

Supplier Diversification and Strategic Sourcing for Chemical Raw Materials in the Manufacturing Sector

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Abstract: Chemical raw materials, the backbone of today's manufacturing, ranging from polymers and resins to solvents, pigments, and specialty chemicals, have emerged as one of the most vulnerable nodes in industrial supply chains worldwide. Multiple disruptions caused by pandemics, geopolitical tensions, climate events, and trade fragmentation have transformed the procurement process from a basic operational task into a key driver of manufacturing resiliency. Pandemics, geopolitical tensions, climate change, and trade fragmentation have created multiple disruptions that have turned procurement into a strategic determinant of the continuity of manufacturing. This paper explores the idea of supplier diversification and strategic sourcing as complementary solutions for chemical raw material supply risk. Using peer-reviewed supply chain management literature and industry information, the paper summarizes the theoretical underpinnings of sourcing risk management, examines the mechanisms by which diversified supplier networks are able to enhance supply chain resilience, and analyzes the strategic sourcing frameworks implemented by prominent chemical companies. The paper also reflects the specific characteristics of manufacturing sectors of import-dependent developing economies and the respective foreign exchange and infrastructural requirements that are associated with raw material procurement. Results show that diversification is not enough and that additional investments in supplier relationship management, digital visibility tools, and sustainability-oriented selection criteria are needed. The paper concludes with a series of ideas for the practice of procurement and supply chain managers who are looking to achieve cost reduction and continuity of supply in an increasingly volatile market of chemical raw materials.

Keywords: *Supplier Diversification, Strategic Sourcing, Chemical Raw Materials, Supply Chain Resilience, Procurement, Manufacturing Sector.*

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I. INTRODUCTION

Chemical raw material manufacturers rely on other chemical manufacturing companies to keep their plants running and are in one of the most geographically fragmented and structurally concentrated supply chains in the world's industry (Bui et al., 2021). Some chemical feedstocks have significant concentrations of producing regions, even though the total quantity of output is comparatively small, and these concentrations have often led to severe disruptions in supply when a single node in the chain has been disrupted. There have been many challenges associated with the sourcing of chemical raw materials that are largely dependent on single supplier efficiency and cost minimisation, all of which have occurred over the past few years, including the COVID-19 pandemic, the Texas winter freeze event of 2021, the Russia-Ukraine conflict and the recurring disruptions to shipping lanes at the Suez Canal and Panama Canal (Chemical Processing, 2024; Elchemy, 2024a).

As a result, procurement and supply chain activities throughout the manufacturing industry had to review two related but conceptually different practices: supplier diversification and strategic sourcing. Supplier diversification is the intentional shift to more suppliers from different vendors, different geographical locations, or different production technologies to minimize reliance on any single supplier (Rheude, 2023). Strategic sourcing, on the other hand, is a more comprehensive and systematic procurement practice in which companies consider the conditions of the markets, categories of spend, and supplier attributes when deciding on their procurement strategies and considering what they need in the long run (Çankaya, 2020). Strategic sourcing is the analysis and organisation framework in which the diversification decision can be made, sequenced, and maintained, whereas diversification is treated as a strategy to reduce risk.

Both practices have special difficulties in the chemical raw materials part of manufacturing value chains. Chemical

inputs are often subject to strict regulatory, safety, and quality standards that limit the number of qualified suppliers, as well as to fluctuating feedstock prices that depend on crude oil and natural gas prices, and to increasingly strict environmental compliance requirements, including changes to the European Union's restrictions on per- and polyfluoroalkyl substances (PFAS) (Chemical Processing, 2024). For import-dependent economies, manufacturers face challenges that are exacerbated by foreign exchange constraints, logistics bottlenecks, and a relatively low level of local raw materials processing capacity (Raw Materials Research and Development Council [RMRDC], 2024).

This paper addresses three related questions. What are the theoretical foundations that account for the benefits of supplier diversification and strategic sourcing to promote resiliency in manufacturing supply chains in chemical raw materials? Second, how have chemical manufacturers and downstream users taken these strategies into practice in terms of mechanisms, frameworks, and organisational practices? Third, what are the risks, trade-offs, and contextual factors (which are especially relevant to the manufacturing sectors in developing countries) that should be considered when formulating a diversified sourcing strategy? The paper draws on conceptual and theoretical studies, empirical and industry evidence, and illustrative case studies, and concludes with practice-oriented recommendations.

