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Overcoming Barriers to Supply Chain Involvement in Supplier Integration into New Product Development

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ABSTRACT

A strategic imperative for supplier integration into new product development (SINPD) is driven by the ever increasing demand for innovative products and global competition. SINPD leverages cross functional knowledge and external supplier capabilities to achieve innovation and quality, reduce costs, and accelerate market introduction. This paper examines expected supply chain management (SCM) personnel contributions to SINPD and the barriers to be overcome for SCM professionals to be strategic partners in such efforts. Significant barriers include misaligned supply strategy, unsupportive culture, limited capabilities, and lack of integrated processes. Survey methodology is used to develop a framework for overcoming such barriers based on insights from SCM professionals. The findings suggest that simultaneous top-down and bottom-up approaches to eliminating barriers is warranted. This research extends the discussion on SINPD by empirically examining the operational and strategic dimensions of organizational structures and processes that limit the contributions of SCM personnel toward the success of SINPD.

Keywords: *new product development, supplier integration, supply chain*

1. INTRODUCTION

In the current competitive landscape, Supplier Integration into New Product Development (SINPD) has become a critical strategy for firms seeking to remain innovative and responsive to global market demands. By leveraging cross-functional knowledge and external supplier capabilities, SINPD facilitates enhanced product quality, cost reduction, and accelerated time-to-market, offering a distinct competitive edge (Fisher, 1997; Ragatz, Handfield, & Scannell, 1997). Further, SINPD positively impacts supply chain resilience by mitigating operational and supply risks (Wieteska, 2020). Despite its strategic importance and benefits, many organizations struggle to fully capitalize on the potential benefits of SINPD due to persistent barriers that limit the effective contribution of Supply Chain Management (SCM) professionals to these initiatives.

SCM personnel play an integral role in bridging organizational silos and fostering collaboration between internal teams and external suppliers. Through activities such as supplier identification, cost management, and relationship building, SCM professionals ensure that supplier contributions align with the strategic goals of new product development efforts (Johnsen, 2009). However, the involvement of SCM personnel in SINPD often faces significant challenges, including misaligned supply strategies, unsupportive organizational cultures, limited technical capabilities, and the absence of integrated processes and systems (Pellathy *et al*, 2019). These barriers not only diminish SCM's potential impact but also jeopardize the overall success of SINPD projects.

The literature underscores the expected roles of SCM in SINPD and highlights gaps in the preparedness of SCM professionals to meet these expectations. Fisher (1997) and Ragatz *et al*. (1997) emphasize the importance of aligning supply chain strategies with product types and leveraging supplier expertise to drive innovation. Laursen and Andersen (2016) extend this perspective, demonstrating that supplier involvement in early stages of NPD can significantly enhance project outcomes. Despite these advantages, SCM's role in SINPD is often constrained by a lack of technical expertise and resource limitations, which hinder their ability to contribute to more strategic and technically complex aspects of product development (Baines *et al*., 2017; Schoenherr & Wagner, 2016).

Cultural and organizational barriers further exacerbate these challenges. As highlighted by Johnsen (2009), unsupportive organizational cultures and the "not-invented-here" syndrome within engineering and R&D teams often restrict SCM's early involvement in NPD efforts. Additionally, limited trust and misaligned objectives between SCM and other functions create inefficiencies and missed opportunities for collaboration. The absence of leadership-driven initiatives to position SCM as a strategic function often leaves it relegated to tactical roles, thereby limiting its potential contributions to SINPD (Kotter, 1996; Beer & Nohria, 2000).

Overcoming these barriers requires a multidimensional approach that addresses both the strategic

and operational aspects of SCM's role in SINPD. Leadership must champion cultural and strategic changes that elevate SCM to a more prominent role, while simultaneously investing in the development of SCM capabilities through training, recruitment, and enhanced systems integration (Amundsen & Martinsen, 2014; Lee, Willis, & Wei Tian, 2017). Schoenherr and Wagner (2016) argue that empowering SCM professionals to manage market turbulence and technological uncertainties can significantly improve their contributions to SINPD. Similarly, Srinivasan and Swink (2018) highlight the importance of supply chain analytics in enhancing visibility and adaptability, enabling SCM to respond effectively to dynamic project requirements.

