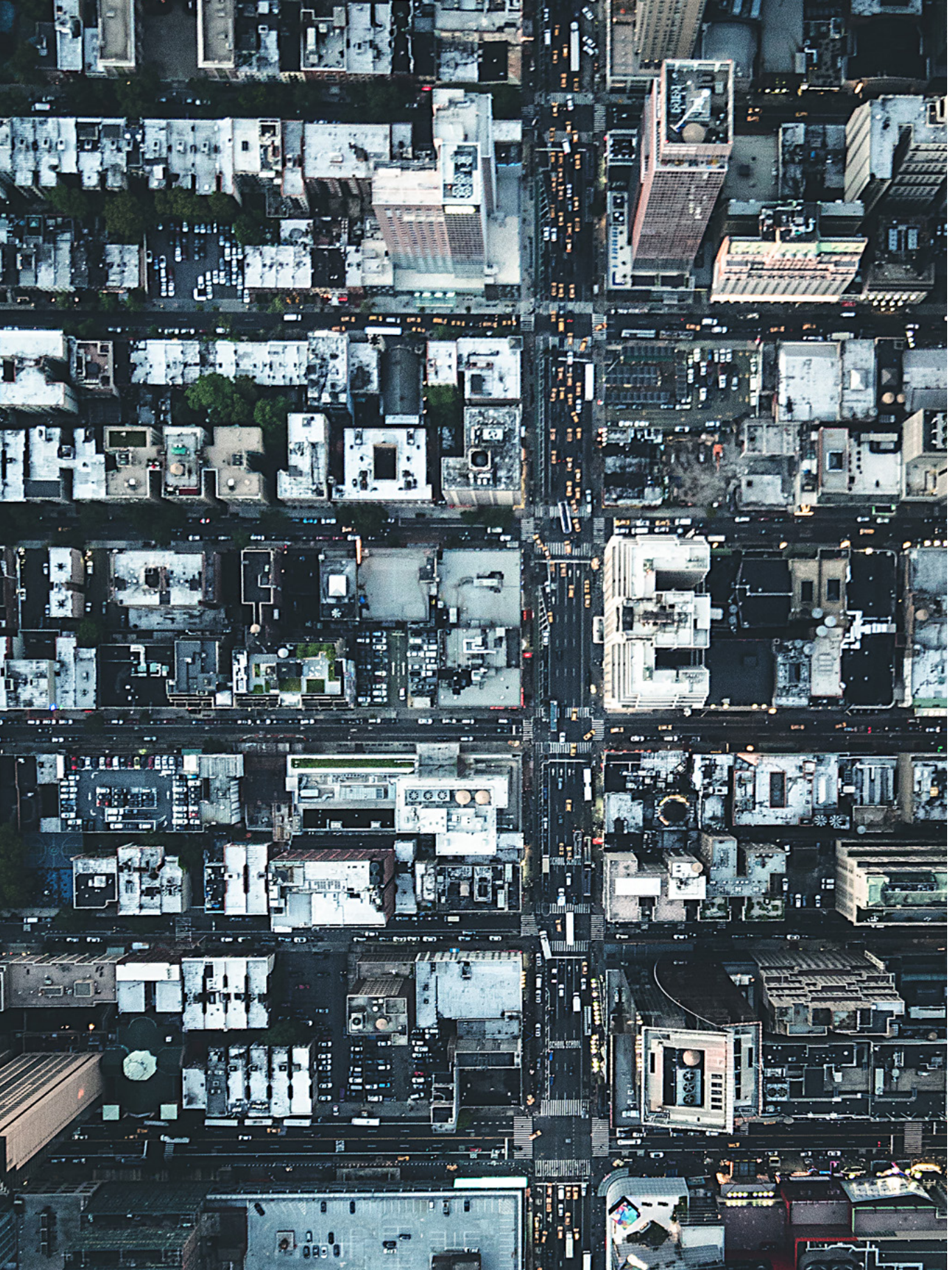
KINAXIS®

Thinking Differently About **Supply Chain Planning**

The Case for Concurrency



A transformation is taking place

Political landscapes shift overnight, global trade is constantly changing, consumers demand increasingly personalized service and smaller day-to-day challenges hit without warning. If your job is supply chain management, how on earth do you plan for the unplannable?

