Model Testing**

An initial exploratory factor analysis<sup>42</sup> was run on the power bases to test for the mediated/non-mediated dichotomy. The results of the inter-factor correlation matrix (Table 6) support the non-mediated grouping as expert, referent, and legitimate, but while coercive and legal legitimate power bases also correlated significantly, reward power stood alone as a independent base. Given these results, the research proceeded with a trichotomization of power strategies including non-mediated (expert, referent, legitimate), coercive-mediated (coercive, legal legitimate), and reward-mediated (reward). Combining these three power strategies and performance orientations (manufacturer, supplier, supply chain), nine models were tested in all (Figure 2).

<INSERT TABLE 6>

<INSERT FIGURE 2>

Anderson and Gerbing's two-step approach to the assessment of structural equation modeling<sup>44</sup> was used to test the research models. During the first step of this method, Confirmatory Factor Analysis is used to validate the *measurement model*, verifying the ability of the indicator scales

to measure the latent factors they were intended to measure.<sup>45</sup> The fit indices for the measurement models are summarized in Table 7 and indicate convergent validity for all items.<sup>46</sup> All survey items for each of the model variables were found to load on their pre-supposed factors with the exception of the legitimate power base.<sup>47</sup> For this reason, legitimate power was removed from the modeling. Discriminant validity was established through pairwise confidence interval comparisons of inter-factor correlations.<sup>48</sup> In addition, scale reliability was established through analysis of composite reliability<sup>49</sup> and variance extracted estimates<sup>50</sup> (Table 8).

<INSERT TABLE 7>

<INSERT TABLE 8>

## **RESEARCH FINDINGS – POWER EFFECTS ON THE SUPPLY CHAIN**

Given an established measurement model, the second step of Anderson and Gerbing's approach analyzes the *structural model* to test the significance of the causal model paths in assessment of the associated research hypotheses. Table 9 reveals the satisfactory fit and parsimony of each of the nine models.<sup>51</sup> Tables 10 and 11 reveal the statistical significance of the model paths, thus revealing the results of the tested hypotheses. A small p-value indicates path significance and subsequent rejection of the null hypothesis represented by that path. Several key insights arise from these power effects findings, each of which are important to integration strategy with the supply chain:

<INSERT TABLES 9>



<INSERT TABLES 10>

<INSERT TABLES 11>

*Referent and expert power each retain a beneficial effect on buyer-supplier relationships.*

With respect to non-mediated power bases (with legitimate power due to the aforementioned lack of validity), *expert* power was found to hold a significant positive influence upon the buyer-supplier relationships as measured by perceived higher levels of commitment, cooperation, trust, and conflict resolution accompanied by decrease tendencies for conflict. This finding thus leads to rejection of Ho2 for this base, revealing the veritable strength of expert power as an instrument to promote integration of the supply chain. The target apparently values the expertise and will be naturally drawn to a closer relationship with the source. Such a finding appears reasonable in the automotive industry considering the value placed upon product and process design capabilities. The suppliers recognize the ability of the manufacturer to provide access to industry intelligence created by its expansive business relations in the chain. Thus, it is clear that the auto manufacturers need to understand what expertise the suppliers value and leverage this expertise as supply chain incentives. Recognizing that their suppliers are often the true source of this knowledge base, the manufacturers can further enhance their own expert power position by serving as knowledge/expertise brokers for their supply chain through coordination of supplier design and production efforts. Many manufacturers are already capitalizing on such an idea with technology centers and coordinated supplier forums.

The research results also point to rejection of Ho2 for *referent* power, revealing the significant advantageous effects of referent power upon the buyer-supplier relationship. This implies that targets that wish to maintain visibility with the power source will intrinsically seek a closer relationship. Such a result indicates that the suppliers in the automotive industry value identification with certain manufacturers, thus promoting a team-oriented supply chain environment driven by the leadership of the manufacturer. Such a notion is already formally operationalized by both Chrysler and Honda with their relational supply chain orientations.

The results for the expert and referent power bases indicate how power can actually be used to enhance relationships in the supply chain. Thus, not only may supply chain integration exist in the presence of power asymmetry, power may actually be utilized as a tool to promote supply chain coordination and effectiveness. It is therefore imperative that the auto manufacturers be able to recognize their own levels of expert and/or referent power and subsequently develop their supply chain strategies to exploit such strengths.