Yet, existing SINPD research has a limited emphasis on the importance of pre-informing and involving supply chain early in SINPD (van Hoek and Chapman (2006), and more research is needed into improving alignment between supply chain and functional areas to improve SINPD effectiveness (van Hoek and Chapman, 2007). This study seeks to address the research gap by empirically examining the contributions of SCM to SINPD, identifying prevalent barriers, and proposing actionable strategies to overcome these challenges. Using a survey methodology, insights from SCM professionals are analyzed to develop a comprehensive framework for enhancing SCM's strategic involvement in SINPD. Though prior research has identified potential barriers to integrating suppliers into new product development in general, and to a lesser extent has identified barriers to internal SCM personnel involvement in SINPD, there is limited research into how SCM professionals should overcome such barriers to increase their involvement and improve SINPD outcomes. The findings emphasize the need for a simultaneous top-down and bottom-up approach, whereby leadership initiatives and grassroots innovations work in tandem to dismantle barriers and foster a culture of collaboration and shared responsibility.

By situating this research within the broader context of organizational change and strategic integration, this study aims to provide actionable insights for practitioners to increase the involvement and contributions of SCM personnel in SINPD. This research also contributes to the academic discourse on SINPD by proposing a research model specifically focused on the relative importance of strategic initiatives and business practices to enhance SCM readiness and ability to contribute to SINPD. The subsequent sections of this paper will explore the literature, methodology, and findings in greater detail, laying the foundation for practical recommendations to enhance the role of SCM in driving innovation and competitive advantage through SINPD.

2. LITERATURE REVIEW

Supplier Integration into New Product Development (SINPD) is widely recognized as a strategic imperative for organizations seeking competitive differentiation in innovation, cost efficiency, and market responsiveness. This section explores the multifaceted dimensions of SINPD, including its strategic importance, process, outcomes, challenges, and critical success factors, with a focus on the role of Supply Chain Management (SCM).

While the strategic importance of SINPD is well-documented, the specific contributions of SCM personnel to this process, the barriers to their involvement, and strategies to overcome such barriers remain largely underexplored. Though many studies do address "supply chain" challenges and opportunities during SINPD, few studies specifically address the operational and strategic challenges faced by SCM professionals and how they overcome such challenges. Van Hoek and Chapman (2006) noted that existing SINPD research has a limited emphasis on the importance of pre-informing and involving supply chain early in SINPD, so they made a call for research into improving alignment between supply chain and functional areas to improve SINPD effectiveness. The researchers subsequently identified that improving basic alignment, improving supply chain readiness, and leveraging supply chain capability are three key initiatives firms can take to drive a more efficient and effective SINPD process (Van Hoek and Chapman, 2007). This research builds on that call for research by focusing specifically on how SCM personnel within a firm can better position themselves to make earlier and more significant contributions to SINPD. By highlighting the research gap, this review underscores the need to investigate the barriers limiting SCM's involvement and its preparedness to contribute effectively to SINPD.

The strategic value of SINPD lies in its potential to harness supplier expertise and resources, thereby enhancing product quality, innovation, and time-to-market. Fisher (1997) and Ragatz, Handfield, and Scannell (1997) emphasize that integrating suppliers early in the new product development (NPD) process aligns supply chain strategies with organizational objectives, enabling firms to adapt to dynamic market demands. This alignment not only facilitates cost-effective solutions but also creates opportunities for shared risk and reward between organizations and their suppliers. Also, close buyer-supplier collaboration in NPD facilitates access to advanced technologies and fosters innovation. These studies underscore the strategic advantages of SINPD in achieving competitive differentiation and market responsiveness (Melander, 2014).

Furthermore, SINPD plays a pivotal role in fostering competitive advantage through collaborative innovation. Laursen and Andersen (2016) demonstrate that supplier involvement in the early phases of NPD such as conceptualization and design, enables organizations to leverage unique supplier capabilities, leading to the creation of differentiated products. The strategic importance of SINPD is further reinforced by its role in mitigating supply risks, improving resource utilization, and ensuring alignment with long-term technological roadmaps (Srinivasan & Swink, 2018). On the intangible side, SINPD strengthens supplier relationships, fosters trust, and builds organizational capabilities for future innovation (Schoenherr & Wagner, 2016).

The SINPD process encompasses several stages, including supplier selection, design collaboration, prototype development, and production ramp-up. SCM is integral to these stages, providing critical contributions such as supplier identification, cost assessment, and relationship management. Johnsen (2009) highlights SCM's ability to

bridge functional silos, ensuring seamless collaboration between internal stakeholders and external suppliers.

These processes, benefits, and outcomes are contingent on the effective integration of SCM into the SINPD process. The absence of SCM's strategic input often results in missed opportunities for cost optimization, supplier innovation, and alignment with organizational goals. This underscores the need for organizational structures and processes that enable SCM to play a more active role in SINPD.

