Building Resilient Business Operations:

Navigating trade policy and scenario changes in a challenging market environment

HOLOCENE

Global supply chains and their associated logistics networks are in a perennial state of flux. This comes off as no surprise to industry stakeholders, considering the very nature of their operations — an ecosystem where the market is cyclical, and freight is commoditized. For companies that build their operations across several geographic markets, the complexities surrounding their end-to-end supply chain operations can be daunting.

The pandemic was a wake-up call to global supply chains. It was a black swan event like no other, overshadowing the capitulation of consumer demand post the 2008 economic crisis or the freight challenges in the immediate aftermath of 9/11. The pandemic saw countries shut doors to contain the spread of COVID-19, which inevitably reverberated on supply and procurement networks around the world.

Businesses struggled across multiple fronts during the pandemic — sourcing operations were stuck with suppliers closing factories for quarantining, containers piling up at ports and yards due to low worker turnout, and bottlenecks seizing up freight corridors.

Compounding the misery were freight costs that had, in some high-traffic lanes, increased tenfold from its pre-pandemic norm. With historic consumer demand, prolonged freight delays, and increased sourcing challenges, the pandemic years were exceptionally disruptive for global supply chains. If likened to a natural disaster, these years could be compared to a hundred-year event in their unprecedented scale of impact.

Such headwinds to trade sent businesses back to the drawing board, prompting a reevaluation of supply chain networks and making resilience an imperative to operating a sustainable business. This led to more diversification of sourcing operations, as evidenced by a notable shift of supply chains from the Chinese mainland to Southeast Asia and Mexico. While a complete decoupling from China remains unlikely at present, this diversification strategy aims to ensure that companies are better prepared for unforeseen disruptions.

That said, diversification exposes companies to the varying regulatory landscapes of different markets. With electoral polarization taking shape amidst a charged political climate, it is now common to see regulations be guided by electoral needs rather than sound economic fundamentals. The Trump administration's trade tariffs war with China and political posturing has seen US businesses rethink their sourcing from the Far East — an impact that sustains to date.

While political flare-ups can introduce trade policy changes that catch businesses off-guard, regulations can come with ample warning and yet remain a challenge. Case in point, a variety of decarbonization regulations that have been signed over the last decade to rein in carbon emissions across the supply chain. *"Europe's carbon tax is a result of its strong environmental proactiveness,"* observed Navneet Lekshminarayanan, the co-founder and managing director of Holocene. *"Brexit, which saw changes in immigration policies, had a significant impact on supply chains as they led to a shortage of blue-collar workers."*

The challenge with transitioning supply chains varies with business complexity

For companies that deal with run-of-the-mill products, like fast fashion or merchandise, diversification and dynamic sourcing can be prudent options to build operational resilience. Transition can be swift, as operations can react better when suppliers can be found worldwide and at short notice.

For instance, a company like Hasbro, which manufactures children's toys, can shift production from China to countries in SE Asia in a matter of months, assuming their existing contracts with suppliers are short-term. Companies with a broad network of suppliers have the flexibility to shift their sourcing to new geographic markets, while drifting away from current partners in regions where changing conditions make trade less favorable.

However, shifting suppliers is a lot more challenging for organizations that deal with sensitive products within industries like medical devices or robotics, thanks to extensive IP involvement and long-term development with suppliers in countries like China or Taiwan. *"Decoupling for trade policy changes is daunting and time-consuming,"* said Anand Singh, the VP of integrated supply chain at Sword Health, a physical therapy provider.

> **"Being an FDA-approved and listed company, Sword's products undergo extensive FDA approval processes, including clinical studies and patent work to create a protective IP around our offerings. This makes it harder for us to diversify or decouple from an existing setup, unlike some of our competitors that purely focus on tech-based digital solutions," said Singh.**

Ultimately, this is a reality that businesses dealing with complicated products or complex supply chains have to work with — diversification is not always a feasible decision. But when policy changes come knocking, companies try their best to circumvent added tariffs by exploring options to classify products in ways that can attract cheaper tax slabs.

