Transform your business with a resilient Supply Chain design

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Supply Chain design is the new competitive advantage

Persistent challenges from increasing customer demands, disruptive competitors, and economic fluctuations make the optimization of Supply Chain designs harder.

Various megatrends mean that Supply Chain complexity and risk are growing. Decision making speed and quality need to increase to enable faster recovery from disruptions. At the same time, there is a need to handle real-time data and complex business requirements across multiple networks – and balance risks and trade-offs.

The greatest risks lie in the Supply Chain

Supply Chains are increasingly at risk of disruption. It can be argued that the greatest risk to business continuity lies in the wider Supply Chain of key suppliers and customers (supply/demand networks) rather than within the company itself. As Supply Chain networks increase in complexity because of outsourcing, globalization, and trading environment volatility, so too has the risk of disruption. The vulnerability of networks has increased because of longer, leaner supply lines within the networks.

While many risks to the Supply Chain come from the external environment, such as war, pandemics, and earthquakes, there is growing evidence that the Supply Chain structure is itself the source of significant risk. The same events that once might have caused minor local disruptions may now affect entire businesses, industries, or economies. At the same time, we know that 80% of the costs come from the design of the Supply Chain.

The ideals of a fully integrated, efficient, and effective Supply Chain

The challenge of the Supply or Operations manager is to achieve the ideals of fully integrated, efficient, and effective Supply Chains capable of creating and sustaining competitive advantages. They must balance downward cost pressures and the need for efficiency with effective ways to manage the demands of market-driven service requirements. At the same time, they need to ensure a resilient and transparent Supply Chain.

By democratizing the processes and thereby reducing functional and data silos, creating an environment for constant learning, using a Supply Chain digital twin to visualize the current Supply Chain and advanced algorithms to model the future, there is an opportunity for ambitious companies to move from episodic one-off design reviews to a state of continuous design. To many, that means transforming from a manual approach to a digital one.



DIGITALIZED SET UP

MANUAL SET UP

Time to develop and deploy can be reduced by up to 80%

From our experience, when Supply Chains are designed to adapt and evolve, companies are prepared to make tradeoffs, optimize policies, develop scenarios, and accelerate the time between making and executing decisions.

We typically see a reduction in time to develop and deploy optimized solutions by up to 80%. Leaders are empowered to make the best decisions based on valuable Supply Chain intelligence. At the end of the day, it benefits the bottom line and gives the flexibility to manage constant change and risk.

In this whitepaper, you can learn more about what Supply Chain design and resiliency are. Reading this whitepaper will provide you with insights on how Supply Chain design can help you transform your Supply Chain

and ensure that it provides you with a competitive advantage.







The future Supply Chain must be resilient

The definition of Supply Chain resiliency

The concept of Supply Chain resiliency traces its roots back to the work of C.S. Holing, an ecologist who first noted the characteristics of a resilient ecological system in 1973. Since then, the notion of resilience has been applied to fields as diverse as psychology, systems thinking, disaster management, and, more recently, Supply Chains.

58%

say they are not able to factor in trade-offs and understand risk across scenarios For some, resilience is a reactive capability that occurs after a disruption or shock has taken place. Others see resilience as more proactive efforts toward helping the firm prepare for disruption.

Considering these different observations, it is not surprising that there is confusion surrounding this key concept.

We define Supply Chain Resilience as: **"The ability of a** Supply Chain to both resist disruptions and recover operational capability after disruptions occur."

As mentioned above, viewed from this perspective, resilience consists of two critical but complementary system components: the capacity for resistance and the capacity for recovery.

The distinctions between Supply Chain resilience, risk, and uncertainty are often blurred and unclear. On top of that, some use risk and uncertainty interchangeably, implying that these two concepts are the same. Yet, this is not the case. While linked, they are separate and distinct concepts.

Risk exists so that firms must deal with the possibilities of encountering situations that can adversely affect them. However, not all future events are equally unknown. Experience offers some insight regarding what events could occur, the probability of their occurrence, and the impact. Firms can predict the likelihood of these events over a set time to help them determine how to react if they were to occur. Events with a greater likelihood and significant potential impact require greater preparation.