➤ *Conceptual Overview*

Supplier diversification and strategic sourcing are often mentioned in tandem in the literature, but have different levels in the procurement decision hierarchy. The strategic sourcing process is a series of steps: spend analysis, market research, supplier evaluation, negotiation, and contract governance – aimed at obtaining the optimal cost, quality, and supply assurance of a given spend category of goods (Çankaya, 2020; Frederico, 2023). This usually starts by dividing the purchasing portfolio by spend value and supply risk, with a specific strategy being developed for each category, which can be single sourcing low-risk, low-value categories and multi-sourcing or supplier development for high-risk, high-value categories (Schotanus and Grandia, 2023).

Supplier diversification is one of several tactical levers that can be pulled in a strategic sourcing process, including vertical integration, long-term contracts, buffer inventory, and supplier development (Qureshi and Ali, 2025). Diversification can manifest in various ways, including supplier diversification within a geographic region; geographic diversification (splitting supply by geography to avoid being disruptive when events happen in a particular region); and diversification among the various production technologies or pathways for a given input, e.g., a combination of petrochemical-based and bio-based sources of the same input (Yin & Ran, 2022). There are a variety of kinds of forms, and the firms are increasingly moving to other types of forms in addition to diversification, and are not just using diversification as one undifferentiated tool.

Another conceptual difference relates to diversification's object. While customer base diversification and supply base diversification are interdependent and both contribute to overall supply chain resilience, analytically, the two dimensions are different (Yin & Ran, 2022). A chemical raw material buyer's key interest point is diversification of the supply base, but, according to the literature on resilience, buyers' diversification efforts are often suboptimal when they are implemented solely at the sourcing level and are not accompanied by the appropriate variations in downstream demand and inventory positioning (Um & Han, 2021).

Another distinction that can be made is between types of risk diversification and strategic sourcing, which are designed to mitigate risk, as the best strategy will vary depending on the type of risk (Bin Hameed et al., 2026). Disruption risk is the risk of low-probability, high-impact events that affect a particular supplier's ability to deliver, such as a fire, flood, or force majeure (war) event. Recurrent operational risk is a more common day-to-day variation in quality, lead time, or cost without any specific disruptive event. Systemic or correlated risk is the risk resulting from multiple shocks occurring at the same time, e.g., pandemic lockdown or region-wide energy crisis (Li et al., 2010). Diversification seems most effective to counteract disruption risk on one node, moderately effective to counteract recurrent operational risk in combination with performance monitoring, and least effective to counteract systemic risk, if used alone, which requires other measures such as demand-side flexibility, safety stock, and, if possible, geographical and technological separation of diversified suppliers (not only increased number of suppliers, but also their separation) (Um & Han, 2021; Wieland, 2021).

➤ *Theoretical Framework*

In volatile environments, three theories are often referred to as to why diversified and strategic sourcing practices have outperformed concentrated and transactional practices: resource dependence theory, transaction cost economics, and the dynamic capabilities view (Öztürk & Bagis, 2025).

The Resource Dependency Theory is a theory that suggests that organisations need the resources they have drawn from the outside and try to control their dependency on the outside in order to maintain their autonomy and minimise the risks of the outside controlling the organisation (Biermann & Harsch, 2017). If applied to chemical raw materials procurement, resource dependence theory would suggest that a chemical manufacturer whose production depends on one supplier for an essential polymer feedstock gives up a certain degree of control of the supply chain regarding pricing, supply reliability, and geopolitical vulnerability to that supplier. Having multiple suppliers backfills a manufacturer's bargaining power and makes the company less structurally dependent on an outside supplier (Faruquee et al., 2021).

