The Role of Supply Chain Integration in achieving competitive advantage: A study of UK Automobile Manufacturers

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ABSTRACT

The competitive nature of the global automobile industry has resulted in a battle for efficiency and consistency in supply chain management (SCM). For manufacturers, the diversified network of suppliers represents more than just a production system; it is a strategic asset that must be managed, evaluated, and revised in order to attain competitive advantage. One capability that has become an increasingly essential means of alignment and assessment is supply chain integration (SCI). Through such practices, manufacturers create informational capital that is inimitable, yet transferrable, allowing suppliers to participate in a mutually-beneficial system of performance-centred outcomes. From cost reduction to time improvements to quality control, the benefits of SCI extend throughout the supply chain lifecycle, providing firms with improved predictability, flexibility, and responsiveness. Yet in spite of such benefits, key limitations including exposure to risks, supplier failures, or changing competitive conditions may expose manufacturers to a vulnerable position that can severely impact value and performance. The current study summarizes the perspectives and predictions of managers within the automobile industry in the UK, highlighting a dynamic model of interdependency and interpolation that embraces SCI as a strategic resource. Full commitment to integration is critical to achieving improved outcomes and performance; therefore, firms seeking to integrate throughout their extended supply chain must be willing to embrace a less centralized locus of control.

1. INTRODUCTION

As modern enterprise continues to be subjected to a changing and competitive international standard, the role of effective resource and supply management within the context of design, development, production, and distribution is increasingly complex. Emphasising the competencies and skill sets critical to such managerial proficiency, [1] define supply chain management (SCM) as 'the systemic, strategic coordination of the traditional business functions and tactics across the business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole'. Focusing on the conceptual foundations underlying SCM practices, [2] extend this definition to reflect a highly ambiguous, multi-dimensional specialisation of managerial capabilities and resources in the form of a functional, efficient, and productive framework that complements firm operations, process objectives, and strategic supplier partnerships. Yet, the researchers also acknowledge that SCM is largely 'pre-paradigmatic' in its conceptual and theoretical construction due to the complex, dynamic nature of industry, organisational strategies, and developmental agendas [2].

Within the SCM framework, the nature of partnerships and strategic alliances continues to influence managerial decision making, directing and aligning agendas and objectives according to the networked capacities of both horizontal and vertical suppliers [3]. Integration, or the alignment of network capabilities, services, and information resources, seeks to maximise system efficiencies and organisational capacities through the connection and maintenance of manufacturers with their supply chain partners [3]. For the automobile industry, Supply Chain Integration (SCI) has evolved out of a critical developmental juncture, providing firms with resource and production capabilities that were previously unavailable or under-developed. John Oldfield, VP of Ford-Europe would suggest in the late 1990s that 'unless we can manage more product programmes faster, at lower cost and with lower investment, we will not be competitive [4]. An agenda driven by what [4] identify as a three-tier strategy of process, people, and technology, the

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evolution of automobile production throughout the global community was built upon compelling, distributed, and technology-facilitated relationships between teams and between manufacturers and suppliers. Within its modern iteration, [5] acknowledge that automobile manufacturers have continued to embrace supplier integration as a means of innovation, lead time reduction, and quality control.

It is from the paradigmatic origins of modern SCM that the current study investigates the practical benefits of SCI, attempting to model, evaluate, and describe the pathways and strategies underlying an effective and performance-centred protocol. By focusing on the automobile industry, this research explores one of the most complex, multi-component systems within modern enterprise. Accordingly, the focus of this study revolves around integrated services and resources that extend across both domestic and global networks. From suppliers to manufacturers to designers, the nature of integration in automobile manufacturing is continuing to evolve, seeking pragmatic solutions to competitive forces and market problems that can be alleviated through partnership and technologically-driven alliances. Over the course of this study, the core objectives associated with SCI will be considered and the experiences and predictions of industry leaders will be evaluated, focusing on the predictive determination of future agendas and strategies for effective SCI management. The current study evaluates SCI benefits and limitations in relation to SCM within this evolving and complex industry.

The paper critically evaluates the role of supply chain integration in helping automobile manufacturers to achieve their desired competitive strategies in the contemporary market environment. This research considers SCI as a catalyst for competitive positioning, development, and growth within a modern environment in which SCM continues to redefine the nature of product development and manufacturing. The next section reviews literature around SCI and factors that affects them. Section 3 elaborates the methodology followed. Section 4 discusses the findings and section 6 concludes this study.

