



SUPPLY CHAIN DIVERSIFICATION

A DHL perspective and framework for
strategic supply chain reconfiguration.

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Setting the scene



Katja Busch
Chief Commercial Officer DHL &
Head of DHL Customer Solutions and Innovation

“Recent global events and dynamics have demonstrated the importance of robust supply chains and the need for organizations to adapt their global supply networks accordingly.

At DHL, we are committed to helping our customers improve resilience in a sustainable way by providing tailored solutions, sharing best practices, and fostering collaborative initiatives.”



Dr. Klaus Dohrmann
Vice President and Head of Innovation and Trend Research at DHL
Customer Solutions and Innovation

While not a new concept, supply chain diversification has come into sharp focus in recent years, driven by the need to mitigate risks and enhance resilience in a volatile world. In practice, supply chain diversification comes in many forms, with the level of intensity depending on each company’s markets, strategies, objectives and risk-taking appetite, to name a few.

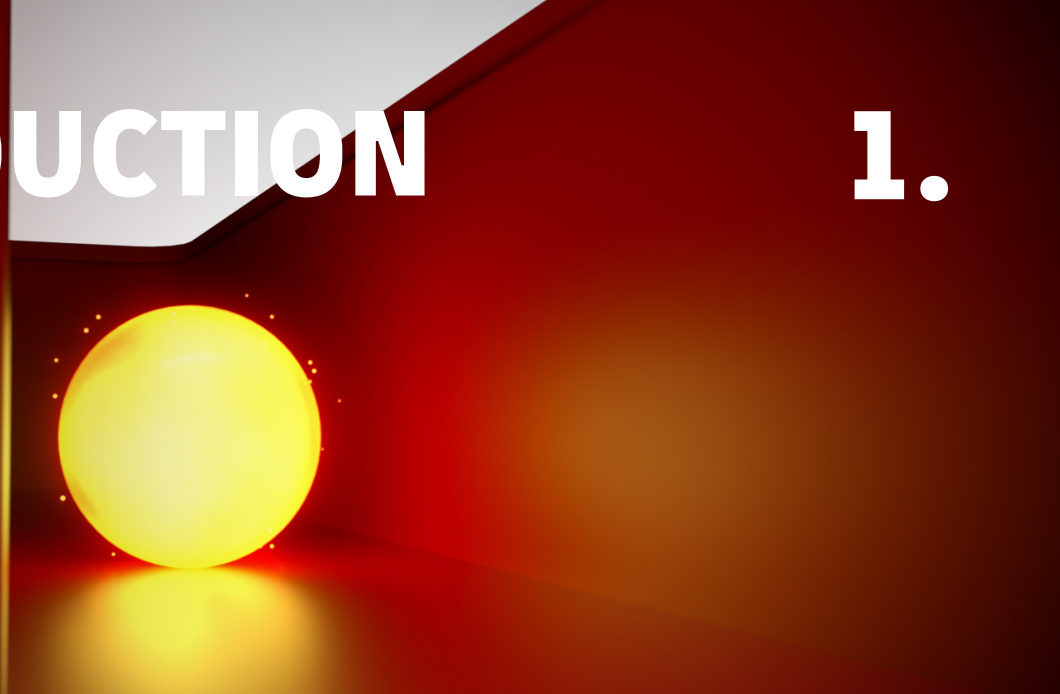
The public discourse often oversimplifies the complexities of this topic, focusing on popular terms such as near-shoring, re-shoring, friend-shoring, China +1 and the like, but fails to consider the full breadth and depth of diversification.

In this report, DHL Trend Research introduces a comprehensive definition of Supply Chain Diversification and a versatile model outlining its dimensions. Developed in close collaboration with our academic partners, it provides our customers and organizations across all industries with the latest research. This research combined with our

industry expertise and logistics solutions charts a course for growth and ultimately a competitive advantage. The report also aims to enrich public and academic discussions around this critical component of business.

The framework provided here can be leveraged at different stages of strategic supply chain management, from interpreting current market dynamics and patterns and assessing the status quo to evaluating options and implementing new diversification strategies. We at DHL are happy to support our customers on this journey and utilize our expertise in cross sector industries and supply chain management at both the strategic and operational level.

We hope this trend report will inspire and guide you and your organization. We look forward to collaborating with you to leverage the benefits of supply chain diversification and continue connecting people and improving lives together.