At Kinaxis, we devote our time to the innovative technologies, processes and methods to help our customers and partners navigate the changing landscape of supply chain planning. Forecasting specific disruptions has become increasingly futile, but if you set your business up to deal with the process of disruption, you'll be set up for success.

The transformative concept at the heart of what we do is concurrency: a model that takes into view the whole planning network and aligns data so that a change in one part of your chain triggers corresponding changes and communications in the rest of the chain, in real time. You can create what-if scenarios, understand their impact on your whole network and assess your options before anything actually happens. This concept of concurrency when applied to supply chain planning is called concurrent planning. Market-leading companies, such as Ford, Unilever and Schneider Electric, across industries – including automotive, consumer goods, and high-tech and electronics – are already harnessing the power of concurrent planning to realize significant business results.

How do you implement it? What technology do you need? And what is the impact on your most important asset: people?

We've sought perspectives on concurrency from supply chain operators, consultants, partners and analysts around the world and across numerous industries and we're sharing it in this inaugural guide to concurrency.

On behalf of the whole team at Kinaxis, we hope you find this guide helpful.

My best,

JOHN SICARD
President and Chief Executive Officer,
Kinaxis

Thinking Differently About Supply Chain Planning: The Case for Concurrency

The need for concurrent planning

Why business as usual doesn't work anymore

The nature of managing a business on a global scale is undergoing fundamental change and it's up to the world's supply chains to keep up. With concurrent planning, they can.

JOHN SICARD
President and Chief Executive Officer, Kinaxis

Rising supply chain expectations

Known more commonly as “the Amazon effect”, the online retailing behemoth has disrupted supply chain operations and consumer expectations dramatically by enabling same-day (and in some cases within two hours) delivery of goods to a customer's front door.

With the addition of ongoing trade wars and tariff issues, political uncertainty, unexpected weather events, and the day-to-day small changes that impact the supply chain, volatility almost feels like a quaint way of describing what businesses are dealing with today.

Yesterday's tools create inefficiency

The ongoing use of tools that use a cascaded approach to supply chain planning, such as SAP which has limited capability in managing these complicated and often simultaneous realities, adds even more strain. Static techniques built on outdated velocity expectations hamstring growth, curtail delivery abilities and put businesses at major risk.

Yesterday's operational silos default to sequential processes and create planning lethargy which fosters a lack of trust between a company's departments and its varying functions. In turn, this misaligns the organization, creating inefficiencies and loss of accuracy. These side effects spread across the organization like wildfire – there's just no absorbing them.

Functional excellence does not translate into supply chain excellence

Current supply chain planning techniques focus on functional excellence: isolating one piece of the supply chain at a time, fine-tuning it and then excelling at it. On the surface, this approach should result in an excellent system, one that operates at peak efficiency from end to end. But it does not.

That's because, between each function, misalignment compounds to create operational blindness. Expertise in capacity planning without understanding the impact on inventory is an example of this lack of transparency, as is a singular focus on inventory management without a connection to the forecast.

In many cases, the supply chain is still not thought of as an end-to-end system despite the fact that functional silos are at fault for hindering a complete view of the supply chain. As a result, people spend their days repeatedly managing the side effects and not tackling the central problem.

Consider for a moment driving your car.

There's a reason why humans can drive – we have control over sight and sound and the dexterity required to match speed with direction simultaneously. Humans are designed for concurrent thinking: planning, sensing and responding to the events around them as they change.

But how difficult would driving be if four people were trying to perform the function together? Driver one is steering, driver two is providing directions, driver three has their foot on the brake, and driver four has their foot on the gas. Now imagine if none of the four are friends,

but complete strangers. Strangers who don't speak the same language.

This is essentially what many supply chains are like. You still may be able to drive but the lack of concurrent thinking won't get you very far in one piece.

Concurrency, be it in your car or in your supply chain, builds on the notion of "always on" alignment as it perpetually systematizes and codifies the synchronization required to do the right thing, in the right order, in the right timeframe, allowing you or your goods to arrive safely at the intended destination.

Perfection doesn't exist

The desire to control the universe to the extent that planners can manage their supply chains by the power of will is unrealistic at best. Despite this, organizations have spent tens of millions of dollars trying to get close, focusing on metrics like "forecast accuracy" and celebrating improvements of five percentage points. The problem is there's no breakthrough to be had because the perfect plan simply doesn't exist.