Despite its strategic potential, SCM's role in SINPD often remains underutilized. Traditional SCM activities, such as procurement and logistics, are frequently prioritized over strategic contributions such as technology alignment and value engineering (Baines *et al*., 2017). This misalignment restricts SCM's involvement in high-impact areas of SINPD, such as early-stage design and innovation. Further, SCM's involvement in SINPD is frequently constrained by organizational, cultural, and technical barriers. Key challenges include:

- Organizational Barriers: Misaligned priorities and siloed functions often marginalize SCM's role in SINPD. Kotter (1996) and Beer and Nohria (2000) emphasize that leadership's failure to position SCM as a strategic partner inhibits its ability to contribute effectively.
- Cultural Resistance: The "not-invented-here" syndrome within engineering and R&D teams creates resistance to external collaboration, limiting SCM's early involvement (Johnsen, 2009).
- Technical Constraints: Limited technical expertise within SCM hinders its ability to engage in complex NPD activities, such as technology alignment and prototype development (Baines *et al*., 2017).
- Resource Limitations: Understaffed and overburdened SCM teams lack the capacity to participate meaningfully in SINPD initiatives (Pellathy *et al*, 2019).
- Process Inefficiencies: The absence of integrated systems and standardized processes for SINPD creates inefficiencies and reduces the effectiveness of SCM's contributions (Srinivasan & Swink, 2018).

Addressing these challenges requires a multidimensional approach that integrates leadership-driven initiatives, cultural change, and capability development. Key success factors include:

- Strategic Alignment: Organizations must align SCM strategies with overall business goals and prioritize SINPD as a strategic initiative (Kotter, 1996).
- Leadership Support: Strong leadership is essential for fostering a culture that values collaboration and positions SCM as a strategic partner (Lee, Willis, & Wei Tian, 2017). Further, organizational culture and flexibility support supply chain integration which in turn has a positive effect on firm performance (Porter, 2019).
- Capability Building: Investments in training, recruitment, and development are critical for equipping SCM professionals with the technical and managerial skills needed for SINPD (Amundsen & Martinsen, 2014).
- Integrated Processes: The implementation of standardized processes and integrated systems enhances SCM's ability to contribute effectively across all stages of SINPD (Schoenherr & Wagner, 2016).
- Supplier Collaboration: Building long-term, trust-based relationships with suppliers fosters alignment and enhances the effectiveness of SINPD initiatives (Laursen & Andersen, 2016).

By investigating these dimensions, this study aims to provide a comprehensive framework for integrating SCM into SINPD, enabling organizations to fully leverage supplier capabilities and achieve sustainable competitive advantage. This study also aims to suggest a research model that will identify the relative importance of different actions that companies might take to increase SCM involvement in SINPD in an attempt to improve SINPD outcomes. The findings will contribute to both academic discourse and practical applications, offering insights for practitioners seeking to enhance the strategic involvement of SCM in NPD.

3. METHODOLOGY

This research was driven by three primary questions.

1) What contributions do SCM personnel make to supplier integration into new product (SINPD) efforts?
2) What obstacles do SCM personnel face in making contributions to SINPD?
3) What are SCM professionals doing to overcome those barriers?

A survey was developed that had two purposes. The first purpose was to provide some basic evidence that the SINPD experiences of the potential respondents to this survey were similar to the experiences of others described in the existing literature. To meet that objective, a small set of Likert scaled questions were presented to examine the respondents' strategic perspective of SINPD, the level of satisfaction of SINPD efforts, and the expected role of SCM personnel in SINPD. The second purpose was to identify the strategies and practices respondents are actually using to increase SCM personnel's contributions to SINPD efforts. To meet that objective and given the relative lack of existing research on this topic, open-ended qualitative questions were presented. The qualitative responses informed the development of a practical framework for firms to employ and suggested the development of a potential research model.

A survey was emailed to 457 supply chain professionals. Potential respondents were randomly pulled from a database of SCM professionals who have supported the SCM program at the researchers' university. These industry partners provide support in a variety of ways including recruitment of students, provision of internships, invited lectures, advisory boards, and research support. Potential respondents represent companies primarily located in the USA but have international operations. Three rounds of participation requests were made using a modified Dillman method (Dillman, Smyth, Christian, 2014). This approach yielded 125 usable responses (27.4% response rate).

Respondent profiles are presented in **Table 1**. Approximately 64% of responses came from larger revenue

companies (1B$-49B$ range). Nearly half of respondents employed over 10,000 people globally. Nearly all companies have North American operations, and most have a global presence. All respondents were either procurement/supply chain professionals, or interface extensively with the SCM function, providing a high level of confidence that participants are well informed respondents.