Globalization has emerged as the defining socioeconomic phenomenon of our time. Since 1980, global trade has increased more than tenfold, reaching a record high of over \$32 trillion in 2022. DHL's own analysis of global connectedness confirms that globalization hit a peak in 2022 and remained near that level in 2023.¹

However, this picture only tells part of the story. Hidden behind these figures is a complex network of globally interconnected supply chains with an ecosystem of countless customers, suppliers, service providers and partners. The recent accumulation of shockwaves caused by COVID-19, geopolitical crises, and natural disasters has led to considerable volatility, with disruption increasing by 183% since 2019 (33% in 2023 alone). The record highs also disguise the challenge of agility and resilience in supply chains, which prevent companies from responding effectively. This vulnerability has resulted in an average of \$1.6 trillion in unrealized revenue opportunities annually in the past few years.²

In this new normal, the business world is coming to grips with the importance of resilience. Numerous companies have begun to explore ways to minimize their supply chain dependency on one country, trade lane or source by moving away from linear, lower-cost supply chain setups. But understanding the complexities and dimensions of supply chain

diversification and how they can be leveraged strategically beyond resilience can ultimately be a key to gaining a competitive advantage.

Supply chain diversification is neither a universal solution nor a strategic necessity for every company. However, every business that relies on logistics should regularly conduct a strategic review of their current supply chain to assess options and decide whether changes are needed or desired. This requires a concerted effort, often including a dedicated investment in processes, infrastructure, technology, and people.

The supply chain diversification model provided in this report is, by design, as lean and straightforward as possible in order to make it as actionable as possible. It is intended to help practitioners manage the wide variety of options, classify actual changes in supply networks and ultimately grasp how to approach this complex topic.

1.1 Definition

What is supply chain diversification?

At DHL, we define supply chain diversification as a proactive strategy that involves embedding one or more of these four dimensions into the supply chain network: multi-shoring, multi-sourcing, adding modes of transport, and diversifying logistics operations.

Overall, supply chain diversification is about developing flexibility and redundancy to reduce risk while increasing agility and resilience in a sustainable way.

A diversified supply chain is an enabler, giving companies the tools and options, they need to respond to external shocks, changing customer needs and market developments.

It's important to note that supply chain diversification is facilitated by state-of-the-art technology and proactive relationship management and depends on multi-stakeholder collaboration.

DEFINITION:

SUPPLY CHAIN DIVERSIFICATION

A proactive strategy that involves embedding one or more of these four dimensions into the supply chain network: multi-shoring, multi-sourcing, adding modes of transport, and diversifying logistics operations.

It enables rapid adaptation and reconfiguration of the supply chain to enhance customer centricity, resilience, sustainability, and agility, which can improve competitive advantage.

Supply chain diversification along the entire supply chain is facilitated by technology and proactive relationship management which enables multi-stakeholder collaboration.

1.2 Elements of the report

Building on the definition of supply chain diversification, Chapter 2 “Dimensions” outlines the four dimensions of the supply chain diversification model, which provide the foundation for developing supply chain diversification strategies.

Chapter 3 “Examples” explores the strategic nuances of each dimension of the model across

various industry sectors, showcasing real-world examples that demonstrate the benefits of diversification strategies.

Chapter 4 “Implementation” provides guidance for leveraging the model and implementing a supply chain diversification strategy.

1.3 Benefits of supply chain diversification

Supply chain diversification is not without challenges, but it is a strategic approach that can unlock many benefits. The five principal advantages are:



“This latest DHL Trend Report underscores our aim to be at the forefront of supply chain trends, empowering our valued customers and businesses across all industries. It provides the latest research, our industry expertise, guidance and logistics solutions needed to bolster resilience, drive agility, improve sustainability and ultimately grow their competitive advantage.”

Dr. Klaus Dohrmann

**Vice President and Head of Innovation and Trend Research
at DHL Customer Solutions and Innovation**

SUPPLY CHAIN DIVERSIFICATION DIMENSIONS

2.



Supply chain diversification can entail everything from simple tweaks in specific links to major reconfigurations of entire global networks: It's not an all-or-nothing proposition.

It is important to emphasize that every supply chain is unique. The four-dimensional model described here is designed to help companies understand their current setup, navigate all available options, and develop an approach tailored to their requirements. Each dimension can be scaled up or down to achieve the appropriate level of diversification.

This versatile model can be applied to specific product supply chains, complete supply chain networks, and entire business units or markets. It facilitates the assessment process and the development of both tactical and strategic scenarios.