2. LITERATURE REVIEW

2.1. SCI AND THE ROOTS OF INDUSTRY PARTNERSHIP

For automobile manufacturers, the supply chain integration process has a variety of potential benefits ranging from quality improvements to inventory management to design and development opportunities [6]. Kim [3] defines SCI as a 'formalized process that connects…one firm's processes with the processes of other firms', integrating 'unique and inimitable capabilities to leverage expertise and core competency'. From a partnership standpoint, there is an expectation of mutual exchange, whereby firms collaborate to reduce transaction costs, improve information sharing, and actively seek to 'create tangible or intangible value'[3]. Such value-added benefits are thereby extended to the consumer population in the form of product quality, service provision, or cost savings, enhancing the broader lifecycle of the product and its outputs [6].

Within the automobile industry, the nature of competition is international and continuously evolving, resulting in variable dimensions that affect and marginalize the relative capacities which domestic firms and foreign partners develop within their home markets [7], [8]. Focusing on the manufacturing process in Australia, for example, [7] demonstrate how multiple foreign producers entered into a competitive resource-driven environment, investing in capacity and capabilities in order to ensure that manufacturing needs could be met. As other nations expanded their own skill sets and capabilities to compete with the Australian manufacturing hub, however, the success of domestic operations is largely dependent upon systems integration and what [7] identifies as the 'social dimensions of their global operations'. From industry restructuring towards a component-based supply chain to the outsourcing of peripheral activities and centralized coordination of production activities, the benefits of SCI have not only created a competitive foundation for foreign operators in Australian manufacturing, but have modernized the dynamics of the regional supply chain[7].

For companies in competitive industries like automobile manufacturing, Petersen et al. [9] suggest that new product development (NPD) represents a critical determinant of competitive advantage. By integrating suppliers into the design and development phases of the product, the researchers propose that new ideas and new capabilities can be achieved that are superior to those generated at the organisation-only level[9]. By organizing suppliers according to their tier-based identities and creating interfaces and nodes of integration, participative vision can lead to improvements in developmental performance, and thereby, enhance end product outcomes. In order to operationalize the process of SCI, [5] introduce the concept of 'product lifecycle management' (PLM). This business strategy is 'intended to link all information, people, and processes associated with a product from birth through end-of-life disposal [5]. For the automobile industry, the structured traits of processes and resources create opportunities for architecting a model of

'configuration traceability and accountability persistence' that not only allows for PLM across finished outputs, but internal components, parts, and services as well [5].

At the core of SCM, [10] challenged managers to embrace a more efficient and effective partnering strategy that is not only based upon collaboration, but is driven by both internal and external contributions. Sodhi and Son [11] similarly describe a protocol of reducing partner asymmetry and building relationship-specific assets (e.g. technological integration) that can be used to create advantage and gain position in the marketplace. Such practices are largely based upon effective information exchange, mutual trust, and joint commitments to a singular goal or agenda [11]. Whilst integration practices may include various tangible resources such as machinery, buildings, and supply chains, [12] propose that intrinsic, intangible resources such as information exchange, skills and competencies, and value-based partnerships provide the most direct benefits for an integrated network. Ultimately, such observations are indicative of an execution-based agenda which, when linked to group priorities and objectives, creates the foundations for achieving and sustaining collaborative goals [12].

2.2. SCI AND ORGANIZATIONAL PERFORMANCE

Focusing on strategic performance outcomes, [3] argues that 'leading companies tend to work frequently with their supply chain partners to achieve exceptional synergies and benefits through integration activities such as accurately identifying customer demand and promoting a mutual exchange of information with suppliers'. Within such collaborative environments, [6] posit that relationship management plays a critical role in maximizing organizational performance, allowing suppliers to participate in decision making processes that might otherwise remain outside of their general locus of control. Once such relationships are established, both formal (contractual agreements, best practices, policies) and informal (verbal acceptance, experience, history) controls serve to determine the level of and conformance relative to the design specifications, reliability standards, finish, and overall durability of the products/components [6]. Through a statistical assessment of the correlation between SCI and product quality, [6] further reveal a positive, dynamic intersection between supply chain integration and product quality outcomes that translates into significant, sustainable performance outcomes.