Table 1 Respondent profiles

Annual Revenue		Number of Employees		Markets Company Operates In		Job Duties Include	
Under $10M	5	Under 50	4	Africa	40	Procurement	40
$10M-$49M	4	50-99	4	Asia	80	Supply Chain Leadership	25
$50M-$99M	7	100-499	15	Europe	81	Planning/Scheduling	12
$100M-$499M	19	500-999	8	North America	117	Operations Management	9
$500M-$999M	5	1,000-4,999	14	South America	65	Data Analytics	7
$1B-$9B	29	5,000-9,999	15			OpEx	5
$10B-$49B	34	Over 10,000	57			Project Management	4
$50B-$99B	2					Supply Chain Management	4
Over $100B	12					Logistics	4
						Sales	4
						Consulting	2
						N/A	7

4. RESULTS

As discussed in the Methodology section, a small set of Likert scaled questions were presented to provide basic confirmation that respondents to this survey had SINPD experiences consistent with the SINPD experiences reported in the existing literature. Before exploring the primary research questions, it was important to use these questions to determine if as reported in the literature SINPD was a strategically important initiative and if SCM is expected to be make meaningful contributions to SINPD, otherwise the findings may be interesting but not of practical importance. Respondents rated their level of agreement with the four prompts below. Results are presented in **Table 2**.

Q1*: Developing and maintaining a technologically capable supply base is critical to my organization's competitive success.*
Q2*: We plan to increase the use of collaborative SINPD in the future*
Q3*: We are currently satisfied with the results of our collaborative SINPD efforts.*
Q4*: Our supply chain organization will take on increasing responsibility for supporting collaborative SINPD efforts.*

Table 2 Percent level of agreement with survey prompts

	Percent Response			
Choice	**Q1**	**Q2**	**Q3**	**Q4**
Strongly Agree	59.35	26.23	4.07	31.71
Agree	30.08	43.44	26.83	35.59
Somewhat agree	6.50	13.11	27.64	19.51
Neither agree nor disagree	2.44	13.11	19.51	8.13
Somewhat disagree	0.81	2.46	12.20	2.44
Disagree	0.81	1.46	9.75	1.63
Strongly disagree	0.00	0.00	0.00	0.00

Consistent with the literature, a majority of respondents (Q1 ≈ 89%) agreed that technologically capable suppliers are critical to company success. Most respondents (Q2 ≈ 70%) also plan to increase the use of SINPD projects. However, a relatively small percentage (Q3 ≈ 31%) expressed a high level of satisfaction with SINPD outcomes. Most firms (Q4 ≈ 68%) indicated that they will increase SCM involvement in SINPD efforts. Though clearly not an exhaustive analysis, these data are consistent with well established research findings and provide some confidence in the utility of responses to the subsequent qualitative questions.

Three open ended questions driven by the primary research questions, were then presented to respondents. The responses were evaluated and categorized by the two researchers and a retired supply chain management professional with over three decades of SCM experience. Any response item that was identified four or less times was not included in the summary response tables below. Those items were typically firm specific (e.g., "we are too small of a firm to influence suppliers") and thus not useful for general observations across firms.

To determine expected SCM contributions, respondents were presented this open-ended prompt: Q5) Please identify the three major contributions that your supply chain organization makes to collaborative SINPD strategy and projects within your organization. Results are summarized in **Table 3**.

Table 3 Expected SCM contributions to SINPD projects

Description	Frequency
Supplier Identification, Assessment, Recommendations	46
Contract Negotiation	31
Cost Assessment and Management	26
Supplier Relationship Management	24
Technology Roadmap Alignment with Suppliers	10
Continuous Improvement / VE & VA	7

Participants were then prompted: Q6) Please identify the three major obstacles faced by your supply chain organization to make a greater contribution to collaborative

SINPD efforts at your firm. Results are presented in **Table 4**.

Table 4 Barriers to SCM contributions to SINPD efforts

Description	Frequency
Engineering starts early work with suppliers without SCM involvement, effectively locking in a supplier without SCM input	15
Lack of SCM technical expertise to work with internal engineering or assess supplier technical capabilities	14
SCM early involvement not supported by management / SCM is focused on ongoing production costs, capacity, logistics, etc., not SINPD	13
Engineering / R&D Resistance or reluctance to engage in SINPD with suppliers (not invented here syndrome)	13
SCM personnel resource constraints; understaffed and over-utilized	12
Confidentiality / IP concerns / Lack of Trust / Information sharing concerns	10
Lack of long term technology alignment with suppliers	6

Finally, participants were asked how they may overcome those barriers through the following prompt: Q7) Please identify the three major improvements you might make in the next three years to increase your supply chain organization's ability to contribute to collaborative SINPD efforts at your firm. Results are presented in **Table 5**.