*Coercive and legal power harm the nature of the buyer-supplier relationship.*

For *coercive-mediated* power sources, Ho1 is rejected, indicating coercion retains a significant negative effect upon the buyer-supplier relationship. Although coercive-oriented strategies may be necessary at times, the research thus indicates that such use of coercion will damage the relational orientation of the supply chain. Coercive power has historically been a visible part of the U.S. automotive industry, but this research indicates that those manufacturers which continue to rely on coercive tactics will harm their own ability to effectively integrate with their suppliers. This could affect the ultimate competitive competence of the manufacturer.

Like coercive power, Ho1 is also rejected for *legal legitimate* power indicating significant negative effect of this power base upon the strength of the buyer-supplier relationship. Contracts are often an inevitable element of transactional relationships, but this research finding argues that it is in the best interest of the involved parties to not use the contract to strong-arm the other. The auto industry has tended to move away from traditional, formal contracts to emphasize more informal, evergreen style agreements. Such a movement serves to negate the potential for legal power plays, and given the harmful effects of legal power found by the research, it appears that this transition to a non-contractual environment will support supply chain integration.

*The ultimate effect of reward power influences is not conclusive.*

It was earlier hypothesized that reward power as a mediated source would have a negative effect upon the supply chain, but the research actually found some evidence for a beneficial effect of reward power. Although this finding offers initial support for reward programs, the larger p-value indicates that the results were not as conclusive as that of expert and referent power however. Traditionally, manufacturers in the auto industry have emphasized reward programs to drive performance improvements by their suppliers, but the outcome from the reward hypothesis suggests that the relational benefits of reward-based incentive programs in the industry appear to be somewhat limited in their effect. Such a finding may be driven somewhat by the close connection between reward and coercive power in that a power target may mistakenly interpret a reward as an intention of coercion. For instance, a reward that is offered but not delivered may be construed as a punishment. Thus, to facilitate more effective supply chain integration, the auto manufacturers are more likely to better benefit from emphasizing expert and referent power bases and de-emphasizing reward programs.

*Power may be utilized as a tool to promote supply chain integration.*

The overall results from the power-effects hypotheses reveal the significant impact of power upon buyer-supplier relationships. Power will impact the supply chain, and this effect may be beneficial or injurious depending on the power bases involved. If a power-holding manufacturer is not aware of its own power arsenal or understand how such power affects its integration efforts, that firm risks ineffective or misdirected supply chain strategy. Furthermore, the contrasting effects of the different power bases may cause the harm of a negatively-oriented base such as coercion to negate the benefit of a positively-oriented base such as expertise. Thus, manufacturers in the automotive industry must carefully control the use of coercive, legal, and reward power while best leveraging applications of expert and referent power. Given that the auto manufacturers tend to stress reward-based programs as well as retaliation by coercion, the research results indicate the need for these manufacturers to reconsider the use of (or lack thereof) power elements in their supply chain strategies.

## **RESEARCH FINDINGS – RELATIONSHIP EFFECTS UPON PERFORMANCE**

The previous power-influence findings indicate the gravity of power effects within the supply chain, and through Ho3, the research also investigates the consequence of this power-affected supply chain upon the performance of the chain. Performance was measured by this research subjectively from the view of the supplier. Summarized in Table 11, the results of the relationship-performance path analyses reveal the beneficial impact of integration upon performance throughout the supply chain.

*A stronger buyer-supplier relationship has a beneficial impact upon the performance of all members of the supply chain.*

The structural equation modeling led to rejection of Ho3, indicating that performance may be enhanced by supply chain integration. A stronger buyer-supplier relationship is specifically found to have a positive significant effect upon the performance of the manufacturer as the power source, the supplier as the power target, and the entire supply chain as a whole. Such findings indicate that a tighter buyer-supplier relationship allows for better performance of supply chain objectives. Thus, those power holders that create a more effective, integrated supply chain will be better able to position the chain as a market leader and subsequently benefit both themselves and their suppliers.

The relationship-performance findings align with the linked notion of the supply chain in the automotive industry. Improvements as well as impairments at distinct points within the chain tend to affect the other chain members. Thus, the autonomistic manufacturer will find it difficult to develop a sustainable competitive advantage without the participation of its supplier base. By capitalizing on the synergistic coordination of an integrated supply chain, the auto manufacturer and its supplier base are better able to respond to competitive pressures in the industry and attain higher levels of performance. Such relationship-performance findings further validate the pursuit of a supply chain orientation within corporate strategy in the U.S. automotive industry to build and maintain a strategic advantage.