Supply chains operate in constant flux and seeking perfection is futile. Organizations must become more agile and be able to predict, absorb and react to the imperfections.

This doesn't mean accuracy isn't important. Organizations absolutely need to have an idea of where they're going. Those that are infinitely agile rely less on accuracy and are able to absorb the unexpected effects that manifest in business.

Eliminating the "I didn't know" excuse

Concurrent planning drives end-to-end supply chain alignment and eliminates the age-old "I didn't know" excuse as organizations have more time to respond to the unexpected.

Decisions made in an agile, concurrent planning environment come from understanding the impact those decisions have before implementation, which creates confidence in the planning decision-making process and results in a more reliable and cost-effective supply chain.

End-to-end connectivity is the key

We've talked a lot about the speed of business and why supply chains must adapt to keep up. A supply chain's ability to adapt to ongoing volatility relies on end-to-end connectivity and the use of both prescriptive and predictive analytics.

For example, even the most effective algorithm won't solve your supply chain problems if it's only applied to a specific function. But, if it's applied to every function across your supply chain simultaneously, "concurrency" or "concurrent planning" occurs.

Inevitably, something unexpected will happen somewhere in the supply chain. A connected, concurrent supply chain instantly handles the effects of these unforeseen events and the impact of the necessary adjustments.

Concurrent planning in action

Real-world applications of concurrent planning are creating positive results for the supply chains of some of the world's biggest brands across a variety of industries, including life sciences, consumer products, and automotive (to name just three). The technique has helped companies successfully mitigate supply chain volatility, from the smaller daily disruptions to the more impactful – such as the scarcity of a raw material – to the extreme, like a tornado or earthquake.

A natural disaster can have a profound and immediate impact on a supply chain. With little time to respond to the emergency, the ability to course correct on the fly, which is a core strength of concurrent planning, becomes crucial. Keysight Technologies, one of our customers, was able to dynamically adapt and keep its supply chain flowing when a devastating wildfire stopped operations at its California headquarters.

Similarly, managing raw material shortages is vital to the manufacturing of a product. The ability for a supply chain planner to have the "speed to detect and the speed to correct" when raw material runs low is critical to meeting customer expectations. Another customer – SMTC – is achieving higher levels of supply chain agility, enabling immediate response to changes in demand, supply, product and daily operations.

In life sciences, concurrent planning saves lives. Supply chain planning decisions go beyond revenue concerns, as decisions are made to ensure life-saving medicines are produced and delivered where and when they need to be.

Regardless of industry, a natural disaster isn't the true measure of the benefit of concurrency. Instead, concurrent planning absorbs hundreds and even thousands of small, inefficient decisions, the sum of which creates a dramatic shift in their business.

Changing mindsets

Every single day, thousands of unexpected events occur, each seemingly immaterial when viewed on their own but epic in their impact when viewed as a whole.

But most organizations don't think of their supply chains that way because they don't measure the inefficiency of their supply chain holistically. And that's because they were built in and still operate in silos.

Concurrent planning absorbs vibrations to eliminate the friction that impedes informed decision-making.

Conclusion

The speed of business is accelerating, and supply chains need to keep pace, whether it's the "Amazon Effect," tariff negotiations, an unplanned equipment shutdown, or a hurricane.

The world moves faster than it did a decade ago, so why are companies continuing to merely hope that decades-old practices will be the solution? Our environment won't get easier to manage, so make the case for concurrent planning strong and clear.

Benefits of concurrency*

Happier customers

Cut manufacturing lead times by

20%

Improve on-time delivery by

43%

Better efficiency

Trim finished goods inventory by

33%

Shrink expedites by

83%

Faster decision-making

Speed up build plan change analyzation by

98%

Shorten planning cycles by

57%

Improved operations

Supply chain planning efficiency increased by

15%

Adherence to inventory targets above

95%

*Kinaxis customer survey

Advocates of concurrency

A global community of supply chain leaders across industries such as automotive, industrial, life sciences, aerospace and defense, consumer products, and high-tech and electronics.

Supply chain planning in a new era of trade

ROBERT KUGEL
SVP and Research Director,
Ventana Research

A period of increasingly free and open world trade that has characterized the past decades appears to be ending, replaced by a new and more challenging era of international commerce. This will pose a significant challenge to most product companies with international operations. Even as they have honed their ability to balance supply and demand, companies are more vulnerable to supply chain issues when events disrupt the smooth flow of goods and services. Organizations can address this vulnerability by enhancing their ability to adapt quickly to environmental changes.