Table 5 Improvements to increase SCM ability to contribute to SINPD

Description	Frequency
Improve SCM technical talent to be involved in SINPD / Provide training to SCM talent	24
More highly integrated systems to enable SINPD	14
Better program management and processes for SINPD / standardized process for SINPD	13
Increased / better / more flexible assessment of potential new suppliers and their technology capability	13
Earlier involvement of SCM in SINPD	11
Reduce number of suppliers and strengthen remaining relationships / longer term contracts	11
Company strategy support SCM involvement in SINPD / Better alignment of all functions in organization	9
Additional SCM headcount	8
Better communication of technology plans / alignment of technology plans with suppliers	8
Engage / educate engineering on accepting new suppliers / prove benefits of SCM and supplier integration	6

5. DISCUSSION

5.1 Respondent Experiences with SINPD

The quantitative data (reference **Table 2**) indicate that: 1) companies plan to increase the use of SINPD initiatives; 2) SCM personnel and suppliers will be increasingly involved in SINPD efforts; and 3) the level of satisfaction with current SINPD is low. This basic analysis served the purpose of providing some evidence that respondents to this survey have shared SINPD experiences with the experiences of others discussed in existing literature. The results confirm the relevance and practical significance of the qualitative data analysis discussed subsequently.

5.2 SCM Contributions to SINPD

The qualitative data presented in **Table 3** indicate that SCM professionals are expected to contribute to SINPD in ways that are consistent with traditional job functions and training. The expected contributions are dominated by activities such as supplier identification and assessment, negotiations, cost management and relationship management. A number of the responses were similar to this response from a purchasing manager at a large manufacturing firm: "[SCM is expected to] 1) Identify potential suppliers, 2) Facilitate collaboration with suppliers. 3) Negotiate financial results of collaboration." These findings suggest that SCM is well positioned to be early and significant contributors to SINPD efforts, as most SCM professionals have extensive training, education and experience to handle such responsibilities.

To a less frequent extent, SCM personnel are expected to directly contribute to the technical success of SINPD efforts, through technology alignment and value engineering efforts. Survey responses suggest that perhaps SCM personnel are not typically capable of supporting such activities. For example, one respondent suggested that SCM professionals generally do not receive a high level of technical training and stated that "In some cases we have started hiring technical backgrounds that have a better grasp of design and cost drivers opposed to a traditional SCM degree." If SCM professionals expect to be involved at the earliest stages of SINPD, they may need to improve their technical competencies. Future research may need to explore the readiness of SCM personnel for taking on technical roles in SINPD, if such roles are well advised, and how companies are better positioning SCM personnel for those roles.

5.3 Barriers to SCM Involvement in SINPD

Regardless of the expected contributions from SCM personnel during SINPD, companies should have organizational structures, strategies and processes in place to support SCM involvement. However, the data in **Table 4** indicate that in many cases barriers exist which limit the effectiveness and efficiency of SCM contributions. The barriers in **Table 4** were consolidated into four main categories that have a reinforcing impact on each other, as suggested in **Figure 1**.

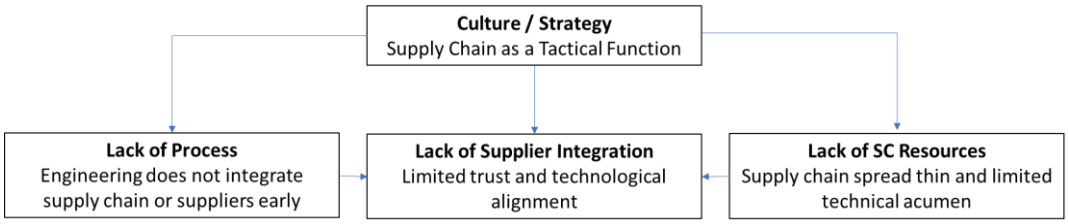

Figure 1 Barriers to SCM contributions to SPIND efforts

The most problematic barrier is a company culture and strategy that does not support SCM efforts in SINPD. As one SCM professional stated, "Many challenges arise and persist because we are not recognized as a strategic partner [in SINPD]." Similarly, many respondents indicated that all barriers are directly attributed to lack of top management support, as indicated by this SCM manager's response that "[The three main barriers are] 1) Organizational silos. 2) Distrust within the organization. 3) Lack of clear direction from top management." If leadership does not position SINPD as a strategic initiative, and if SCM is positioned as a tactical rather than strategic function, it will be extremely difficult for SCM professionals to develop the competencies, capabilities, systems and processes to contribute to SINPD efforts. SCM professionals should take the lead to influence company culture and raise SCM to a strategic level by proving the value they provide during SINPD.