2.1 Dimension 1



MULTI-SHORING

The first dimension involves geographical diversification.

Multi-shoring means introducing redundant manufacturing capacities or additional supplier locations in separate areas.

This might include adding locations in other countries or even continents to mitigate operational, compliance, or reputational risks.

Multi-shoring can involve the same supplier but from an additional location – for example, getting the same part from two different plants.

The spectrum of multi-shoring diversification ranges from a supply network built on one country (low) to one widely dispersed across multiple countries or even continents (high).

2.2 Dimension 2



MULTI-SOURCING

The second dimension focuses on quantity rather than geography.

The most common approach involves adding redundant suppliers, although integrating additional manufacturing capacities is also standard practice.

Diversification can take place within local or regional ecosystems, such as adding a new supplier located in the same city. Multi-sourcing is primarily used to mitigate financial or operational risks, such as a supplier's inability to deliver on time or at all.

The breadth of a company's supply network can range from having a single supplier for a specific part or product (low) to maintaining multiple suppliers on multiple tiers for each part or product (high).

2.3 Dimension 3



MODES OF TRANSPORTATION

The third dimension centers on utilizing more modes of transport for the trade lane of a particular product or part.

Adding at least one transport mode to any part of the supply chain (first mile, long haul, last mile, etc.) makes a supply chain more diversified than it was before. Modes include air, ocean, rail and road. Simultaneously, using various modes of transport or multi-modal solutions for a part or product also typically diversifies shipping routes, which can reduce operational risk and buffer volatilities in

demand. It's important to note that adding modes of transport is not a contingency plan but rather a parallel transportation method for the same point-to-point connection. Furthermore, different modes of transport offer varying lead times, which must be considered and aligned with the business model.

Mode diversification spans from one mode for each part or product (low) to parallel modes for each part or product (high).

2.4 Dimension 4



LOGISTICS OPERATIONS

The final dimension of supply chain diversification involves expanding logistics capabilities.

This means augmenting the logistics infrastructure with additional capacities, such as hubs, warehouses, and distribution centers. Depending on the requirements, this could include redundant logistics capabilities in other locations both near and far. Diversifying logistics operations may also involve outsourcing certain logistics activities.

Like multi-shoring and multi-sourcing, a diversified logistics operation provides alternative options that maintain continuity in the supply chain during disruptions.

The spectrum of logistics operations diversification ranges from a single logistics operation for a specific need (low) to multiple redundancies across diverse geographies (high).

EXAMPLES OF SUPPLY CHAIN DIVERSIFICATION

3.

Implementing a diversification strategy typically requires a more sophisticated logistics setup, either in-house or outsourced.

To better understand these supply chains, this chapter delves into the strategic nuances of each of the four dimensions of supply chain diversification. The examples, based on actual cases, illustrate how businesses implement diversification strategies to enhance resilience, customer centricity, and market responsiveness in a sustainable way. They highlight the importance of each dimension and exemplify the multifaceted potential of supply chain diversification.



3.1 Dimension 1

MULTI-SHORING

As outlined in Chapter 2, the first dimension of supply chain diversification is geographic and can range from a supply network built on one country or region to one widely dispersed across multiple regions or continents.

The multi-shoring trend is particularly evident in the manufacturing of electric vehicle (EV) components as companies expand their capabilities. Volkswagen Group (VW) provides a best-practice example with PowerCo, which was established to bundle the group's activities along the EV battery supply chain. VW is now building gigafactories strategically located in key markets in Europe and North America.³ This allows the company to mitigate risks, respond rapidly to market demands, optimize costs, and meet sustainability goals. Another example is Geely-owned Swedish car manufacturer Volvo, which is investing around €1.2 billion in a new EV plant in eastern Slovakia, the first new European production site for Volvo Cars in almost 60 years.⁴

In 2022, LEGO Group announced plans to invest more than US\$1 billion in a new factory in Chesterfield County, Virginia, their first in the United States and seventh factory globally.⁵ The company has served the North American market from their site in Mexico. LEGO Group says that they position their factories close to their biggest markets to shorten the distance their products must travel, allowing the company to rapidly respond to changing consumer demand and better manage their carbon footprint.