*Effective power management in the supply chain may be used as a tool to enhance performance of the power holder and the entire supply chain.*

The research earlier revealed that power has a significant influence upon the buyer-supplier relationship, and it has just been shown that this relationship will enhance performance. It remains clear that power will thus indirectly influence performance via the buyer-supplier relationship. This ensuing effect of power upon performance highlights both the need for an awareness of power among automotive manufacturers and the importance of effective power management within the supply chain. The manufacturers must comprehend the scope of their power and understand how to use it effectively to drive performance.

Due to the nature of power asymmetry in the automotive industry, modifications to power strategy must originate with the manufacturer as the power holder, but for the most part, the manufacturers have been reluctant to yield their power advantage. The relationship-performance results offer instigation for the power source to control its authority, however, as that firm can actually enhance its own performance by doing so. Furthermore, it is clear that those manufacturers which fail to adjust their supply chain strategy for power influences risk harming their own performance and subsequent competitive position in the industry.

## **CONCLUSIONS**

Supply chain integration represents a promising but intricate tool that is still maturing as a weapon in the international business place. To support this maturation process, more supply chain research and practitioner wisdom is needed to expose the critical drivers and barriers of the integration process. The research described in this paper seeks to offer initial evidence to

recognize power as one such variable in the supply chain.

Power remains a predominant yet overlooked factor in supply chain strategy, and subsequently, the distinct role of power within the chain remains ambiguous. Most firms are not completely aware of the broad scope of power dimensions and therefore may not actively manage their own power bases. Such practitioners risk ineffective and potentially damaging supply chain strategy. Likewise, there has been little logistics research that focuses upon power effects in the supply chain, and thus, insight derived from the supply chain integration literature base may in part be naïve and misleading.

With foundations from marketing channels literature, the research presented here seeks to contribute an initial offering to reveal the role and subsequent importance of power within the supply chain. The findings may be summarized with four key theses:

- *Power plays a significant role in the supply chain, and the different sources of power have contrasting effects upon inter-firm relationships in the chain. Thus, both the power source and the power target must be able to recognize the presence of power, then reconcile supply chain strategy for power influences.*
- *A stronger buyer-supplier relationship will enhance performance throughout the chain. This offers validation for the pursuit of supply chain integration as a key driver of corporate strategy and promotes the need for a better understanding of the integration process.*

- *Exploitation of the supply chain by the power partner may lead to dissention and under performance, thus hurting the power holder. Likewise, a judicious use of power may serve to benefit the power holder.*
- *Influences of power on the buyer-supplier relationship and subsequent effects of this relationship upon supply chain performance expose the potential of power as a tool to promote integration of the chain and empower higher levels of performance. This performance benefit incites the power holders to take a second look at their positioning of power within supply chain strategy and urges a more conscious, considerate use of power.*

Supply chain strategy must be formulated with complete and sober information. Thus, firms must understand their chain partners in all respects. Such a notion includes comprehension of the sources, imbalances, and consequences of power to direct the most beneficial use (or disuse) of this power for the performance of the chain. While it is not the intention of this paper to promote power management as a cure-all for effective supply chain integration, this paper does seek to establish the importance of power as one significant element of such integration. In doing so, it works to encourage the awareness of power effects within practitioner and academic supply chain pursuits, offering to help map one penetrating piece of the integration puzzle.

This paper hopefully provides both instigation and insight for the academic and practitioner pursuit of power influences in the supply chain. Despite the value of this research in exposing power issues, it does not offer a complete analysis of power effects. Much more power research is needed to further clarify the true role of power asymmetry in the supply chain. Such



research may take the form of a similar methodology applied to other industries where power plays a prominent role. Another valuable source of power research may include longitudinal analyses to study the impact of power influences in the supply chain relationship over time. Furthermore, the research presented here only measures power effects from the viewpoint of the supplier as the power target, so the analysis does not necessarily offer a complete vision of power management. An analysis from a dyadic perspective of both the target and source would most likely yield enhanced practical insight for industry application. This could be further extended to include the multiple echelons of the supply chain to understand power effects on a network of relationships. Finally, the effects of a power-based relationship upon performance could be greatly expanded through the use of objective performance measures rather than the subjective measures used in this research.