Companies that have not established a culture and strategy that supports SINPD will lack processes and systems that require engineering to work with SCM before working with suppliers on NPD efforts. A common perspective of survey participants that lack of systems and processes inhibit SCM involvement in SINPD is exemplified by this response: "[For SCM] Lack of being included in new product development at time of quote. We have disjointed systems that lack team usage. Projects are too far down the road before purchasing and the suppliers are brought in to collaborate." Again, if SCM personnel want a good seat at the NPD table, they need to develop capabilities to contribute at a strategic level and prove their value. Some of these change efforts are discussed in the subsequent section.

Respondents also indicated that a lack of SCM resources, particularly in the form of technical talent and limited SCM headcount, is also a significant barrier that is a direct consequence of SCM being positioned for a tactical rather than strategic role. One SCM manager reported that "While we agree SINPD activity is crucial to our long term success, our SCM team routinely engages in short term, inside the current fiscal year projects that have direct dollar figures attached." Relatedly, some participant indicated that it makes little sense for SCM to develop strong technical competencies for NPD when they are mostly focused on cost reductions after the product is designed and released.

Lack of supplier integration is another significant barrier. This barrier is likely a consequence of not deploying a strategy for SCM and supplier involvement in SINPD, the lack policies and systems that require SCM involvement, and lack of SCM resources to support SINPD. As one respondent stated, "We are spread too thin focused on cost to leverage supplier capabilities in NPD."

5.4 Overcoming Barriers to SCM Personnel Involvement in SINPD

SCM personnel need to take a proactive role to overcome the significant barriers to their involvement in SINPD. For some firms, overcoming barriers to SCM involvement in SINPD is a greater challenge than it is for others. For example, one respondent indicated that SCM involvement in SINPD is currently nonexistent: "It is all after the fact. Our supply chain team is not involved with upstream design planning." For other firms, SCM already has a somewhat active role and some processes are in place to support SCM involvement such that barriers may be easier to overcome. For example, one respondent stated that they currently employ "1) Supply chain segmentation to support the channel to market strategy. 2) Globally standardized supplier performance and management processes that included SINPD elements. 3) Supplier management on a global perspective where common suppliers are supporting multiple product lines across multiple sites."

Regardless of the current state of SCM involvement in SINPD, firms are well advised to implement a multidimensional, reinforcing, and simultaneous approach to removing the related barriers to SCM involvement in SINPD that were previously depicted in **Figure 1**. Respondents' ideas for overcoming these barriers to increase SCM contributions to SINPD were presented in **Table 5**. These ideas were consolidated into four main approaches that have a reinforcing impact on each other as suggested in **Figure 2**. These four improvement approaches directly relate to the four main barriers that were previously depicted in **Figure 1**.

Given that a lack of culture and strategy that supports SINPD is the most problematic barrier, it is not surprising that initiatives to change the culture would be paramount. Company leadership should initiate a culture change by raising the strategic role of SCM and educating engineering on such change. One firm indicated that the necessary shift starts with upper management: "[We need] goal alignment across functional groups and executive sponsorship of SINPD efforts." Another firm indicated that SCM cannot wait for company leadership to change the culture, and that SCM must take a proactive role in influencing company strategy and culture from the ground up by initiating new processes: "Purchasing has been pushing back to engineering to be more open to developing more suppliers…We are pushing engineering to become open minded to design solutions. So prior to sourcing starting, we are starting to have several suppliers come in together in the same room on the same day, have engineering propose some high level tech objectives or general specifications needed for the product, and have suppliers listen so that they can come back and pitch ideas in private."