After years of manufacturing most of their products in China, many technology companies are now seeking to add manufacturing capabilities elsewhere, mainly in other Southeast Asian countries, often referred to as the “China+1” strategy. For example, HP is shifting its laptop production to Thailand, and Foxconn is moving a portion of its assembly capabilities from China to Vietnam.⁶ Tech-giant Apple is also shifting production from China, where currently most iPhones, iPads and other Apple products are produced, to India, Vietnam, and other Asian countries. Apple now builds around 14% of its iPhones in India, twice the amount it produced there the previous year.⁷

Furthermore, Google is diversifying its geographical manufacturing footprint by adding production of its Pixel in India and Vietnam next to existing factories in China.⁸ Dell has also updated its sourcing strategy to better meet market demands. In response to challenges like the semiconductor component shortage, Dell instructed its suppliers to significantly reduce their use of Chinese-made chips and components, even if sourced from non-Chinese companies. The company plans to make at least 20% of all its laptops in Vietnam this year. This multi-shoring approach helps Dell enhance its resilience during supply shortages.⁹

These strategic decisions are designed not only to reduce dependencies and increase resilience but also to bring organizations closer to a vast and attractive customer base and access large, skilled labor pools, such as those in India.



3.2 Dimension 2

MULTI-SOURCING

The second dimension of supply chain diversification mainly involves adding redundancies in the supplier base, i.e., additional suppliers for the same parts or products.

Although multi-sourcing is not a new concept, and companies across all sectors continually assess and adapt their supplier bases, there has been a noticeable increase in recent years driven by higher supply chain volatility. The 2022 EY Industrial Supply Chain Survey found that 62% of industrial companies surveyed had made significant changes to their supplier base in the previous 24 months and 77% had or were planning to increase their total number of suppliers.¹⁰

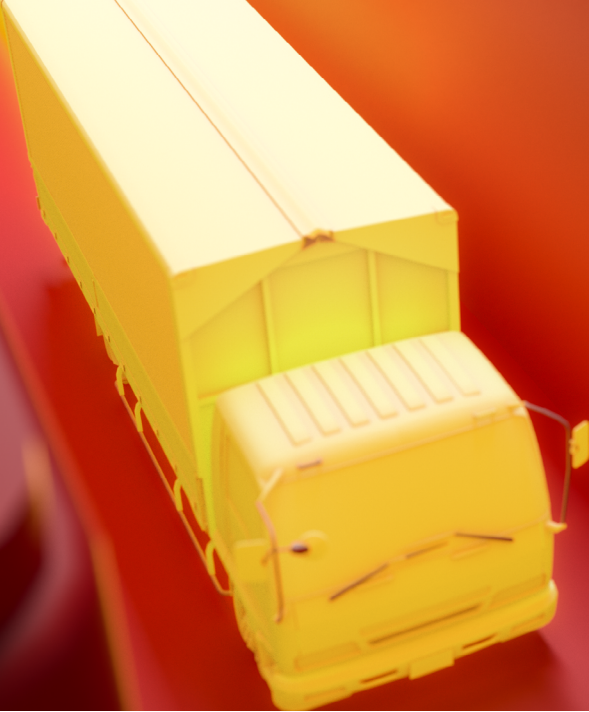
One of the world's largest fashion groups provides a prominent example of a business effectively leveraging multi-sourcing on a global scale. The company strategically spreads their supply chain across thousands of facilities and direct suppliers worldwide. This strategy allows the company

to adapt swiftly to peak customer demand and leverage the unique strengths of each supplier. Multiple suppliers also mean they can respond quickly to disruption, redistributing production to ensure products are always in stock.

An European elevator producer and the leading construction and mining equipment manufacturer provide additional examples of how multi-sourcing strategies can lead to increased customer centricity, flexibility, and resilience. The global leader in the elevator and escalator market purchases the same supplies from multiple suppliers to ensure product availability and agility, allowing the company to respond quickly to market needs. The leading construction and mining equipment manufacturer follows a multi-sourcing approach for technical supplies, which balances orders across suppliers, improving time to market. Redundant part suppliers have improved the company's resilience and competitive advantage, reinforcing their leading market positions.

3.3 Dimension 3

MODES OF TRANSPORTATION



The third dimension of supply chain diversification concerns the physical flow of goods. Adding modes of transport can decrease interdependencies, fostering agility and resilience and boosting a company's overall value proposition.

A retail market leader provides a best-practice example of this dimension of supply chain diversification. Aiming to respond rapidly to consumer preferences and trends within 10 to 14 days, the company utilizes all modes of transport across all supply lines, opting, for instance, to ship goods via air freight between regions rather than using slower ocean freight. This allows swift and flexible stock reallocation between markets based on customer requirements and disruptions.