93% of Supply Chain leaders plan to increase resilience

Every Supply Chain leader seeks an optimally designed network to reduce costs while improving its resiliency, efficiency, customer service levels, and competitive advantage. Furthermore, business and Supply Chain leaders understand that changes in demand, service expectations, market costs, and reverse logistics can affect the effectiveness of Supply Chain networks.

Hence, it could be a business advantage to periodically re-evaluate the Supply Chain design or determine whether a restructure is needed. However, this can

be quite costly and time-consuming when done manually. According to a McKinsey survey, 93% of global Supply Chain leaders plan to increase resiliency, and 44% would increase resiliency even at the expense of short-term savings.

Most companies are still in the early stages of their efforts to connect the entire Supply Chain with a seamless flow of data. Digital technologies can deliver major benefits to efficiency and transparency that are yet to be fully realized.



would increase resiliency even at the expense of short-term savings.

Companies now have access to new solutions for running scenarios, assessing trade-offs, improving transparency, accelerating responses, and even changing the cost structures.

Drivers of Supply Chain resilience

Now that we have described what Supply Chain resilience is, it is time to look at what the drivers for Supply Chain resilience typically are. However, it can differ from industry to industry.

Supply Chains were not designed for resilience

Supply Chains have grown in length and complexity as companies expanded around the world in pursuit of margin improvements. According to a McKinsey study, since the year 2000, the value of intermediate goods traded globally has tripled to more than \$10 trillion annually. However, these choices can sometimes lead to unintended consequences if they are not calibrated to risk exposure.

Supply Chain networks are typically designed for efficiency, cost, and market proximity, but not necessarily for transparency and resilience. Now they are operating in a world where disruptions are regular occurrences. Averaging across industries, companies can now expect Supply Chain disruptions lasting a month or longer to occur every 3.7 years, and the most severe events take a major financial toll.



Supply Chain complexity is rising

The need to source products from farther around the globe and move them faster while delivering at lower cost has increased complexity and risk while making it harder to respond to sudden disruption. Companies have typically managed their Supply Chains with relatively stable networks, policies, and modes of transportation. This can be challenging in a world of uncertainty. Old ways of planning driven by static assumptions around Supply Chain design are no longer enough. There is an increasing acknowledgment that resiliency necessitates building optionality in nodes, modes, and flows of Supply Chain designs.

Computational power has increased

We also live in a world of accelerating change, where the future is less and less a copy of the past. Some would argue that change has been accelerating. This sudden acceleration is the product of radical shifts in the growth of computational power and network capacity. For example, an iPhone has nearly 6000 times more transistors than the i486 chip that powered PCs in the late 1980s. Global internet traffic amounts to more than 46,000 gigabytes per second, a nearly 40-million-fold increase since 1992.

Demands are shifting

Both business-to-consumer (B2C) and business-to-business (B2B) companies expect to see meaningful shifts in the shape of future demand. This will affect commercial models. During the COVID-19 pandemic, many households prioritized buying goods (especially basic products such as groceries) over services (such as restaurants and hair salons, many of which were closed anyway).

As a result, pent-up demand could lead to a spike in spending on services as and when normalcy returns. What is still unclear is which services will return and in what form. For example, consumers have been spending more on home-based products, such as streaming and meal delivery. Will those preferences stick, or will consumers revert to their pre-pandemic habits? Or something in between? How quickly will travel and related services recover, and what will consumers expect from these experiences?

The expectation for seamless on-demand delivery will likely require companies to

Will those preferences stick, or will consumers revert to their pre-pandemic habits?

collaborate with the ecosystem in networks. Also, we will see that they will require a personalized experience, which could increasingly replace more traditional, isolated channel strategies. Few companies will be immune to these shifts.

The Supply Chain should be an integral part of the business strategy

For companies competing on a global scale, things can change quickly. All too often, Supply Chain strategy and business strategy have been kept separate. Driven by greater global complexity and

52%

lack access to data or are not able to connect all the available data



the enormous stress that has been placed on networks, from higher customer expectations to dynamic delivery solutions, companies should challenge the traditional thinking that the Supply Chain exists simply to meet the commercial needs of the business. Instead, Supply Chain considerations should become central to business strategy.