> **"I recall witnessing this at a major food processing company exploring the addition of paraffin to cooking oil," said Singh. "There's a tax difference between coconut oil with paraffin — typically used for hair — and coconut oil for cooking. Hair oil, being considered a luxury item, was taxed differently than cooking oil, which is categorized as a necessity. The company, primarily involved in the cooking oil sector, aimed to avoid the higher tax associated with the 'hair oil' classification. Therefore, they focused on developing a variant of coconut oil for cooking purposes without paraffin."**

Such scenarios are interesting, and more commonplace than the market would realize. Complying with trade policy and strategic maneuvering is crucial to running a successful business. Companies understand this, and hire trade compliance lawyers to deal with changing conditions.

However, such expert maneuvering is reactive and seldom proactive. *"Even the big auditing firms react to events as and when they happen, and do not look to proactively anticipate potential global challenges on the horizon,"* pointed out Singh. *"This reactive stance results in crucial information flow — from local to regional to national to global levels — not being captured effectively."*

Despite investing in trade compliance and diligently adhering to policies, companies often struggle to forecast changes in their operational environment. This lack of foresight frequently leads them to implement drastic stop-gap measures that hinder operations — processes that get increasingly harder to implement with scale.

Trade incentivization can make or break businesses

Trade flows, while influenced by myriad factors, are significantly impacted by trade incentivization policies. These policies, which can include tax breaks, subsidies, and regulatory adjustments, have a strong say in where industries like manufacturing, pharma, or textile would move. When governments implement favorable trade policies, they create an environment that can attract investment, stimulate production, and shift the dynamics of international trade.

In a globalized economy, the movement of industries is often fluid, seeking out regions that offer the most advantageous conditions. This movement is not just about cost but also encompasses factors such as political stability, access to markets, and the quality of infrastructure. Successful trade incentivization requires a balanced approach, considering all these aspects to truly make a region attractive for business operations.

The Mexican policy gamble to leverage nearshoring attempts

Landmark Tax Breaks Unveiled

- Accelerated deductions up to 89% in 2023-2024
- Additional 25% off for worker training & upskilling

In Oct '23, Mexico issued a landmark decree to offer astonishingly high tax breaks for companies relocating their operations to Mexico. The tax cuts include accelerated investment deductions of upto 89% (and a minimum of 56%) in 2023 and 2024, with additional deductions of 25% during three years of training and upskilling workers.

Hailed as a calculated move, the policy targets major export industries, such as auto and semiconductor manufacturing — verticals that are anticipated for high growth.

These incentives were designed to attract companies with nearshoring on their mind, and considering Mexico shares its northern border with the world's largest con-

Targeting High-Growth Sectors

- Automotive
- Semiconductors
- Farm equipment
- Battery

> Mexico's political stability and strategic location present an attractive option for manufacturing investments amidst global instability.
>
> David Martinez, Roche

Strategic Geographic Appeal

Leveraging proximity to the US market

sumer country, there is a significant strategic appeal to this trade policy. While this is a recent policy change, the green shoots are already reflected in the growing export numbers post-pandemic. In 2022, Mexico recorded $613 billion in exports — a 17.2% increase from 2021. With a policy tailwind, the rate of growth of exports can be expected to sustain, even if it does not tick higher.

Boosting Mexico's Exports

- $613 billion in exports for 2022
- 17.2% increase from 2021

"The current global instability, such as conflicts in Ukraine and the Middle East, creates investment challenges and internal crises. Mexico's political stability and strategic location present an attractive option for manufacturing investments amidst global instability." said David Martinez, the global head of logistics strategy & governance at Roche.

Tesla Leads the Charge

- Investment in the world's largest manufacturing facility
- Setting a trend for others to follow

> **"Take Tesla, for example," said Martinez. "They've recently invested in the largest manufacturing facility in the world in Mexico. This move indicates a trend where more companies are likely to follow suit. Once a major player like Tesla sets up operations in Mexico, it encourages other companies, including suppliers for Tesla, to move there as well."**

Mexico is an example of how regulations, if encouraging and incentivizing to business, can sway trade flows. Mexican authorities expect this to bring annual foreign direct investment of $55 billion, up from the $36 billion registered in 2022.