An alternative but somewhat incompatible perspective is provided by "Transaction cost economics." It forecasts that companies will choose the supplier arrangement that

minimizes the sum of production and transaction costs and that when asset specificity, uncertainty and transaction frequency are high, companies may rationally prefer a "slim and fat" supplier base with few, close relationships with suppliers instead of a wide supplier base with many one-off transactions because of the increasing cost of switching, qualification, and relationship-specific investments (Parameswaran & Vanathi, 2026). It is at the heart of the sourcing practicality in the chemical industry: in the chemical industry, many specialty chemical inputs cannot be sourced from multiple suppliers because of the cost of diversification, despite being considered desirable in terms of risk (Rouch, 2022).

The dynamic capabilities perspective resolves this tension by focusing not only on the one-time assembly of the supplier base but also on the firm's ability to reconfigure the supplier base quickly when conditions change. While supplier diversification is a component of redundancy, Wieland (2021) contends that firms with the ability to sense, seize, and reconfigure their supply chains to prepare for disruptions, evaluate alternative supplier options, and implement supplier transitions quickly to prevent or reduce losses are more resilient. From this view, it is not surprising to see that companies that have both supply base diversification and digital transformation capabilities have materially better resilience results compared to companies that only have one of these capabilities, as reported in (Yin & Ran, 2022).

II. METHODOLOGY

The research follows the narrative literature synthesis approach, which is based on reviewed literature published in supply chain management, operations management, and sustainability journals from 2020 to 2026, as well as industry analyses and sector reports from procurement advisory firms, chemical industry publications, and development-oriented research institutions during the time period of 2020 to 2026. The selected sources were triangulated from the academic and practitioner literatures and were chosen for their direct relevance to sourcing risk, supplier diversification, and the procurement of chemicals and critical materials, as well as for providing theory and detail that may not be offered in the peer-reviewed literature. This mixed-source strategy is appropriate for a topic in which there have been rapid changes in practice in response to real-world disruptions, often before the academic publication cycle, and in which case evidence is generated by practitioners that is not represented in the academic literature.

III. LITERATURE REVIEW

Since 2020, there has been a significant increase in empirical research on sourcing risk management, in part due to the disruptions caused by the COVID-19 pandemic and ensuing geopolitical unrest. Based on a configurational analysis of 191 manufacturing listed companies, Yin and Ran (2022) discovered that supply base diversification and digital transformation were not sufficient conditions for high supply chain resilience; they found that multiple other combinations

of diversification, digital depth and digital breadth led to high supply chain resilience, suggesting that supply sourcing strategy needs to be based on a company's existing digital capabilities and organisational structures instead of being applied as a 'one size fits all' template.

Using both global supply chain risk exposure and resilience outcomes, Um and Han (2021) found that the negative relationship between risk exposure and operational performance could be significantly mitigated by the use of mitigating strategies such as diversification of suppliers, buffer inventory, and information sharing, but that each mitigating strategy did not have the same effect on the relationship. Geographic diversification is useful for addressing disruption risk from localised events like a plant shutdown, but is less effective against systemic risk from events affecting multiple regions at the same time, such as a pandemic, and needs other measures, e.g., demand flexibility or safety stock.

There has been a long debate on single versus multiple sourcing, with recent papers adding much to the analysis. Spieske et al. (2022) looked at healthcare supply chains in Europe during the COVID-19 crisis and found that companies that diversified their upstream supplier base and extended procurement relationships and inter-organisational resource sharing were able to provide better continuity of supply than companies that diversified their supplier base. Ahmed and Huma (2021) also showed that the mix of lean and agile sourcing strategies, and not simply either one strategy or the other alone, leads to the best supply chain risk management outcomes, implying that diversification decisions should address which spend categories are best suited to lean, efficiency-focused sourcing, and which to agile, risk-focused, multi-supplier sourcing.

Similarly, structural strategic sourcing was found to be positively related to supply chain agility and cost performance, suggesting that diversification decisions yield better results when they are part of a structured sourcing process rather than taken reactively, as shown in the empirical work of Çankaya (2020). Frederico (2023) further introduced a strategic sourcing framework based on resilience, which explicitly introduced disruption scenario planning in the sourcing decision cycle, thus claiming that transparency in the criteria used to make a supplier choice is a prerequisite for the sourcing process to be effective as a resiliency mechanism and not as a cost-driven activity.