The measures of performance within the automobile industry are ultimately linked to end-product outcomes; however, [8] propose that for managers seeking to assess supply chain effectiveness and performance effects, there is an extensive list of 20 factors that can be evaluated, highlighting a complex and inter-related paradigm for assessing and modelling supply chain performance throughout the extended, integrated product lifecycle. By assessing these factors in the form of if-then relationships (If variable X influences variable Y, then the outcome will be Z), [8] offer a complex, yet functional assessment tool which bases performance analysis in supply chain relationships upon the extended effects of fuzzy, matrix-driven analysis. Whilst the model itself is not empirically tested, it does present a valuable foundation on which future tests and assessments of performance could be based. For manufacturers, establishing expectations and value-based guidelines in SCI is one means of preventing inconsistencies and predicting quality outcomes [13]. Highlighting the integration of sustainable standards and green manufacturing guidelines across automobile supply chains in Brazil, [13] suggest that by committing to the reduction or elimination of hazardous substances through integrated, collaborative supply chains, firms have the potential to meet expanded environmental standards. From lean and efficient production to material selection and monitoring to workplace responsibility and human rights, the commitment to an extended, integrated, and responsible supply chain is predicated upon explicit, broadly disseminated values and priorities [13]. Through the establishment of continuous, effective communication channels, the definition of power dynamics and expectations, and the establishment of functional trust relationships, [14] propose that effective SCI can significantly enhance the performance-based influences of effective SCM initiatives.

Partnership quality and supply chain transparency is critical precondition of desirable SCM performance outcomes [15]. By committing to explicit goals, such as the total quality standard idealized by [16], systems management standards have the potential to overcome uncertainty and to achieve more desirable outcomes even when faced with uncertainty. In fact, [17] propose that through technological integration and information exchange, transaction costs can be systematically reduced, allowing flexibility during periods of demand fluctuation or uncertainty. In addition, by prioritizing efficient and functional partnerships over more adversarial SCM dynamics, what [17] describe as an 'ambidextrous' strategy that manages 'short-term operational efficiency and long term strategic flexibility', can be integrated into the SCM protocol to maximize the performance benefits of SCI. As described by [16] such approaches are about flexibility and proactivity, conditions that are enabled and supported by efficient SCI and collaborative supply chain partnerships.

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2.3. TECHNOLOGY AND SYSTEMS INTEGRATION STRATEGIZING

Early research in automobile systems integration by [4] predicted an environment in which technology would facilitate exchanges between interdependent, but virtual or distributed teams. The expectation was that through constant communication, shared online workspaces, and a mutual agenda, suppliers, designers, and manufacturers could collaborate to reduce costs, increase speed of production, and enhance the overall quality of the finished product [4]. Yet in order to achieve such integration, [18] propose that firms must be prepared to subvert a variety of key barriers including the 'lack of strategic alignment of information strategies in the chain, firm size, lack of awareness of the benefits, lack of motivation, and regional challenges'. Strategies which polarize or distance organisations from a more cooperative relationship can create incomplete integration outcomes that lead to informational vulnerabilities and the potential loss of fidelity in the interconnected partnerships [18]. Ultimately, it is the ability of firms to respond to changing market conditions and uncertainties which [19] suggest creates the advantages and dynamic benefits of a fully integrated supply chain standard.

Underscoring the SCI paradigm are three different approaches to integration including internal, supplier, and customer integration [20]. Internal integration involves inter-departmental interactions and collaboration that 'bring departments together into a cohesive organisation' [20]. Supplier integration refers to a 'process of interaction and collaboration between an organisation and suppliers to ensure an effective flow of supplies' [20]. Finally, customer integration represents a 'process of interaction and collaboration between an organisation and its customers to ensure an effective flow of supplies'. In order to further delimit the degrees of integration in supply chain relationships, [21] categorize exchanges according to 'demand-oriented and supply oriented' information collaboration. Demand-oriented information integration refers to tracking outcomes of consumer-orders, real-time sales data, forecasts, and market predictions, whilst supply-oriented information evolves out of inventory statistics, organizational policies, capacity, and system requirements [21]. Whilst firms may be willing to exchange supply side information with suppliers in a form of incomplete information framework, by failing to include demand side information and feedback, the potential for uncertainty-based risks and market influences is magnified [21].