Projected FDI Growth

- $36 billion in 2022
- Expected $55 billion post-policy

The domino effect of trade policy changes

While Mexico's move will positively impact FDI and job growth, there are some unintended consequences of changing regulations. To begin with, the Mexican logistics infrastructure might not be completely prepared to handle this high influx of manufacturing units on such short notice. *"Chinese car manufacturers are now setting bases in Mexico as it's an extremely lucrative scenario,"* said Lekshminarayan. *"They've flooded the market, and interestingly, from a logistics perspective, challenged the capacity of Mexican ports."*

Traditionally, vehicles are transported using roll-on roll-off (ro-ro) vessels. Ro-ro ships are designed to carry wheeled cargo such as cars, trucks, trailers, and railroad cars, which are driven on and off the ship on their own wheels or using a platform vehicle, such as a self-propelled modular transporter. This is in contrast to the traditional vessels, which use a crane to load and unload cargo.

Yet, while this method has been effective historically, the recent surge in manufacturing and export activities, particularly from Chinese car manufacturers setting up in Mexico, has put unprecedented pressure on this system. The sudden increase in ro-ro shipments overwhelmed Mexican ports, which are not fully equipped to handle such a volume of ro-ro vessels.

In response, Chinese manufacturers innovated by developing car-carrying containers, allowing them to leverage the existing containerized terminals, effectively circumventing the limitations of the ro-ro terminal infrastructure. This approach reduced lead times, as the options would be to either wait for their turn or move their cars via the better-equipped US West Coast or Gulf Coast ports.

> **"This was a genius move," mused Lekshminarayan. "Such shifts demonstrate the unforeseen impact of policies aimed at job creation and tax cuts. Major auto companies in Mexico could struggle with container terminal capacity issues. The Chinese, with their financial power, have secured specialized contracts with terminal port operators, ensuring priority to their vessels."**

The repercussions of the Mexican decree go beyond local challenges, and will have an impact far from its borders. For instance, European manufacturers with a high exposure to the US market will suffer disproportionately from nearshoring.

> **"If trade incentivization causes a stir, the same can be said of trade wars," observed Lekshminarayanan. "If Trump were to come back as President, there would be high chances of the US slapping added import duties. Let's say they impose a flat 10% import duty on everything, justifying it by calling it a silver bullet to shrink the US economic deficit. This would cause a major stir across the world importing to the US."**

Imagine a German Tier-1 firm manufacturing heavy machinery parts for a US business. Considering margins are already tight, an increase of 10% in landed cost would cause a severe dent in their bottom line. *"Such added costs don't vanish; they trickle down, and eventually, the end consumer will foot the bill, at least partially."*

Ro-ro vessel anchored at the dock as cars get unloaded

Source: ATS

Trade is both localized and globalized, all at the same time

From a Flutter to a Storm

It's a phenomenon where a minute localized change in a complex system can have a seismically large impact elsewhere.

In chaos theory, there is a term called the butterfly effect. It is a phenomenon where a minute localized change in a complex system can have a seismically large impact elsewhere. Edward Lorenz, the mathematician and meteorologist credited with this effect, explained that it was derived from the metaphorical example of a tornado rising up as a result of minor disturbances caused by a distant butterfly flapping its wings several weeks earlier.

Global trade flows have a solid case to make for the butterfly effect. *"For instance, climate change-induced droughts in Somalia in the horn of Africa could lead to a resurgence in piracy as desperation grows amongst its people,"* said Singh.

Drought in Somalia: A Catalyst for Piracy

- Climate-induced droughts heighten piracy risks
- Direct threat to vital Red Sea trade routes to Europe

"This poses a direct risk to container vessels moving via the Red Sea to Europe and further West. When these trade lanes become dangerous to operate, and alternative routes like the Panama Canal are congested and drought-stricken, the cost of freight increases."

Supply chain diversification has meant more businesses have shifted some of their operations to SE Asia. This prompts more traffic to move via the Suez Canal, rather than trans-Pacific, as would likely be the case if freight moved from the Chinese mainland. More volumes moving via the Red Sea would mean more chances of pirate attacks off the Somalian coast.

The Ripple Effect on Global Shipping

- Increased freight costs due to alternative congested routes
- Potential pivot in shipping lanes causing broader implications

"This illustrates how an event happening in one part of the world could lead to widespread and rapid implications," said Singh.