The relational aspect of diversified sourcing is covered by Faruquee et al. (2021), who concluded that strategic supplier relationships, together with digital transformation, enhance supply chain resilience, but only when inter-organisational trust is maintained; digital transformation projects that result in a substitution of technology for trustful collaborative relationships may paradoxically result in lessened resilience outcomes. This discovery is especially important in the sourcing of chemical raw materials, where lengthy and stringent technical qualification programs and proprietary formulation information can create an environment for building highly trusted, and often not easily

repeatable, supplier relationships. Parameswaran & Vanathi (2026) also find in a review of SRM practices in manufacturing organisations that the advantages of a diverse supplier base are dependent upon the firm's ability to handle more than one supplier without weakening its relationship with strategically important suppliers.

Sourcing strategy has increasingly come to include sustainability considerations. Arda et al. (2023) extended the concept of sustainable supply chain management through a resource-based view, as they emphasize that sustainable, environmentally and socially responsible sourcing practices can generate competitive advantage not just as a compliance cost, and Abubakar et al. (2022) prove that supplier selection with corporate social responsibility criteria can enhance long-term supplier relationships and lower the exposure to reputational risk. Building on this research, Asif et al. (2022) explore the role Industry 4.0 technologies can play in making supplier audits more authentic and cost-effective, a topic of special interest to the sourcing of chemicals, due to the regulatory pressure on compliance with chemical supply chains.

Third, studies of the geopolitical aspects of sourcing chemical and critical materials have become more prominent. Wang et al. (2023) evaluate the supply risk of geopolitics for critical mineral inputs in energy storage technologies, and they conclude that the external dependence and concentrated supply sources contribute to increases in supply risk indices for critical energy storage inputs like cobalt and lithium, similar to the concentration risk found in several petrochemical feedstocks. Taken together, this body of work shows that supplier diversification is a necessary though incomplete solution to address CRM supply risk, and that its effectiveness is related to integrating it with strategic sourcing discipline, digital visibility, depth of relationship, and sustainability requirements.

➤ *Drivers of Supplier Diversification in Chemical Raw Material Sourcing*

Unsurprisingly, chemical raw material procurement over the last five years has seen buyers across the manufacturing industry focus on diversifying their supply base to a great extent, given several converging drivers (Pelser & Bande, 2025). The first is disruptions; the chemical industry has just had a string of supply impacts, such as pandemic-related plant shutdowns, extreme weather events, and shipping-lane congestion, that have illustrated the risks of relying on a single supplier or geographically concentrated source of supply (Chemical Processing, 2024; HFS Research, 2024).

Geopolitical realignment is the second driver. Once stable cross-border sourcing arrangements have become a source of strategic uncertainty, especially for feedstocks and minerals that are produced in geographically concentrated locations (Wang et al., 2023), this is likely to continue. Reshoring, nearshoring, and friend-shoring programs are being implemented by chemical manufacturers to mitigate the exposure risks associated with politically sensitive supply corridors, as well as diversify their supply chains to multiple

international suppliers – more traditional approaches (Chemical Processing, 2024).

Next, regulatory tightening has reduced the number of qualified suppliers in some chemical categories, and, correspondingly, diversified suppliers are more critical as a compliance risk mitigant. The regulatory actions that limit PFAS usage have forced the industry to look for other sources, and in some instances, even other chemistry, well before the deadlines for enforcement. (Chemical Processing, 2024) Fourth, the commercial rationale for diversifying supply sources to use different pricing models and being able to move volume up or down as crude oil and natural gas prices rise and fall has grown stronger (GEP, 2024a).

The fifth and least talked about one is the increasing awareness of the manufacturers in import-dependent countries that if raw material concentration is a factor, it exacerbates the vulnerability of the economy. In Nigeria, for example, local raw material sourcing rates stood at 53.5 percent for manufacturers in 2023, which is far lower than the rates of sourcing over 70 percent for South African manufacturers and 80 percent for Indian manufacturers, leaving manufacturers highly vulnerable to foreign exchange fluctuations and import logistics disruptions (RMRDC, 2024). In such environments, diversification is not just about choosing a supplier from abroad, but a conscious effort to look for ways to diversify to domestic and regional suppliers, wherever possible, and at the same time mitigate the risks of currency depreciation and import dependence (Elsakka et al., 2024).