The importance of supply chain integration strategy to corporate competitiveness has expanded significantly over the last decade, and such growth will continue into the millennia. Given the significance of power effects within the chain exposed by the research presented here, power issues will likewise continue to become more prevalent. Despite the promising results of this research, the automotive industry should not necessarily serve a benchmark for power management as even the most relationally oriented auto manufacturers still manipulate the supply chain with power. It is critical to realize, however, that those firms which seek to lead the race to integrate the supply chain must become exhaustively conscious of their own power and effectively manage this power to support their integration strategy. These firms will be better qualified to both recognize and capitalize on integration opportunities, helping them to develop and sustain supply chain integration as a source of competitive advantage.

## APPENDIX I

### SAMPLE SURVEY QUESTIONS

#### **Expert Power**

*XXX is an expert in the automotive industry.*

*We respect the judgment of XXX's representatives.*

*XXX retains business expertise that makes them likely to suggest the proper thing to do.*

#### **Referent Power**

*We really admire the way XXX runs their business so we try to follow their lead.*

*We often do what XXX asks because we are proud to be affiliated with them.*

*We talk up XXX to our colleagues as a great business with which to be associated.*

#### **Legitimate Power**

*XXX has the right to tell us what to do.*

*Since XXX is our customer, we should accept their requests and recommendations.*

*Customers have a right to expect suppliers to follow their instructions.*

#### **Legal Legitimate Power**

*XXX often refers to portions of an agreement to gain our compliance on a particular request.*

*XXX makes a point to refer to any legal agreement when attempting to influence us.*

*XXX uses sections of our sales agreement as a "tool" to get us to agree to their demands.*

#### **Reward Power**

*XXX offers incentives when we were initially reluctant to cooperate with a new program.*

*We feel that by going along with XXX, we will be favored on other occasions.*

*XXX offers rewards so that we will go along with their wishes.*

#### **Coercive Power**

*If we do not do as asked, we will not receive very good treatment from XXX.*

*If we do not agree to their suggestions, XXX could make things difficult for us.*

*XXX makes it clear that failing to comply with their requests will result in penalties against us.*

#### **Commitment**

*Our firm is committed to the preservation of good working relationships with XXX.*

*Our firm believes in XXX as a partner.*

*Our relationship with XXX could be described as one of high commitment*

#### **Conflict**

*Sometimes XXX prevents us from doing what we want to do.*

*XXX does not have our best interests at heart.*

*We often disagree with XXX on critical issues.*

#### **Conflict Resolution**

*The discussions we have with XXX in areas of disagreement are usually very productive.*

*Our discussions in areas of disagreement with XXX create more problems than they solve.*

*Discussions in areas of disagreement increase the strength of our relationship.*

#### **Cooperation**

*Our relationship with XXX is better described as a "cooperative effort" rather than an "arm's length negotiation".*

*Overall, our firm and XXX perform well together in carrying out our respective tasks.*

*We feel that we can count on XXX to give us the support that other suppliers receive.*

**Trust**

*XXX is concerned about our welfare.*

*XXX considers how its actions will affect us.*

*We trust XXX.*

**Performance**

*The performance of the entire supply chain has improved as a result of our relationship with XXX.*

*The efficiency of our relationship with XXX has improved XXX's performance.*

*Without XXX, our performance would not be as good as it is with them.*

## ENDNOTES

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**TABLE 1**  
**U.S. NEW VEHICLE SALES - 1998**

<b>Manufacturer</b>	<b>Vehicles Sold, U.S. Market</b>	<b>% of Total</b>	<b>Cumm.</b>
General Motors/Saab	4,583,546	30.2%	30.2%
Ford/Jaguar	3,908,354	25.8%	56.0%
Chrysler/Mercedes	2,680,256	17.7%	73.7%
Toyota/Lexus	1,361,025	9.0%	82.7%
Honda/Acura	1,009,600	6.7%	89.3%
Nissan/Infiniti	621,528	4.1%	93.4%
VW/Audi/Rolls Royce	267,616	1.8%	95.2%
BMW/Land Rover	152,981	1.0%	96.2%
All Other	575,407	3.8%	100.0%
<hr/>			
<b>Total</b>	15,160,313	100.0%	