Focusing on the roots of a systems-oriented integration paradigm, [3] acknowledges that SCI involves 'organizational practices for developing value-added seamless processes across a supply chain for sharing resources and knowledge among participants, and for transforming firms' capabilities into synergistic values'. Chen et al. (2009:64) further distil such interpretations of SCI into two primary objectives: 'connectivity and simplification'. From a connection standpoint, there is an expectation of integrating business processes across internal and external agents in order to create a seamless flow of transactions, resources, and processes. As a means of resolving complexity and mitigating risk within the broader supply chain environment, [22] further suggests that simplifying business processes through the elimination of duplication and the architecture of 'efficient and effective routines and policies' creates a common foundation on which integrated firms and departments engage in operational solution-making. Facilitated by advanced information technology systems, [23] suggests that such collaboration has the potential to identify more effective connections between processes and 'facilitate simpler and more reliable integration between them'. The resultant output is an efficient, value-added process that improves upon past processes and standards.

Technological advances not only create opportunities for SCI, but create new and innovative techniques that manufacturers can use to improve the design, production, and distribution processes underlying automobile manufacturing [24]. By expanding network communication channels to include a collaborative design process, [24] demonstrate how technological mediation can lead to key outputs such as component modularity that can then be used across multiple company resources or products. Through a proposed online parts library, the researchers demonstrate how new, accepted and alternative parts can be uploaded, classified, and compared to existing parts, allowing manufacturers to select the most cost-effective, seamless, and functional configuration for their vehicles [24]. Focusing on such collaborative workflows in practice, [23] outlines a network of integrated systems used in automobile clustering in Slovenia, characterizing a cloud-based database that allows teams to adjust and refine specifications and components in order to meet performance standards, identify new business opportunities, and ultimately reduce the end cost of the production process.

With the advent of online capabilities, [24] and [25] propose that e-business technologies have the potential to significantly enhance the functionality of supply networks. The objective of such systems is to create a functional connection between information technology resources across supplier that can be used to improve organizational performance [25]. In fact, [26] demonstrate empirically that through a functional, effective integration protocol, organisations are able to leverage innovative potential in order to maximize overall supply chain performance. Through improved visibility of supply chain nodes and channels, expanded information exchange capabilities, and the reduction of exchange-based barriers across the supply network, the potential for efficient partnerships and performance improvements is maximized [26]. As firms integrate their resources and information sharing capabilities into a singular

system, cooperative cost reduction initiatives and efficiency controls provide solutions to problems and uncertainties once borne individually [27]. Yet, the outcomes and overall performance of these networks is based upon what [28] describe as a 'willingness to share' agenda that requires both proactive and systematized exchanges in order to positively improve the supply chain dynamic.

From a review of academic research in this field, it is clear that there are several distinctive concepts that influence and target SCI practices. Firstly, there is an underlying expectation of strategic partnership which creates pathways for manufacturers to develop systems-driven alliances with their supply chain partners. In addition, there are technological resources and capabilities that provide the systems support and integrated services to ensure that efficiency and performance objectives are actualized through SCI commitments. Yet in spite of such efforts, the risks, opportunities and benefits surrounding the integration process have yet to be adequately assessed. There is a significant gap between the theoretical merits of integrated systems and services and the practical experiences, influences, and opportunities surrounding their manifestation in practice. This paper therefore attempts to address some of these research gaps.

3. METHODOLOGY

Based upon the multi-segment, multi-focus design of the [26] survey, the current study focused on developing and administering a survey based on past academic observations and industry concerns that could evaluate the processes and influences underlying the adoption of SCI within the automobile industry. Hence, a questionnaire was developed, focusing on capturing the honest and open perspectives and experiences of managers relative to SCI within automobile design and manufacturing. The quantitative survey segment was developed in four distinct sections (Demographic Overview; Structured Prompts; Weighted List (Benefits); Weighted List (Risks)) each of which was designed to capture different information or evidence from the participants by virtue of its construct. By ensuring that each of these instruments overlapped in terms of focus and scope, this research approach was designed to assess managerial perspectives and eliminate researcher bias according to a unified and revelatory research model [29].

In order to ensure their relevance and consistency in relation to the research focus, the initial draft was administered as a pilot study to four managers at different automobile manufacturers throughout the UK. Following the collection of these initial results and feedback from the participants, several adjustments were made across the spectrum of questions. Once the quantitative survey segment had been finalized, a five-question, open-ended qualitative survey was developed. Few semi-structured interview style component was developed based upon the quantitative prompts, but was designed to encourage open and honest feedback about the process of SCI and the hurdles, opportunities, and past experiences encountered within the automobile industry. Whilst these prompts were standardized for all of the respondents, the depth and breadth of each individual's response were varied, allowing for evidence to be analyzed and deciphered according to unique patterns and observations.