"The approach to crisis events and adverse scenarios is not just to look to predict them, but to follow the trail to understand the chain reactions that follow." Capturing and utilizing regional and local news is crucial for such an analysis. Such information can be repackaged and made into actionable insights that can save supply chains from running into a wall. *"At the executive level, such insights can guide strategic planning, helping leaders understand the impact of past decisions or prepare for future risks,"* contended Singh.

However, gathering data and disseminating information is easier said than done, especially when some of the most widely used commodities pass through perilous territory.

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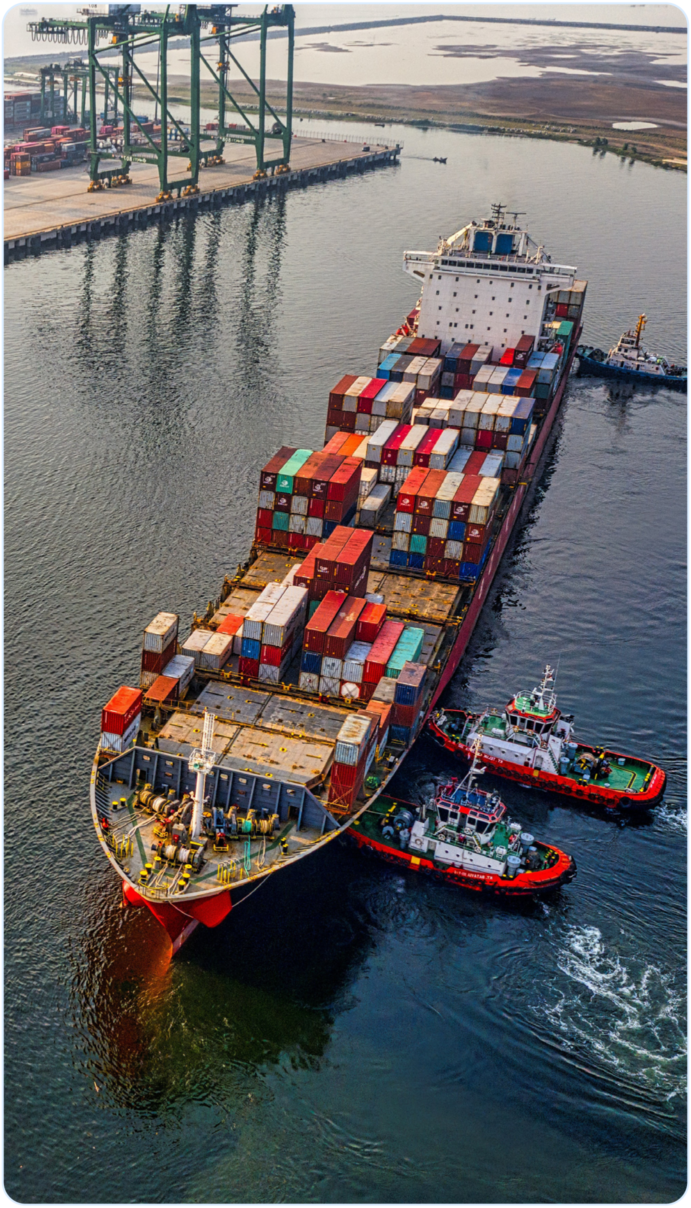

Take coltan, for instance, a vital mineral used in manufacturing electronic devices like smartphones and laptops. Coltan is predominantly sourced from regions in Africa, particularly the Democratic Republic of Congo (DRC), which is known for its conflict-ridden mining areas controlled by various armed groups.

In these regions, companies often find themselves in complex negotiations with local militias or gangs who control the coltan mines. These negotiations are fraught with ethical and safety challenges, making it difficult for companies to ensure a steady and responsible supply of this crucial mineral. Due to the high risks involved, these companies cannot afford to have their personnel on the ground, making local market intelligence hard to obtain.

To navigate this, companies increasingly rely on local news sources and informants to gather information about the situation in these mining areas. These sources provide insights into the current state of the mines, the level of conflict, and the dynamics between different groups controlling the areas. Perusing local information can help companies make informed decisions about sourcing coltan while attempting to avoid contributing to the conflict or putting their personnel at risk.