Source<sup>1</sup>

**TABLE 2**

**POTENTIAL BENEFITS OF INTEGRATED BUYER-SUPPLIER RELATIONSHIPS**

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<b>Reduced Uncertainty for Buyers in:</b> <ul style="list-style-type: none"><li>• materials costs</li><li>• quality</li><li>• timing and lead times</li><li>• availability and responsiveness</li></ul>	<b>Cost Savings from:</b> <ul style="list-style-type: none"><li>• economies of scale in<ul style="list-style-type: none"><li>- ordering</li><li>- production</li><li>- transportation</li></ul></li><li>• decreased administration costs</li><li>• decreased switching costs</li><li>• integration of processes, technologies</li><li>• improved asset utilization</li></ul>
<b>Reduced Uncertainty for Suppliers in:</b> <ul style="list-style-type: none"><li>• market</li><li>• understanding of customer need</li><li>• product/materials specifications</li></ul>	
<b>Reduced Uncertainty for Both in:</b> <ul style="list-style-type: none"><li>• convergent expectations and goals</li><li>• reduced effects from externalities</li><li>• reduced opportunism</li><li>• increased communication</li><li>• shared risk and reward</li></ul>	<b>Enhanced Responsiveness from:</b> <ul style="list-style-type: none"><li>• joint product and process development</li><li>• faster time to market</li><li>• improved cycle times</li></ul>

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Sources<sup>12</sup>

**TABLE 3**  
**DEFINITIONS OF RELATIONSHIP ELEMENTS**

<b>Relationship Element</b>	<b>Description</b>	<b>Integrated Relationship Characteristic</b>
<b>Commitment</b>	<i>Feeling of being emotionally impelled to maintain a long term relationship</i>	High levels of commitment
<b>Conflict</b>	<i>Disunity caused by competitive or opposing action</i>	Low levels of conflict
<b>Conflict Resolution</b>	<i>Ability to relationally mitigate disunity through mutual solution</i>	Strong ability to resolve conflict
<b>Cooperation</b>	<i>Association of mutual benefit through joint effort</i>	High levels of cooperation
<b>Trust</b>	<i>Confidence in honesty and integrity of partner</i>	High levels of trust

**TABLE 4**  
**BASES OF INTER-FIRM POWER**

<b>Power Base</b>	<b>Description</b>	<b>Automotive Industry Example</b>
<b>Reward</b>	Source retains ability to mediate rewards to target.	<i>Manufacturer awards additional business to supplier.</i>
<b>Coercive</b>	Source holds ability to mediate punishment to target.	<i>Manufacturer cancels business with supplier.</i>
<b>Expert</b>	Source has access to knowledge and skills desired by target.	<i>Supplier desires participation with Honda's BP program.</i>
<b>Referent</b>	Target values identification with source.	<i>Supplier desires association with Chrysler's Extended Enterprise.</i>
<b>Legitimate</b>	Target believes source retains natural right to influence.	<i>Supplier views itself as direct subsidiary of manufacturer.</i>
<b>Legal Legitimate</b>	Source retains judiciary right to influence target.	<i>Supplier and manufacturer maintain a formal sales contract.</i>

Sources<sup>21</sup>



**TABLE 5**  
**DICHOTOMIZATION OF POWER BASES**

<b><u>Mediated</u></b>		<b><u>Non-mediated</u></b>
Coercive	vs	Expert
Legal		Referent
Reward		Referent
<hr/>		
<b><u>Coercive</u></b>		<b><u>Non-coercive</u></b>
Coercive	vs	Expert
		Legal
		Referent
		Reward
		Traditional
<hr/>		
<b><u>Economic</u></b>		<b><u>Non-economic</u></b>
Coercive	vs	Expert
Reward		Legal
		Referent
		Traditional