➤ *Strategic Sourcing Frameworks and Practices*

In the context of raw material categories, chemical manufacturers and downstream users have agreed to the repetition of certain aspects of strategic sourcing practice. Recurring aspects of strategic sourcing practice, when applied to categories of raw materials, have coalesced into a few shared elements (Sima, 2022). Systematic spend and risk segmentation, usually based on a variant of the Kraljic portfolio matrix, is the first one, wherein purchasing categories are segmented based on profit impact and supply risk. Low-risk, low-value materials are handled via single or dual sourcing for efficiency, and high-risk, high-value chemicals via diversification and supplier development, including specialty catalysts, regulated solvents and/or feedstocks, with concentrated production geographies (EP, 2020; GEP, 2024a).

The second element is the structured supplier assessment that includes traditional supplier assessment factors (Quality, Price, Delivery reliability, financial stability) as well as new ones (Sustainability performance, Digital integration capability, Geopolitical exposure). This shows how category management and supplier rationalisation strategies for combined spend portfolios are used to identify cost synergies and supply security benefits as chemical companies pursue mergers and acquisitions (M&A) (GEP 2024b).

Third, the use of predictive procurement analytics for sourcing chemical raw materials has become more and more at the heart of strategic sourcing. The use of advanced analytics and big data to forecast demand, price trends, and supplier performance allows procurement teams to gain more insight into the availability of raw materials and price fluctuations, resulting in a better chance to activate a diverse supply option before entering the crisis sourcing mode (GEP, 2024a). LG Chem's use of Internet of Things (IoT) technology to track inventory at its Korean and Chinese manufacturing facilities is just one example of these applications, which have helped to boost supply chain responsiveness that, despite the continuous shipping-lane disruption, is measurable (HFS Research, 2024).

Fourth, dual and multi-sourcing arrangements are more and more happening on “paper” and not just “on the hoof,” so that although any primary supplier may be doing alright during normal operations, a formal agreement is negotiated to guarantee that a minimum volume of parts is purchased from the secondary supplier. This approach is consistent with the theoretical concerns raised about transaction costs, where firms can establish close ties with their core supplier (Faruquee et al., 2021).

Finally, there are strategic sourcing frameworks that now include the use of formal digital collaboration platforms, which increase visibility and data sharing and go beyond the core supply chain. One example of this is the Cofinity-X marketplace, which has been developed by BASF, Henkel and automotive original equipment manufacturers for standardised data exchange and carbon traceability across a multi-party, diversified supplier network, rather than through a point-to-point integration between each partner (Chemical Processing, 2024). This type of platform mitigates the coordination problem, which otherwise would restrict the degree of supplier diversification in practice, thus directly tackling the transaction cost concerns raised in the theoretical literature.

➤ *Illustrative Industry Practice*

There are several examples of diversification and strategic sourcing that can be found in the real world, including a few examples of chemical manufacturers and downstream users. A network of regional production hubs that brings raw materials in from around their region and distributes to local markets also played a role in creating regional hub flexibility, which enabled Dow to reroute supply and continue operations throughout the 2021 Texas winter freeze when much of the domestic production capacity was lost (Elchemy, 2024a). This is also part of Dow's strategic plan to decrease reliance on high-risk import areas by increasing domestic production capacity, as part of its ‘Operation Next’ program (HFS Research, 2024).

BASF showcases a complementary strategy based on strategic alliance building. However, due to the scarcity of raw materials, including key chemical raw materials, BASF joined forces with Linde in Europe to ensure the stable supply of necessary feedstocks, instead of facing up to potential stagnation of its supply chain due to less prepared competitors

(HFS Research, 2024). BASF has also followed a successful diversification strategy, which involves sourcing from local and regional suppliers while maintaining a level of dependence on suppliers in other countries, as opposed to diversifying globally across all its sourcing categories in line with the strategic sourcing literature (Elchemy, 2024b).