I recently summarized some of the key findings of our S&OP research[1]. Our analysis suggests that many companies that deal in physical products are doing a mediocre job of sales and operations planning and so may need to identify ways to improve. For instance, half (51%) of participants rated their company's S&OP performance only as adequate while fewer than half that amount, 22 percent, said they do it well or very well and another 22 percent think their performance is poor. The results suggest that senior executives in companies with only moderately complex supply chains should pay closer attention to S&OP because of the challenges that they are facing today. It's likely that achieving more effective supply chain planning and management will grow in importance as the journey to a new trade equilibrium is bound to be bumpy.

Concurrent planning is a relatively new, technology-enabled approach to producing plans and scenarios much faster than cascaded planning. It exploits today's lower-cost computational power and advanced algorithms to produce plans and scenarios much faster than the cascaded methods that were necessary because of technology and cost constraints. Concurrent planning enables organizations with highly complex planning models to run and rerun scenarios in minutes

rather than hours. Planners can develop plans or sets of alternatives fast enough for the projections to be actionable. This capability is critical in the new era of trade.

When companies have immediate visibility into the condition of their supply chain they can quickly create and evaluate scenarios for planning purposes or evaluate different courses of action in response to market changes. One finding of our Next-Generation Business Planning benchmark research illustrates the value of quickly assessing multiple scenarios: Three-fourths (73%) of those companies that are able to assess every relevant scenario say their plans are accurate or very accurate, while that's true of just 36 percent of those that explore only a limited number of scenarios or none at all. Software that allows planners to quickly assess scenario outcomes enables organizations to evaluate more scenarios in the time available.

Our research also finds that one of the main sets of challenges that organizations grapple with involves data: 38 percent said that the necessary data isn't available; another 30 percent said that their data isn't accurate. One consequence of bad or unavailable data is that the resulting plans aren't completely accurate. Only one-third (31%) characterized their S&OP as very accurate or accurate, while half (49%) described theirs as somewhat accurate. Somewhat accurate planning is like somewhat accurate juggling: There are a lot of dropped balls. Likely because it is complex, S&OP challenges a majority of companies.

Organizations with even moderately complex multinational supply chains are facing and will continue to face significant challenges in managing them. Dealing with competitive changes, new technologies, a market-driven proliferation of SKUs, the growing use of contract manufacturers and a proliferation of commerce channels is making supply chain management more difficult. Adding to the challenges are a more uncertain trade environment, unprecedented market volatility and the impacts and costs of ongoing legal, regulatory and taxation changes. Each of these factors makes it that much harder for organizations to make good sourcing, purchasing and production decisions at a pace that maintains market share and profitability and achieves performance targets – in other words, to be agile in supply chain management.

In this environment, senior managers and executives should evaluate how their organization is positioned competitively, taking an especially close look at their ability to do dynamic supply and demand chain contingency planning. All managers and executives with planning responsibilities, and particularly those in organizations that are exposed to significant market volatility, should be alerting senior leadership teams regularly to opportunities and vulnerabilities. They also must ensure that they have the planning tools they need not only to anticipate change but to benefit from it. I recommend that larger companies with even moderately complex supply chains assess the tools they're using.

[1] https://robertkugel.ventanaresearch.com/sales-and-operations-planning-just-mediocre

Concurrent planning

What is it and how is it revolutionizing supply chain management?

The world has changed a lot over the last century. We put a man on the moon, developed vaccines and revolutionized how we connect with computers, the internet and mobile phones.

HARISH IYER
VP, Industry and Solutions, Kinaxis

ALEXA CHEATER
Manager, Industry and Solutions, Kinaxis

Supply chains have changed a lot too. Expanding ecosystems. Omni-channel experiences. Supersized customer demands. Decision-makers are dealing with more volatility and complexity than ever before. You aren't managing your grandfather's supply chain. So why are you still using his processes? Silos and spreadsheets are crippling you. And your ability to do business.

You aren't managing your grandfather's supply chain. So why are you still using his processes?