The business must be agile in responding to change

Supply Chain agility can be defined as: **"The ability to respond rapidly to unpredictable changes in demand or supply."** Many companies are at risk because their response times to demand changes or supply disruptions are too long. Two key ingredients of agility are visibility and velocity.

Supply Chain visibility is the ability of all members of the Supply Chain to see from one end of the pipeline to the other. Visibility, for example, implies a clear view of upstream and downstream inventories, demand and supply conditions, and production and purchasing schedules with clear lines of communications and agreement on "one set of numbers."

Velocity is defined as: **"Distance over time."** To increase velocity, time must be reduced. Here we are talking about "end-to-end" pipeline time, i.e., the time it takes to move product and materials from one end of the Supply Chain to the other.

It is not just velocity that matters in the creation of agile Supply Chains. It is acceleration. In other words, how rapidly can the Supply Chain react to changes in demand, upwards and downwards? These are the basic foundations for improved Supply Chain velocity and acceleration: Streamlined processes, reduced inbound lead times, and non-value-added time reduction.

Supply Chain design can help you transform your business

Below you will find a list of the most typical reasons Advanced Technology within Supply Chain design can help you transform your business:

01 Make more automated decisions

While most global Supply Chain-reliant companies have already embraced the power of data and advanced analytics across their company, the vast majority have been working with outof-the-box tools cobbled together with in-house applications or spreadsheet-based solutions. Advanced technology can help the Supply Chain use mathematical solvers and

algorithms to find the best decision or decisions for a given business problem within a defined set of constraints.

27%

say their current solution

produces results they don't

understand or cannot use

02 Quicker deployment to users in the organization

Advanced technology offers the possibility of creating a personalized experience. With apps, you will be able to create a tailored solution with the appropriate user experience for anyone in the organization to facilitate democratized, Al-powered decision-making.

03 Gain proactive insights

Leading companies can apply advanced technologies to fundamentally rethink and transform their Supply Chain, enhance their real-time understanding of activity in complex supply networks, and leverage continuous scenario planning to optimize the balance of cost against risk and agility of their network footprint.

04 Continually revisit the Supply Chain design

In other words, by adopting new technologies and the practice of continuous design, companies can reduce risk, improve resilience, and turn their Supply Chain challenges into a competitive advantage. By applying advanced algorithms, companies can continually revisit and adapt to make the best decisions balancing profitability, service, risk, and sustainability.

05 Make faster decisions

With an end-to-end extensible data model, Al, and rich algorithms, Supply Chain leaders can use simulations to quickly learn how to best respond to changing conditions. They can adjust scenarios and options in these models to identify which decisions best support agility and resilience. The best decisions require the right balance of profitability, service, risk, and sustainability.

06 Drive insights through relevant data

Designing a Supply Chain that is both resilient and efficient while addressing increasingly complex and nuanced markets is challenging. Supply Chains will have to consider multiple dimensions: proximity to customer markets, diverse customer service requirements (including after-sales service and reverse logistics), sources of raw materials, proximity to key suppliers and ecosystem partners, risks, regulations, customs, duties, and sustainability factors.

In the following, we give an example of how data can be utilized in the model to drive insights through relevant data:



The digital twin is an important transformation enabler

What is a digital twin?

A digital twin is a virtual representation of real-world operations. Investments made in creating and building digital twins will pay off again and again. The live data being captured can be used in everything from quality control to inventory management. Digital twins are also valuable because they can be analyzed and explored by various stakeholders using different types of tools. They can be used by engineering, production, and maintenance teams to experiment with new approaches and what-if-scenarios without disrupting actual production.

Gartner refers to the digital Supply Chain twin as: "A digital, dynamic, real-time and time-phased representation of the various associations between the data objects that ultimately make up how the physical Supply Chain operates."

The data captured by digital twins is available to feed Machine Learning predictive models. In general, the larger and more varied the dataset being analyzed, the greater the likelihood machine learners will discover previously unknown operational patterns and aberrations. However, for machine learners to be effective, they need to be analyzing relevant data. Modern streaming architectures can dynamically filter incoming data to focus on the right data points and levels of granularity.