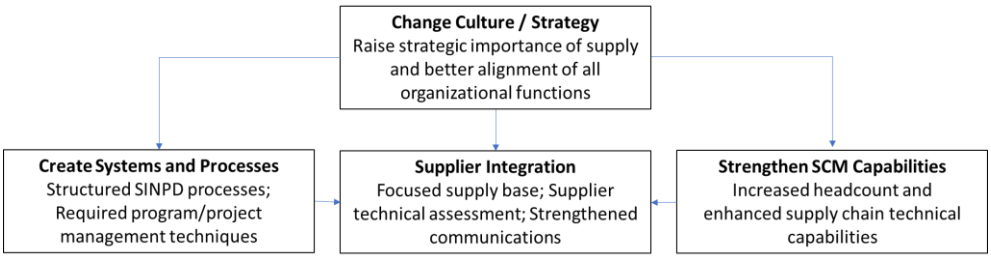

Figure 2 Planned improvements to increase SCM involvement in SINPD

In overcoming barriers to SCM involvement in SINPD, it is evident that organizational change should be driven through both top-down leadership and bottom-up initiatives. The interplay of these approaches is critical in fostering an environment conducive to strategic and operational integration. Kotter (1996) underscores the necessity of leadership in initiating and guiding change, emphasizing that clear vision and strong direction from the top are essential for transformative efforts. Concurrently, Beer and Nohria (2000) argue that successful change also requires engaging the workforce at all levels, ensuring that innovations and adaptations are practically grounded and widely accepted. By harmonizing strategic vision with grassroots innovations within SCM, organizations can more effectively navigate the complexities of NPD, leading to enhanced innovation and competitive advantage. This integrated approach ensures that strategic intentions set by management are effectively embraced and implemented by those at the operational forefront, thereby maximizing the potential of SCM contributions to SINPD.

This cultural change can support and mutually be supported by the creation of systems and processes that enable effective and efficient SINPD and enforce SCM involvement in such efforts. One respondent indicated that to overcome process barriers their organization recently implemented new systems in which "IT, supply chain and sales departments worked to together to build a web based new part tracking system to get product from design to box in a more efficient way. Supply chain and IT launched an ERP forward looking system, and this helps in projecting future new product part demands before orders are actually placed." Another company indicated that an important process change was to ensure SCM performance metrics were linked to SINPD efforts, specifically stating "[We plan for] supply chain metrics to be a staple component of the "success" evaluation of new product launch."

A cultural shift and effective systems should enable the SCM organization to recruit and develop the necessary technical capabilities of SCM professionals and increase headcount to support SINPD. One company indicated that they needed "Continued recruitment of strong supply chain personnel, recruiting focused on supply chain personnel with additional technical background in material sciences, and continued development of SCM personnel."

Collectively, these policy and process changes should enable closely aligned supplier relationships. One company recently adopted a strategy and process for better supplier alignment: "Every 18 months each commodity strategy goes through a deep dive commodity strategy review to see what suppliers should exit, which ones we want to grow with, the trends of the market with technology, etc. We regularly review our existing suppliers, but also entertain meeting other suppliers…and if they offer a technology that their competitors currently don't have, we will investigate with other stakeholders in our company, engineering, supplier quality, purchasing, and leadership to see if we are interested in adding a supplier that we see value to add in the space."

5.5 Future Research Considerations

The findings from this study offer a foundation for identifying critical areas of future research that can enhance the strategic involvement of Supply Chain Management (SCM) professionals in Supplier Integration into New Product Development (SINPD). This section outlines potential research directions and implications. Building on the practical framework and insights presented, future research should explore the following key areas.

Strategic Alignment and Organizational Change:

1. Which leadership-driven cultural changes will most effectively elevate SCM to a strategic role in SINPD?
2. What specific strategies can top management employ to integrate SCM into cross-functional decision-making processes for SINPD?
3. How do variations in organizational structure and leadership approaches impact the effectiveness of SCM contributions to SINPD?

Capability Development:

1. What are the most effective methods for developing technical competencies among SCM professionals to support early-stage design and innovation in SINPD?
2. How do investments in training and recruitment of technically skilled SCM personnel influence the outcomes of SINPD initiatives?
3. What role do advanced technologies (e.g., supply chain analytics, AI, and ERP systems) play in enhancing SCM readiness and contributions to SINPD?

Process Integration:

1. How can firms design and implement standardized processes that ensure early SCM involvement in SINPD, and is there a hierarchy of implementation of such processes that is most effective?
2. What metrics can be developed to evaluate the success of SCM's participation in SINPD efforts?
3. How do integrated systems improve coordination between engineering, SCM, and suppliers in SINPD initiatives?

Supplier Collaboration and Long-Term Relationships:

1. What are the most efficient and effective strategies firms can employ to build trust and alignment between suppliers and internal stakeholders in SINPD?
2. How do long-term supplier partnerships influence technological alignment and innovation outcomes in SINPD, and given rapid technological change and new technology suppliers is it a good strategy to focus on long term buyer/supplier technology relationships?
3. What mechanisms can ensure that supplier capabilities are fully leveraged during the new product development process?

If the epigram "There is nothing so practical as a good theory", which is largely attributed to Kurt Lewin is true, then it is reasonable to utilize the practical findings from this research to suggest potential research questions and relationships between SINPD strategies and processes that need further investigation. A research model that would directly extend from the frameworks previously presented is shown in **Figure 3**. This model is driven by the call for more research focused on how improving basic alignment, improving supply chain readiness, and leveraging supply chain capability can drive a more efficient and effective SINPD process (Van Hoek and Chapman, 2007).