A global technology company presents another excellent example of utilizing additional modes of transport to improve market responsiveness and flexibility, control costs, and lower emissions. The company leverages a combination of air freight for critical shipments and ocean freight for build-to-stock shipments and bulkier goods.

They also take advantage of fast ocean freight services from China to the United States (14-day transit time), with the option to fly express shipments if needed, which enhances flexibility tremendously.

An leading pharmaceuticals and medical device company offers an additional perspective on the benefits of diversifying the mode of transportation. The company tailors its transport mode strategy to product and market requirements. Although air freight is often necessary, they increasingly utilize ocean and road transport to diversify their supply chain, reduce costs and minimize emissions. This diversification allows the company to adapt quickly to market needs. For example, the firm traditionally relied on bulk shipments due to a high demand for products that didn't require temperature monitoring. With the recent increase in biopharma products, there is an emerging need to transport more low-volume shipments of temperature-sensitive products. In response, the company adapted its supply chains to include temperature-controlled options.



3.4 Dimension 4

LOGISTICS OPERATIONS

The fourth dimension of supply chain diversification focuses on expanding logistics infrastructure to provide alternative options that maintain continuity in the supply chain during disruptions.

A global sportswear and athletic equipment manufacturer provides an excellent example of a company transitioning from a centralized to a decentralized and diversified logistics network. While the company aims to optimize profitability, the goal of its supply chain strategy is also to improve resilience. They deliver products from production sites directly to regional and local warehouses, enhancing resilience and cost efficiency.

The company has also increased its logistics footprint, establishing a presence in South America and India, opening a new hub in Southern Europe, and expanding operations along the east and west coasts of the United States.

An European elevator manufacturer and a global productivity partner for mining and construction employ a similar logistics diversification strategy but on a regional scale. Each company assembles different parts of its finished products at separate distribution centers across several regions. Spare parts are stored primarily at each country's local distribution and customer centers, facilitating rapid repair of essential products as needed. Finished products are shipped directly from production sites to customer centers to ensure customer centricity and agility.

IMPLEMENTING A SUPPLY CHAIN DIVERSIFICATION STRATEGY

4.

This chapter offers guidance for making informed decisions about supply chain diversification that align with strategic and operational objectives.

The six key steps outlined below can facilitate a company's initial exploration of supply chain diversification to determine needs and requirements and develop a diversification strategy that ensures long-term resiliency and continuous improvement.

It's important to achieve the maximum level of end-to-end supply chain visibility for each step. This includes not only visibility of goods or products in transit but also inventory levels and locations. Full visibility encompasses a complete mapping and assessment of the supply chain with all relevant suppliers and partners as well as the physical flows of goods within the supply chain.

1. Analyze the current level of supply chain diversification

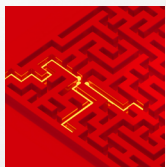


The process must begin with a comprehensive map of the existing supply chain to ensure a high level of transparency, followed by an analysis of the level of diversification across the four dimensions of the model.



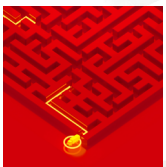
Dimension 1. **MULTI-SHORING**

Chart all supplier locations, including company-owned manufacturing facilities and ideally down to tier 3 suppliers. Identify key customer locations and evaluate the company's current capacity to supply main markets.



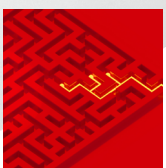
Dimension 2. **MULTI-SOURCING**

Identify and assess key suppliers, partners and manufacturing facilities. Analyze the company's dependency on each and its ability to supply essential parts, products and services.



Dimension 3. **MODES OF TRANSPORTATION**

Outline the current main modes of transport for each trade lane. Assess the physical flow of goods and examine the existing transportation network in terms of capacity, flexibility, reliability and partners.



Dimension 4. **LOGISTICS OPERATIONS**

Map the current distribution and warehouse networks (owned and third-party), detailing inventory locations and levels. Assess the current capacity to respond to fluctuations in market demand.

2. Determine the envisioned level of supply chain diversification



Define the objective in terms of diversification and in alignment with the company's overall strategic goals, considering the key benefits of diversification: customer centricity, agility, sustainability, resilience and profitability. Based on the current level of diversification derived from Step 1, determine the level required to best meet that objective.



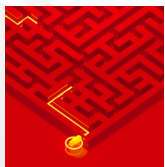
Dimension 1. **MULTI-SHORING**

Based on the business objectives, identify which additional geographical locations would improve the reliability of the company's supply.