Data from digital twins can also be automatically input into decision models, which capture the range of operational choices that could be made at key control and intersection points within the business. Optimizations can then be run to mathematically identify the best sets of choices – among thousands of possible decision combinations for achieving specific goals within specific operating constraints.

As digital twinning becomes increasingly commonplace, optimization will be widely adopted as one of the biggest prerequisites. Data availability and readiness will already be taken care of. In addition, better tools for digital twin visualization will help teams explore and understand the key drivers and trade-offs in optimized plans and decisions.

Use a digital twin to create a resilient Supply Chain

Given that Supply Chains need to be redesigned to treat disruptions as the norm and Supply Chain Resilience, we believe that the use of digital twins will increase.

Supply Chains can use them to create business process simulations that can be updated in real-time as circumstances change. For example, this could include finding the best way to shift production to alternate locations, move inventory to different warehouses, increase or decrease safety stocks and be better prepared overall.

Summing up, we could say that a digital twin allows companies to recreate their Supply Chain in the virtual world and quickly test scenarios in a risk-free manner to learn how decisions will impact the network operations.



Ingredients to a successful Supply Chain design environment

There is clear evidence that companies that implement digital technologies fueled with new data sources to test, learn, and adapt rapidly can outpace their competitors. It is not just about dealing with the challenges and issues of the day; it is about using a culture of technology and digital tools that enable you to be ready for the challenges that are yet to come.



In Optilon, we have been working with Supply Chain design for more than 15 years. From our experience, the most innovative companies are combining the following "ingredients" to form their approach to Supply Chain design:

- They identify challenges and business opportunities in their existing Supply Chain
- They ensure that the technology, powered by AI and machine learning, **fits the maturity of the company**
- They create a dynamic data model with internal and external data sources
- They tailor the solution with a **personalized experience** for anyone in the organization
- They ensure C-suite commitment and engagement as well as a growth mindset
- They **build governance processes and structures** that support an ongoing refinement of the optimal Supply Chain design
- They continuously invest in building skills and competences



Use this overview to determine your perfect use case.



Checklist for your approach

The starting point for your Supply Chain design journey will always be your own Supply Chain challenges. Use the following frameworks to become sharper on why it could be useful for you and your company to utilize advanced technologies within Supply Chain design.

What kind of questions would be good to ask to become more specific on the use cases?

TACTICAL LEVEL

Cost	 How much inventory do you carry at each stock-keeping unit and location level? Do you regularly evaluate the impact of changing product flow routes in the network in terms of landed costs, capacity utilization, and lead times? Do you regularly determine the optimal transport modes, carrier selection, and flow routes through the network? Do you integrate transport rates to identify improvement opportunities and assess future development of your transport costs? Do you need to shift your supplier base to a more reginal one? 	 Do you have a digital twin of your Supply Chain network that allows you to quickly evaluate the impact of Supply Chain decisions? Are your data and Supply Chain models consistently up to date, enabling faster refreshes in response to market changes?
Quality/ risk/ Sustainability	 What knowledge do you have about the supplier bases of your suppliers? I.e., would a disruption at a first or second-tier supplier trigger an alert in your planning systems? 	 Is your network over-reliant on specific regions? Are you able to adequately assess the cost to serve/profitability vs. risk of given supplier network configurations? Or emission to serve considerations?
Delivery	 Have you conducted a detailed disruption scenario analysis to determine potential weaknesses? Are you able to reallocate volumes automatically and dynamically across suppliers? Do you understand the profitability impact of doing so? 	 Do you regularly assess how best to use your Supply Chain network based on expected changes in customer demand?
Decision making	Can your inventory management systems automatically rebalance inventories across the network?	• Do you have the continuous capability to answer both strategic questions to determine what the best structure is, as well as tactical questions on how to use the current structure optimally?

STRATEGIC LEVEL

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Supply Chain business value with Supply Chain design

Below you will find some examples of how others have benefitted from Advanced Technology within Supply Chain design.





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