**FIGURE 11**  
**GENERALIZED RESEARCH MODEL**



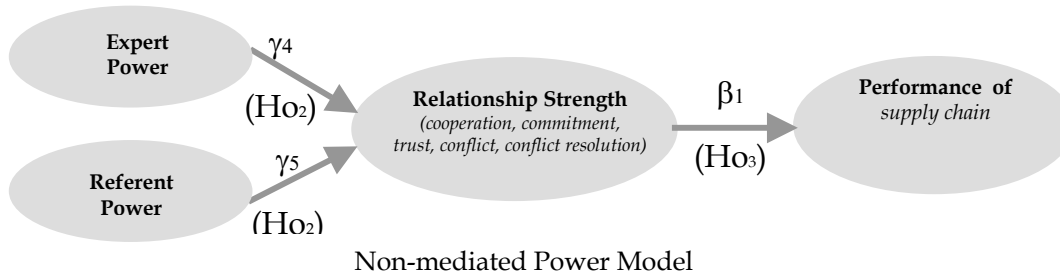
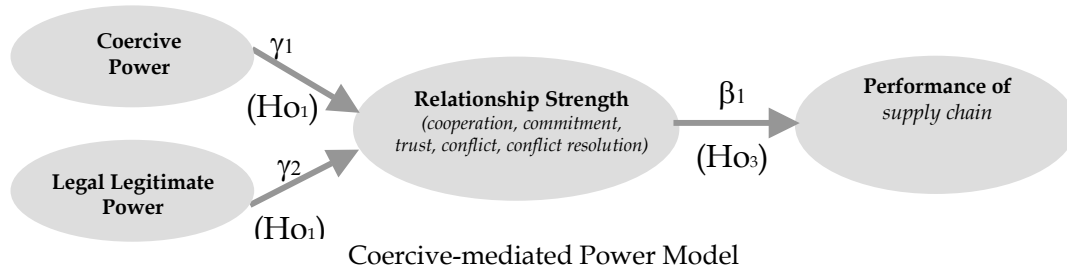
**TABLE 6**

**DICHOTOMIZATION OF POWER BASES: INTER-FACTOR CORRELATIONS**

	expert	referent	legit	legal	coercive	reward
expert	100*	56*	58*	-28	-37	13
referent		100*	50*	-34	-37	29
legit			100*	-38	-27	12
legal legit				100*	44*	13
coercive					100*	9
reward						100*

*Note:* Significance set as  $\geq .40^{43}$

**FIGURE 12**  
**SPECIFIC RESEARCH MODELS**



**TABLE 7**  
**FIT INDICIES FOR MEASUREMENT MODELS**

		<i>Coercive-Mediated</i>	<i>Coercive-Mediated</i>	<i>Coercive-Mediated</i>	<i>Reward-Mediated</i>	<i>Reward-Mediated</i>	<i>Reward-Mediated</i>	<i>Non-Mediated</i>	<i>Non-Mediated</i>	<i>Non-Mediated</i>	<b>Power Source</b>
<i>Fit Index</i>	<i>Suggested Value</i>	<i>Supplier</i>	<i>Manufacturer</i>	<i>Supply Chain</i>	<i>Supplier</i>	<i>Manufacturer</i>	<i>Supply Chain</i>	<i>Supplier</i>	<i>Manufacturer</i>	<i>Supply Chain</i>	<b>Performance</b>
<b>Chi-square</b>	< 2*d.f.	173.7	180.4	194.5	111.5	116.5	116.5	190.3	185.5	179.4	
<b>(d.f.)</b>		109	109	109	71	71	71	109	109	109	
<b>CFI</b>	> .90	0.97	0.97	0.96	0.98	0.97	0.97	0.96	0.96	0.97	
<b>NNFI</b>	> .90	0.97	0.96	0.96	0.97	0.96	0.96	0.95	0.95	0.96	
<b>GFI</b>	> .90	0.92	0.92	0.92	0.94	0.93	0.93	0.91	0.92	0.92	
<b>Residuals</b>	small, no pattern	small, no pattern	small, no pattern	small, no pattern	small, no pattern	small, no pattern	small, no pattern	small, no pattern	small, no pattern	small, no pattern	
<b>Factor Loadings</b>	all significant	all significant	all significant	all significant	all significant	all significant	all significant	all significant	all significant	all significant	

**TABLE 8**  
**RELIABILITY RESULTS**

<b>Construct</b>		<b>Composite Reliability</b> <i>(suggested value <math>\geq 0.70</math>)</i>	<b>Variance Extracted Estimates</b> <i>(suggested value <math>\geq 0.50</math>)</i>
<b>Power</b>	Expert Power	0.76	0.53
	Referent Power	0.80	0.57
	Legal Legitimate Power	0.90	0.75
	Coercive Power	0.84	0.65
	Reward Power	0.76	0.51
<b>Relationship</b>	Relationship Strength	0.89	0.62
<b>Performance</b>	Supplier Performance	0.85	0.65
	Manufacturer Performance	0.85	0.55
	Supply Chain Performance	0.85	0.66