Through a review of the OICA (International Organisation of Motor Vehicle Manufacturers) [30] ranking of automobile manufacturers, a list of the top 20 manufacturers by volume was populated. The list includes manufacturers across the United Kingdom from North West & West Midlands to South West to East of England to South East to East Midlands & Yorkshire and the Humber. Whilst localization of study could provide insights into the unique and distinctive hurdles encountered by manufacturers within a given geographic region, the current research was undertaken to assess SCI from a broader, strategic perspective. Accordingly, 15 of the leading companies on the top 20 list were selected, providing a diverse representation from across the UK community. Whilst the initial survey target was 50 unique managers distributed across at least 10 different organisations, following the e-mail contact with the HR managers, the survey population was projected significantly lower (only 9 (18%) actual managers were willing to complete the survey). Accordingly, a revised tactic was devised based upon supplier contact portals and manufacturer queries. Through this revised, direct sampling strategy, e-mails were sent to a total of 47 managers across all 15 of the organisations in order to expand the sample population. In addition to the original nine managers, a total of 27 of the 47 prospects (57.4%) responded to the survey query. The combined survey population of 36 was then contacted via e-mail, skype, and telephone in order to administer the survey. Of the 36 prospects, only 34 completed the survey in its entirety. In order to prevent translation errors or challenges during the surveying process, all participants were required to speak and understand English before committing to the process. These managers were distributed across automobile manufacturers located within the South West (6), North West & West Midlands (8), East of England (8), East Midlands & Yorkshire and the Humber (5), and South East (7). By creating this comparable pattern of national manufacturing integration strategies, the survey results were able to be evaluated both as a broad representation of the automobile industry as a whole and by national beliefs and value systems. All results were collected from the respondents using a single form and randomized during the analysis process in order to restrict any layering or group-specific bias.

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4. FINDINGS AND DISCUSSIONS

4.1. PARTICIPANT DEMOGRAPHICS

The demographic factors captured from the respondents were divided across six different categories. The survey response revealed 29.4% of the respondents were female, whilst 70.6% were male. Comparing the age-range distribution of the respondents reveal that 61% of the participants were between the ages of 35 and 54 whereas 24% were under the age of 24, whilst just 15% reported attaining an age greater than 55. Looking at the educational level of participants it was found that 74% of respondents have some form of college degree while the remaining 26% had attended college at some point in time. In terms of the regional distribution, it was relatively equitable with higher representation in North West & West Midlands (23%), East of England (23%), and South East (21%) due to the higher representation of global leaders in automobile manufacturing within these regions. Remaining 15% were from East Midlands & Yorkshire and the Humber and 18% from south west. In terms of the experience majority (64%) of respondents were holding experience of 3-6 years, with just 6 % have worked in the industry for less than 1 year. A small percentage (9%) have achieved 7 or more years of employment, and a fairly large population of the respondents (21%) have worked within this industry for between 1 and 2 years. The final demographic factor assessed the individual respondents' positions within their current automobile organisations. With 32% operating within the sales side of the manufacturing system and 21% serving as line managers for this same system, there was a large percentage of this survey population with direct experience in SCI and SCM. No executives agreed to participate in this process; however, 29% of the respondents were regional managers of manufacturing operations, a grouping that was directly related to the e-mail based querying protocol employed during this sampling process.