> **“In business operations, it isn’t always as easy as sourcing fish from the ocean for the international sushi market. It’s about obtaining market intelligence from regions where you don’t want your personnel stationed due to safety risks,” said Singh. “While pursuing local information is paramount, very few companies have the wherewithal to draw such intelligence. No major consulting firm like BCG, KPMG, or Deloitte delves into this level of global trade to understand critical commodities.”**

The struggle to leverage localized data for a globalized context

While local context is undoubtedly crucial to gaining context over operational resilience, there are several headwinds to effectively leveraging this localized data for globalized trade dynamics. The disparity in information accessibility and reliability across different regions is palpable, especially if these regions are embroiled in conflict or political instability, causing data to be scarce or skewed.

This aside, small and medium enterprises (SMEs) largely lack the capability or network to tap into these local information streams effectively. They face significant barriers in gathering and analyzing data due to limited financial and human resources. This puts them at a disadvantage in preemptively addressing supply chain risks compared to larger corporations.

However, even larger companies, despite their resources, encounter internal communication challenges. *"The problem is no one talks to anyone,"* said Singh. *"Large multinational corporation with offices across the world face the issue of siloed information at regional and global levels. The Osaka office might not communicate pertinent information to its national head office in Tokyo, which in turn might not relay the information it has effectively to the regional head office in Singapore, and so on. This goes all the way to the top."*

Such information gaps could quickly devolve into a classic case of Chinese whispers, with information becoming a distorted version of the truth at the end of the chain. These challenges emphasize the need for a more integrated approach to data gathering and analysis. Companies must develop strategies to connect their global operations with local insights, ensuring a seamless flow of information. This could involve investing in local partnerships, enhancing internal communication protocols, or employing advanced analytics to make sense of disparate data sources.

> **"Let's consider a large organization like Philips. The preliminary conversation around sourcing will start with understanding the supply base. It's about making a list of critical and non-critical suppliers, their production locations, and the regions they operate in. Essentially, this information serves as a blueprint for Philips' supply chain roadmap. By analyzing this data, they can connect the dots across various regions and countries," said Singh.**

Armed with such information, a company like Philips can deploy AL and ML algorithms to continuously monitor for any changes to the status quo. *"Consider a scenario where a small but critical supplier, who might not usually attract the attention of the CEO or CTO, is being acquired by a larger supplier,"* Singh pointed out. *"This larger supplier might be supporting one of Philips' competitors. Such a transaction can have significant implications, especially in terms of intellectual property, which might now be shared with the competitor. Such under-the-radar activity is crucial and should be communicated back to Philips as it's a red flag that needs immediate attention."*

Similarly, other regional events, like natural disasters or political changes leading to labor strikes, can significantly impact the supply chain. These events might not be in the primary focus of global news, but their ripple effects are critical for companies. Global news, often in various languages, needs to be consolidated and analyzed for relevance.

> **"The challenge here is information overload," said Singh. "When you cast a wide net, you end up gathering an overwhelming amount of data. Companies might not be interested in every piece of news, but rather in specific information that pertains to the criticality of their suppliers and products they provide."**

Once relevant information is identified and brought back, it acts like a tailored brief. Supply chain managers would focus on intel specific to their suppliers, while executives can look at regional news and macroeconomic factors that can disrupt operations. Predictive analysis becomes critical here, as it helps anticipate future scenarios based on current trends and data.

Although humans struggle with making accurate predictions, combining predictive models with human insights can be more effective than relying solely on deterministic models in this context. Predictive models, which assess probabilities and likelihoods of various outcomes, are particularly valuable in scenarios where data constantly evolves, and outcomes are not strictly deterministic. This approach enables companies to navigate uncertainties and complexities in global trade, by analyzing patterns and trends to foresee potential supply chain disruptions.

Building predictive models that cherry-pick probable scenarios

While communication gaps and information overload are two different problems within an organizational setup, they are distant ends within the same spectrum — the former is a result of a breakdown in internal communication, and the latter is an over-zealous attempt to plug blindspots in the network that end up swamping the system.