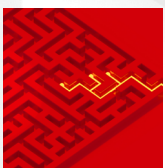
Dimension 2. **MULTI-SOURCING**

Consider potential additional suppliers to partner with. Determine the optimal number of suppliers needed to achieve the business objectives effectively.



Dimension 3. **MODES OF TRANSPORTATION**

What other modes of transportation could the company use to satisfy business needs?



Dimension 4. **LOGISTICS OPERATIONS**

Evaluate potential strategies for expanding the existing logistics operations network.

3. Evaluate the impacts of diversification



Assess and conduct a thorough analysis to determine if the current level of diversification matches the envisioned level.

Consider the impact on the business and evaluate the following aspects:

- Financial (e.g., operational cost, inventory levels, cost of capital, cost to serve)
- Customer satisfaction (e.g., service levels, quality, brand reputation)
- Sustainability along all Environmental, Social and Governance pillars
- Current risk profiles vs. those of envisioned level
- Skills, capabilities, and mindset available and required
- Infrastructure, ecosystems, and resources available and required
- Levels of management complexity

4. Identify required resources



Determine the essential resources and investments needed for the envisioned levels of diversification, which include:

- People, including change management needs
- Processes
- Technology
- Customers
- Supplier and partner engagement

5. Decision



If diversification is deemed necessary, proceed to the next step to initiate the planning, implementation and management process.

Note that the decision will vary for each company and specific supply chain and is contingent on multiple factors assessed in the previous steps, such as the competitive landscape, financial considerations, sustainability goals, risk mitigation, infrastructure readiness and organizational capabilities.

If Steps 1-4 suggest that diversification is not warranted, no further action is required; however, routine evaluations of supply chain diversification are recommended.

6. Implement and manage the diversification strategy



Identify the critical dimensions to be prioritized and formulate a comprehensive strategy to achieve the envisioned level of diversification.

It is also imperative to remember that supply chain diversification is not a “set-and-forget” endeavor but demands continuous management and improvement.

Consider the following recommendations:

- Develop a business case that showcases the benefits and impacts of diversification
- Draft a roadmap with a tactical plan, action items, timeline, and key performance indicators
- Involve key stakeholders, including key suppliers and logistics partners

Note that it is crucial to maintain flexibility during the implementation and management process. Supply chains are inherently dynamic, influenced by evolving regulations, geopolitical risks and shifts in market dynamics.

CONCLUSION & OUTLOOK

5.



“Supply chain resilience holds utmost importance in ensuring the attractiveness and viability of global trade. For businesses, the diversification of supply chains to adapt to the evolving global economic landscape, mitigate disruptions, and maintain seamless operations is a cornerstone of sustainable long-term economic success.

Key areas include sourcing locations, partners, transportation mode shifts and additional logistics infrastructure.”



Yin Zou
Executive Vice President of Corporate Development
DHL Group

Supply chain diversification has already become a popular theme in supply chain management, and for good reason. It is an essential strategic lever for building resilience, enhancing customer centricity, driving profitability, improving sustainability, and gaining a competitive advantage.

FUTURE-PROOFING SUPPLY CHAINS

With disruption accelerating, diversified supply chains are expected to become increasingly significant. Recent experience demonstrates that companies with strategically diversified supply chains are better positioned to navigate uncertainties and seize emerging opportunities.

Today's new normal demands continuous assessment and more regular reconfigurations of supply chains to meet new requirements, enhance risk profiles and maintain or improve agility and resilience.

Transparency and visibility across the entire supply chain are imperative and the foundation for success, with state-of-the-art technology, supply chain management tools and strong partnerships playing a decisive role.

It's important to understand that there is no one-size-fits-all approach to supply chain diversification. Each company's situation is unique, and individual factors must be considered, such as market dynamics, the existing supply chain setup, strategic business objectives and the ability and willingness to tackle risks.

However, companies looking to leverage the full benefits of supply chain diversification highlighted in this report must embrace collaboration across the entire supply chain. Logistics service providers like DHL can play an important role in this, from supporting the assessment of the current level of diversification to helping map out the supply chain, determining solutions that best meet a company's overall strategic goals and managing the continuous assessment and improvement process.

We hope this report's structured, actionable model will allow companies to go beyond the buzzwords and explore the nuances and potential benefits of supply chain diversification. With a deeper understanding of the four dimensions, companies can overcome the challenges and make strategic decisions to build resiliency and consistently meet customer needs in today's volatile global marketplace.

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