*Note: Since multiple (9) models were tested, composite reliability and variance extracted estimates presented above indicate lowest value achieve in any model.*

**TABLE 9**

**FIT INDICIES FOR STRUCTURAL MODELS**

		<i>Coercive-Mediated</i>	<i>Coercive-Mediated</i>	<i>Coercive-Mediated</i>	<i>Reward-Mediated</i>	<i>Reward-Mediated</i>	<i>Reward-Mediated</i>	<i>Non-Mediated</i>	<i>Non-Mediated</i>	<i>Non-Mediated</i>	<b>Power Source</b>
<i>Fit Indices</i>	<i>Suggested Value</i>	<i>Supplier</i>	<i>Manufacturer</i>	<i>Supply Chain</i>	<i>Supplier</i>	<i>Manufacturer</i>	<i>Supply Chain</i>	<i>Supplier</i>	<i>Manufacturer</i>	<i>Supply Chain</i>	<b>Performance</b>
<b>Chi-square</b>	< 2*d.f.	221.6	190.9	185.4	116.9	121.8	121.6	187.4	195.2	209.9	
<b>(d.f.)</b>		113	113	113	73	73	73	113	113	113	
<b>CFI</b>	> .90	0.95	0.96	0.97	0.97	0.97	0.97	0.97	0.97	0.96	
<b>NNFI</b>	> .90	0.94	0.96	0.96	0.97	0.96	0.96	0.96	0.96	0.95	
<b>GFI</b>	> .90	0.90	0.91	0.92	0.93	0.93	0.93	0.92	0.91	0.91	
<b>Factor Loadings</b>	all significant	all significant	all significant	all significant	all significant	all significant	all significant	all significant	all significant	all significant	
<b>Parsimony</b>											
<b>PNFI</b>	> .60	0.79	0.76	0.76	0.75	0.74	0.74	0.77	0.77	0.76	
<b>RNFI</b>	> .90	0.96	1.00	1.00	0.99	0.99	0.99	0.98	0.97	0.97	

**TABLE 10**  
**RESULTS FROM THE POWER-RELATIONSHIP HYPOTHESES**

Power Base	t	P-value	Path	Result	Interpretation
Coercive (mediated)	-3.87	<.01***	$\gamma_1$	Reject Ho1	Coercive power has a significant <u>negative</u> effect upon the buyer-supplier relationship.
Legal Legitimate (mediated)	-6.64	<.01***	$\gamma_2$	Reject Ho1	Legal legitimate power has a significant <u>negative</u> effect upon the buyer-supplier relationship.
Reward (mediated)	2.49	>.01, <.05**	$\gamma_3$	Inconclusive for Ho1	Some evidence exists for reward power having a significant positive effect upon the buyer-supplier relationship.
Expert (non-mediated)	4.56	<.01***	$\gamma_4$	Reject Ho2	Expert power has a significant <u>positive</u> effect upon the buyer-supplier relationship.
Referent (non-mediated)	5.63	<.01***	$\gamma_5$	Reject Ho2	Referent power has a significant <u>positive</u> effect upon the buyer-supplier relationship.

\*\*\* indicates significance at  $\alpha = .01$

\*\* indicates significance at  $\alpha = .05$

\* indicates significance at  $\alpha = .10$



**TABLE 11**

**RESULTS FROM THE RELATIONSHIP-PERFORMANCE HYPOTHESES**

<b>Performance Orientation</b>	<b>t</b>	<b>P-value</b>	<b>Path</b>	<b>Result</b>	<b>Interpretation</b>
Manufacturer (power source)	3.95	<.01***	$\beta_{1m}$	<i>Reject Ho3</i>	<i>A stronger buyer-supplier relationship has a significant <u>positive</u> effect upon manufacturer performance.</i>
Supplier (power target)	8.42	<.01***	$\beta_{1s}$	<i>Reject Ho3</i>	<i>A stronger buyer-supplier relationship has a significant <u>positive</u> effect upon supplier performance.</i>
Supply Chain	4.40	<.01***	$\beta_{1c}$	<i>Reject Ho3</i>	<i>A stronger buyer-supplier relationship has a significant <u>positive</u> effect upon performance of the entire supply chain.</i>

\*\*\* indicates significance at  $\alpha = .01$

\*\* indicates significance at  $\alpha = .05$

\* indicates significance at  $\alpha = .10$