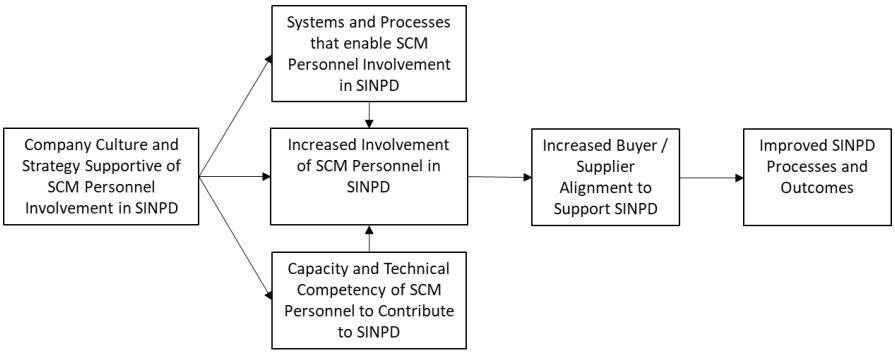

Figure 3 Potential research model, enhancing SCM personnel contributions to SINPD

To deepen the theoretical understanding of these topics, future research could develop and empirically test this proposed research model. This model suggests relationships among strategic alignment, SCM capability development, process integration, and increased SCM personnel involvement in SINPD as key enablers of effective buyer/supplier integration and in turn improved SINPD outcomes. This model visualizes the interplay between these factors, highlighting potential pathways for advancing SCM contributions to SINPD.

- **Strategic Alignment as a Catalyst:** Further studies could investigate how aligning corporate strategy with SCM initiatives impacts the speed and efficiency of SINPD projects. For example, examining the role of goal alignment across functional groups could provide insights into reducing organizational silos.
- **SCM Competency as a Mediator:** Research might explore the mediating role of SCM competencies in bridging cultural and technical barriers, particularly in environments with resource constraints. Comparative studies across industries could shed light on how competency gaps are addressed in varying contexts.
- **Digital Transformation and Analytics:** The integration of digital tools and analytics warrants further exploration. Specifically, how do these technologies facilitate early supplier involvement and support SCM's role in mitigating risks during SINPD? Future research could also explore the interplay between supply chain visibility and flexibility in dynamic NPD environments.

The practical barriers and strategies identified in this study highlight the critical need for a multidisciplinary approach to SINPD research. Future studies could adopt cross-industry analyses to identify universal versus industry-specific challenges in SCM involvement. Additionally, longitudinal studies could provide valuable insights into how changes in organizational culture and strategy over time influence SINPD outcomes.

Finally, this research underscores the importance of collaboration between academia and industry. By engaging practitioners in the research process, future studies can ensure the relevance and applicability of their findings, thereby fostering actionable solutions that bridge the gap between theory and practice in SCM and SINPD integration.

In summary, future research should aim to advance both theoretical and practical understanding of SCM's strategic contributions to SINPD. By addressing the outlined questions and exploring the proposed model, scholars can contribute to the development of more effective frameworks, tools, and strategies for overcoming the barriers to SCM involvement in SINPD and enhancing the overall success of these initiatives.

6. CONCLUSION

SINPD is a complex process on many levels including management of technical issues, communication challenges, time and budget constraints, policy and organizational barriers, and lack of appropriate knowledge and skills for example. This research focused on the role of SCM professionals in SINPD and how organizations can overcome barriers to SCM involvement in SINPD. The data suggest that SINPD is strategically important, that the results of such efforts are less than satisfactory, and that companies plan to increase the level of SCM personnel involvement in SINPD.

It was not surprising that the vast majority of expected contributions from SCM professionals focus on supplier selection, negotiation, cost management and relationship management. It would seem SCM professionals would be well prepared to handle those activities. It is less obvious if

SCM has the appropriate skills to support technology alignment and VA/VE efforts.

Significant barriers prohibit SCM personnel from making greater contributions to SINPD, including a company culture that positions SCM for a tactical rather than strategic role, lack of systems and process that enable SCM involvement, SCM talent and time constraints, and lack of supply base alignment. The removal of these barriers to SCM involvement in SINPD must occur on two fronts. Executive leadership must drive a cultural change by emphasizing the strategic importance of SINPD and by allocating resources to support implementation. At the ground level, SCM leaders and practitioners must develop processes, systems and capabilities that align with and influence strategic direction and support the cultural change. A simultaneous top-down and bottom-up approach to change is the best route to increasing SCM involvement in SINPD and the success of such efforts. A potential practical framework for overcoming barriers and a research model to explore the relationships between key variables influencing SCM personnel's role in SINPD were presented.

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