But with predictive models in the mix, companies can turn to scenario analysis. *"You could have 10,000 different indicators in play, which can amount to 10 million scenarios when you account for all the permutations and combinations,"* said Singh. *"When looking at specific scenarios, or several events, it's crucial to think of the domino effect."*

Consider the case of inventory smoothing. If a company has a million dollars to buy inventory without stocking out, the prudent way to optimize inventory will be to simulate various possible scenarios. Running simulations will help decide events that have a higher probability of occurring, helping weed out a bulk of the scenarios that are not realistic. Ultimately, the company will be left with a few scenarios, which can be categorized and ranked to create different probabilistic outcomes.

> **"This process requires human intelligence initially, but ML will take over in time as the system gets more refined," said Singh. "For instance, a regional conflict that might be occurring today could resolve itself next year, shifting dynamics and probably propping up another scenario on the back burner. While ML does not factor in human-centric emotions like greed, assisting technology with human input will create a solid model to work with for scenario analysis."**

That said, building them in-house is arduous for large companies and out of reach for SMEs. Such a predicament puts the limelight on companies like Holocene, which can go beyond the limitations that corporations face by considering the plethora of variables impacting their business. *"Holocene is small enough yet big enough to create an information base that could lead to industry-standard predictions in the future,"* said Lekshminarayanan.

> **"The inherent deficiencies in the ecosystem allow us to come in, talk to individual stakeholders, scrape information from localized sources, and crunch the data to create meaningful insights for our customers."**

Lekshminarayanan pointed out that companies often spiral into bad decisions based on their approximate understanding of the present scenario. *"An approximate idea of the present does not determine an approximate idea of the future. This is something that companies fail to reckon with, as predicting future operational needs while standing on shaky ground will end up jeopardizing the company's demand and production plans, putting millions of dollars at risk."*

Take the case of toy wholesaler Hasbro. Sales predictably skyrocketed at the height of the pandemic, as children stayed home and exhausted parents overspent on toys to keep them engaged. Witnessing this historically high demand, supply chain managers at Hasbro took the risk of ordering a massive inventory in mid-2021, which, in an unpleasant turn of events, ended up arriving all through Q4 '21 to Q2 '22, due to clogged trans-Pacific maritime routes.

A bulk of these orders had no basis in the quickly changing reality as restrictions ceased post-pandemic. The result was a 54% year-on-year increase in stocks held in Q4 '21, and a double whammy that saw these bloated inventories tie up capital and increase warehousing costs. While it is easy to see in retrospect that this was a horrendous move, supply chain managers at Hasbro made the ill-fated bet based on reality they did not fully understand, which ended up eating their margins, inevitably sinking the company's bottom line.

In the end, scenario analysis helps not just because of its predictive power but also as a tool for strategic planning. A predictive model is not fortune-telling. Unlike fortune telling, such predictive models provide more than one scenario that is based on informed decisions. *"Stating you will get rich by 40 is fortune telling. Telling you there's a 30% chance of being hit by a trolley as you walk in an airplane aisle is prediction based on available data,"* contended Singh.

Probabilistic scenarios allow businesses to make decisions based on data. The key to operational resilience is to provide options and rank scenarios on their probability of occurrence. In essence, this is what Holocene can do — enable companies to act on scenarios based on their degree of probability, thus facilitating more informed decision-making and reducing the risks associated with uncertainty. By leveraging these models, businesses can navigate complex global trade dynamics more effectively, ensuring they are prepared for a range of potential outcomes, rather than being caught off guard by unforeseen events.

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> Navneet Lekshminarayanan, Holocene

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About Holocene

Holocene GmbH stands at the forefront of revolutionizing supply chain management, masterfully linking various elements within the network. The company's core expertise lies in optimizing data, ensuring it is both enriched and standardized to provide clear, tailored insights for every stakeholder. This approach is instrumental in mapping the influence of global events on supply chain factors like logistics, demand, and supply. By doing so, Holocene excels in proactively identifying and evaluating potential risks, significantly aiding in both mid-term and long-term strategic planning.

A key aspect of Holocene's strategy is the integration of advanced machine learning technologies, which are pivotal in overcoming traditional barriers to supply chain innovation, especially those impeding digital transformation. This technological prowess not only boosts operational efficiency but also enhances the company's agility in responding to market fluctuations. Holocene is not just adapting to the evolving landscape of supply chain management but is actively shaping its future, marking its position as an influential leader in the field.