4.2. REGIONAL COMPARISON OF MANAGERIAL THOUGHTS

The survey responses were first compared regionally. When asked about the complexity of automobile production that makes SCI a challenging and potentially risky venture, most respondents from South West and North West & West Midlands disagreed with this statement, whereas East Midlands & Yorkshire and the Humber respondents felt that there was a potential for SCI-based risk within the complex automobile industry. When asked whether the quality control concerns often prevent firms from adopting SCI in automobile manufacturing, South West participants rejected this claim, amongst North West & West Midlands manufacturers. There was strong agreement that quality control concerns prevent firms from adopting SCI. Given the agreement marginally reflected across the other three regions, there are quality controls-related concerns that must be addressed in order to improve the overall effectiveness and transitional influence of SCI. When asked whether relationships in SCM are critical to moderating uncertainty and meeting desirable network outcomes, the North West & West Midlands respondents suggested that relationships are critical to SCM moderating, a belief system that was further confirmed by South East and East Midlands & Yorkshire and the Humber participants, but two groups (South West and East of England) remained neutral. Strong disagreement was expressed by the South West and the East of England respondents when asked whether by outsourcing innovation or R&D, firms lose their own ability to develop and sustain competitive advantage. South East respondents were neutral whilst North West & West Midlands and East Midlands & Yorkshire and the Humber respondents indicated that there was concern about a lost ability to sustain competitive advantage through SCI. When asked whether there is significant liability associated with outsourced components in automobile manufacturing, a strong bias by the South West and the East of England respondents towards a rejection of liability, suggesting a claim of validity in outsourcing and supplier-manufactured components. Across the South East and North West & West Midlands, however, there was agreement, indicating a desire to retain control over manufacturing processes. Offering concerns about the market-based dynamics of the supplier-oriented manufacturing industry, the South West and the East of England respondents rejected the claim that a single hub could be used to produce all major components. This practice, however, was considered by the South East and North West & West Midlands respondents as potentially viable. With regard to the question whether future of the automobile industry is SCI and, as such, firms should evolve as quickly as possible, the South West and the East of England agree that the future of this industry is SCI, whilst the South East and North West & West Midlands agree, but are more hesitant to generate consensus to this prediction.

Focusing on partnering for success, 65.7% of the respondents agree that long term partnerships enhance the effectiveness of SCI, and in fact, 76.5% believe that those suppliers who refuse to integrate are likely to lose their position and status within the industry. Further emphasizing the relationship value, 58.8% of the respondents believe that relationships can moderate uncertainty and achieve network outcomes. Only 14.7% of the respondents agree that complexity makes SCI a risky venture, whilst a marginal 26.5% of the participants agree that outsourcing can lead to deficiencies in competitive advantage. These findings indicate a positive inclination towards support for SCI across the respondent population. To address the adaptation of SCI practices, 67.6% of the participants agree that in their current

state small scale suppliers do not have sufficient technological infrastructure to meet the integration requirement; however, 76.5% believe that most businesses will restrict their level of integration in the early stages of SCI anyway. There is an opening within such feedback for smaller scale suppliers to develop inroads to successful partnerships; a position which 64.7% of the respondents acknowledge is currently being serviced in a ratio of individual suppliers to multiple manufacturers in order to meet demand. Given that 44% of the respondents rejected the concept of a centralized supply hub for all automobile manufacturers, it is unlikely that there is a singular solution to future supply chain needs. Further, 79.4% of these managers caution that inadequate or deficient systems integration could lead to greater inefficiencies. Clearly, this process is based upon selective and strategic partnerships that are capable of meeting the needs and expectations of individual automobile manufacturers.

4.4. CONCLUSIONS

The evidence collected for research suggests that semi-integration strategies may expose corporations to greater risks than full integration strategies can ultimately achieve. For suppliers, integration means predictability, consistency, and transparency. For manufacturers, integration also reflects these principles, but it creates competitive advantage through the inimitable knowledge and shared capacities that emerge out of a shared-fate partnership. The participants in this study are not only supportive of integration strategies, but are wholly optimistic about their potential benefits for long term performance improvements and organizational development. Ultimately, it is this intersection between capacity and systems efficiency that creates additional value and can strategically improve responsiveness to risks and vulnerabilities arising from systemic, market-driven forces. For manufacturers of a complex, technologically advanced product like an automobile, the thousands of components used to achieve quality outputs are sourced from multiple suppliers across multiple tiers of separation and responsibility. Integration eliminates much of the uncertainty surrounding such relationships and allows agents and firms to address market and supply chain risks through a functional, efficient, and dynamic partnership. The true vulnerabilities within this industry evolve out of a failure to communicate and openly share information that could potentially impact upon performance outcomes. This study contributes additional justification for manufacturers pursuing an integration strategy and offers a summative paradigm for developing and implementing a centralized integration strategy for immediate deployment in future manufacturing partnerships.

The scope of the current study was focused on the experiences and observations of the managers within the context of their existing marketplaces. However, as additional competitors enter into this industry and the diversity of automobile partnerships expands, the role of SCI is likely to complicate assessment and analysis. For this reason, the current study was limited to the immediate and predictive conclusions and recommendations drawn from a narrow, yet multinational cohort of participants. Future research based upon case studies of strategy implementation, partner management, and resource optimization could provide additional benefits to this developing field.

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