Diversification as per each risk type proved to be beneficial in the Japanese case: Mitsubishi Chemical's diversification against typhoons and monsoon-related climate change events. The company's multi-sourcing approach with geographically diverse suppliers results in a substantial decrease in production days lost due to speedy supplier replacement during climate events (HFS Research, 2024). This case illustrates the theoretical principle that diversification planning should be based on the risk profile of the firm, and not on a formula.

In developing economies that rely extensively on imports, the implementation of these frameworks is limited by structural factors that are not present in the cases above. Although the manufacturing sector is largely dependent on chemicals and other raw materials from abroad, its manufacturers still experience some infrastructural limitations, foreign exchange scarcity, and relatively high processing capacity in Nigeria, with locally sourced raw materials accounting for more than 50% of the total raw material requirements for the manufacturing sector as of 2023 (RMRDC, 2024). A similar scenario is observed in the pharmaceutical manufacturing industry of Nigeria, with about 70 percent of the medicines and active pharmaceutical ingredients still being imported, thereby leaving the manufacturers vulnerable to the depreciation of the local currency and disruption of cross-border logistics supply chains at the same time (Okereke et al., 2021). Based on these cases, it is observed that, for manufacturers in a similarly constrained environment, any attempt to reduce the risk of raw material supply should include deliberate government and industry-level interventions such as tariff exemption on critical raw materials and investment in processing domestically sourced raw materials, along with firm-level diversification decisions (Guardian Nigeria, 2025).

The impact of these dynamics is felt in downstream manufacturing sub-sectors, such as paints and coatings, inks, and plastics manufacturing, that are significant consumers of chemical raw materials: resins, pigments, solvents, and specialty additives represent a proportion of variable production costs that is large in these sub-sectors, and technical qualification needs are specific to each chemical formula, making it difficult to replace it quickly (Sikharulidze & Fuschi, 2023). Firms in these sub-sectors report similar responses to those found in the broader chemical industry literature: having a limited number of main feedstock suppliers, crude-oil-related price volatility, and exposure to shipping delays and customs delays related to imported pigments and specialty additives not produced domestically (Neshiel Agrochem, 2026). Within realistic budget and staffing constraints, the sequencing recommendation in strategic sourcing literature, whereby diversification investment is focused on the smaller set of high-risk, high-

value inputs identified through spend segmentation rather than diversification, is a practical path towards improving resilience for such manufacturers (Çankaya, 2020).

➤ *Challenges and Risks of Diversification*

Although it is beneficial, supplier diversification is not cost-free and risk-free and may also create new vulnerabilities if undertaken in a non-critical manner. The most immediate costs are associated with qualification and coordination efforts, as the more one diversifies, the more technical and regulatory documentation and quality assurance efforts involve procurement and technical resources (Neshiel Agrochem, 2026). Qualification costs may be large enough to outweigh significant portions of the risk-adjusted benefit of diversification for highly specified chemical inputs that must be certified as pharmaceutical grade, food grade, or industrial grade (Anyakora et al., 2017).

Diluted purchase leverage is a second risk. A reduction in the purchasing volume that is spread across several suppliers can also lead to a lower position for the buyer in terms of negotiating prices and service levels with suppliers, and may mean that during a shortage of a particular product, the supplier will not place as much priority on the buyer's orders as it would on those of a larger buyer since the buyer represents a smaller share of the supplier's order book (Rheude, 2023). This is in particular relevant in the recovery phase after a disruption, when suppliers have to distribute their limited capacity among their customers and are likely to focus on customers buying higher volumes and in a more strategic manner.

Third, diversification will not prevent all system risks that will impact several suppliers at once. According to Um and Han (2021), mitigating strategies developed to address localised disruption are less effective during a pandemic-scale or macroeconomic shock that may impact a network of suppliers at the same time, even if there are many individual suppliers within the network. Similarly, Wieland (2021) states that while redundancy of this type of supplier diversification is important, it is not the complete solution for resilience; there must also be dynamic sensing and reconfiguration in many procurement functions that are not currently in place.

Fourth, if strategies for diversification are not complemented by sustainability and governance considerations, it could be associated with reputational and compliance risk, especially when the supplier base is expanded to countries with lower standards of enforcement regarding environmental and/or labour standards (Arda et al., 2023; Abubakar et al., 2022). Last, for manufacturers from countries facing foreign exchange constraints, international diversification can paradoxically boost aggregate foreign exchange exposure even if it lowers single-supplier concentration risk, reaffirming the need to go hand-in-hand with investment in domestic or regional foreign exchange supply alternatives, not simply relying on international diversification alone (RMRDC, 2024).

Another all-too-final challenge has to do with measurement. Companies often don't have good internal measures to determine the resilience return for a particular diversification investment, making it hard to defend the qualification and coordination expenses behind introducing suppliers for an investment with an unlikely and low probability of return. The findings from Yin and Ran (2022) are relevant here: Resilience outcomes are not the result of diversification alone; in fact, because the resilience benefits of diversification depend on the complementary investments in visibility, analytics, and supplier collaboration platforms, firms that analyse diversification investment based on the single variable cost-benefit analysis will systematically undervalue diversification.

IV. RECOMMENDATIONS FOR PRACTICE

The theoretical and empirical evidence examined indicates several recommendations for practice for manufacturing firms aiming to build chemical raw material sourcing resilience. First, a category-differentiated diversification approach should be followed instead of a uniform diversification mandate, and structured spend and risk segmentation should be used to decide on which chemical inputs to invest in diversification – and which to invest in disciplined single or dual sourcing.

Second, diversification decisions should be made as part of a formalised strategic sourcing process with disruption scenario planning, clear decision criteria for suppliers, and regular re-evaluation of the supplier portfolio - not be done reactively when a disruption occurs (Frederico, 2023). Third, businesses need to invest in digital procurement and inventory visibility solutions and be able to identify supply risk early, while at the same time being able to activate secondary supplier relationships to quickly leverage new sources of supply, in line with the research findings that digital transformation and diversification go hand-in-hand – not in competition.

Fourth, procurement needs to maintain the depth of relationships with strategically important suppliers while simultaneously diversifying the supplier base, which may involve tying up a primary supplier with a secondary supplier by using structured supplier agreements with minimum volume commitments, without losing the collaborative and trusting relationships that sourcing specialty chemicals demands (Faruquee et al., 2021). Last but not least, sustainability and governance principles must be built into supplier assessment processes from the start of any diversification effort, as the supplier base is expanded and diversified into new markets.

Last but not least, for manufacturers in an import-dependent developing economy, the diversification strategy should not be limited to diversification of the suppliers but extend to greater engagement with initiatives of domestic raw material development, industry associations, and government incentive programmes that focus on expanding local processing capacity, as only international diversification

would leave foreign exchange and logistics vulnerabilities significantly unchecked.

V. CONCLUSION

In the global supply chain for chemicals, raw material, supplier diversification, and strategic sourcing have shifted from being peripheral issues in procurement to key factors for manufacturing continuity. The evidence from this paper suggests that diversification provides benefits of resilience, but these benefits are not assured but depend on how diversification is implemented: if it is part of a disciplined strategic sourcing process, if there are digital tools to give visibility to these changes, if diversification is tailored to the risk profile of a given firm, and if diversification is balanced against its costs in terms of qualification expenses, coordination and overheads, and the reduction of purchasing leverage that inevitably comes along with it.

With regulatory tightening, exposure to volatile commodity prices and geopolitical realignment, there is little sign of the strategic value of sourcing resilience being diluted in the short term for the chemical manufacturing sector. The rationale for diversification is further strengthened for manufacturing firms operating in import-dependent economies given the structural issues in the availability of foreign exchange and processing capacity needed in the domestic market; however, the effectiveness of diversification would be more pronounced if it could be complemented by coordinated policy actions at the firm level in foreign sourcing and at the national level in industrial policy rather than procurement alone. Continued research will be useful in the improvement of future studies of the resilience returns for various forms and intensities of chemical raw material diversification, the more detailed examination of how diversity of the international supply chain can be most effectively complemented by diversification of the domestic supply chain by developing economy manufacturers, and more longitudinal studies.

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