Yesterday's techniques are no match for today's reality

The slow, sequential planning techniques of the past are no match for today's fast-paced reality. Managing your supply chain that way can leave you feeling like you're making critical decisions about your business with only half the information available. That's because the information you need to make decisions has to filter through others, one at a time, before finally getting to you. And when you finally do get the information you need, it's more than likely that it isn't even accurate anymore.

That's because in the hours, days and weeks it took for you to get the information, reality has changed.

con·cur·rent plan·ning /kən'kər'nt/'planiNG/ *noun*

The process of making and managing synchronized plans across time horizons, business processes and organizational boundaries at the same time.

A customer altered their order. A supplier was late with their delivery. A typhoon is brewing near one of your factories. Life doesn't wait. Neither should your supply chain.

Sequential planning is a vicious cycle.

1. Wait for the person ahead of you to generate a plan.
2. Create your plan using their results.
3. Realize once you're done you've affected someone else.
4. Argue over whose version of the data is right.
5. Start all over again since everyone's misaligned.

And that's just standard process. Throw in an unexpected change and the delays and frustration only grow. Supply and demand are never balanced because you're always out of sync.

Eliminating volatility is impossible. Managing it doesn't have to be.

You're never going to be able to get rid of volatility in your life, your business or your supply chain. But you can limit its impact. All it takes is the ability to make confident decisions quickly.

Concurrent planning is the process of making and managing unified plans across multiple time horizons, business processes and organizational boundaries at the same time. It synchronizes data, processes and people to collapse decision-making time, break down organizational boundaries and dynamically balance the end-to-end network. If one person makes a change, everyone else instantly understands the impact on themselves, their team and the organization as a whole.

Time horizons: Companies plan across a variety of connected time horizons. Long-term (years), medium-term (months), short-term (days) and the here and now (hours, minutes and seconds). Concurrent planning unifies plans across all time horizons and granularities so you can understand past, present and future impacts across the entire planning horizon at once.

Vertical business processes: Business processes and related decision-making range from strategic through execution. Strategic decisions happen less frequently but have a high impact across the organization. Execution-level decisions are frequent, but typically have a lower impact. Each business process

has its own set of inputs and outcomes for decisions, with varying levels of detail. However, they all need to connect and work harmoniously together. Concurrent planning synchronizes vertical business processes so you can understand impacts across all processes at once, in as much detail as you need to make confident decisions.

Horizontal organization boundaries: Most companies are organized functionally – sales, marketing, distribution, manufacturing, etc. These functions are often responsible for their own business processes across various time horizons. That can lead to functional silos with formal, time-consuming handoffs across the business processes within that group, internally across functional boundaries and externally with customers and suppliers. Concurrent planning unites the organization, connecting data, processes and people to help break down those silos and connect your extended network.

You can eliminate risk, waste and latency from your business.

Planning becomes faster and more collaborative. It's like being on a great conference call. Everyone shares information, works through issues on the spot and walks away confident they're seeing the big picture.

Faster, confident decision-making made easy

Concurrent planning bridges the gap between planning and execution by interweaving every aspect of your business – from strategic to tactical. Inputs from finance, sales and marketing help drive long-term plans. Data from customers, suppliers and partners feed into short-term plans and detailed execution. You're able to make real-time decisions and align teams around a common goal.

That results in a business that's free of risk, waste and latency.

No risk: Know sooner when risks or opportunities arise with end-to-end visibility.

No waste: Act faster to adjust plans and streamline efficiencies with a connected network.

No latency: Decide more confidently with an instant understanding of the impact on your business.

The future of planning is concurrent

Concurrent planning is revolutionizing the way companies plan because it delivers trusted results when it matters most. It removes reliance on outdated technologies like Excel. It provides a connected, synchronized supply chain. And it lets you understand current performance and instantly see and interpret a change across your end-to-end network. The result is happier customers, lower costs and higher productivity.

Lippert Components

Gaining greater control and transparency across the supply chain

To streamline operations, Lippert Components Inc. (LCI) needed more control and transparency, which could only come by connecting all of its business functions. With plants and warehouses located around the world, it was imperative for LCI to standardize processes in line with best industry standards. The company was looking for a solution that would enable them to manage a unified plan across multiple teams and site boundaries. The search led to Kinaxis RapidResponse.

KRISTEN LEBARON
Director of Supply Chain,
Lippert Components, Inc.

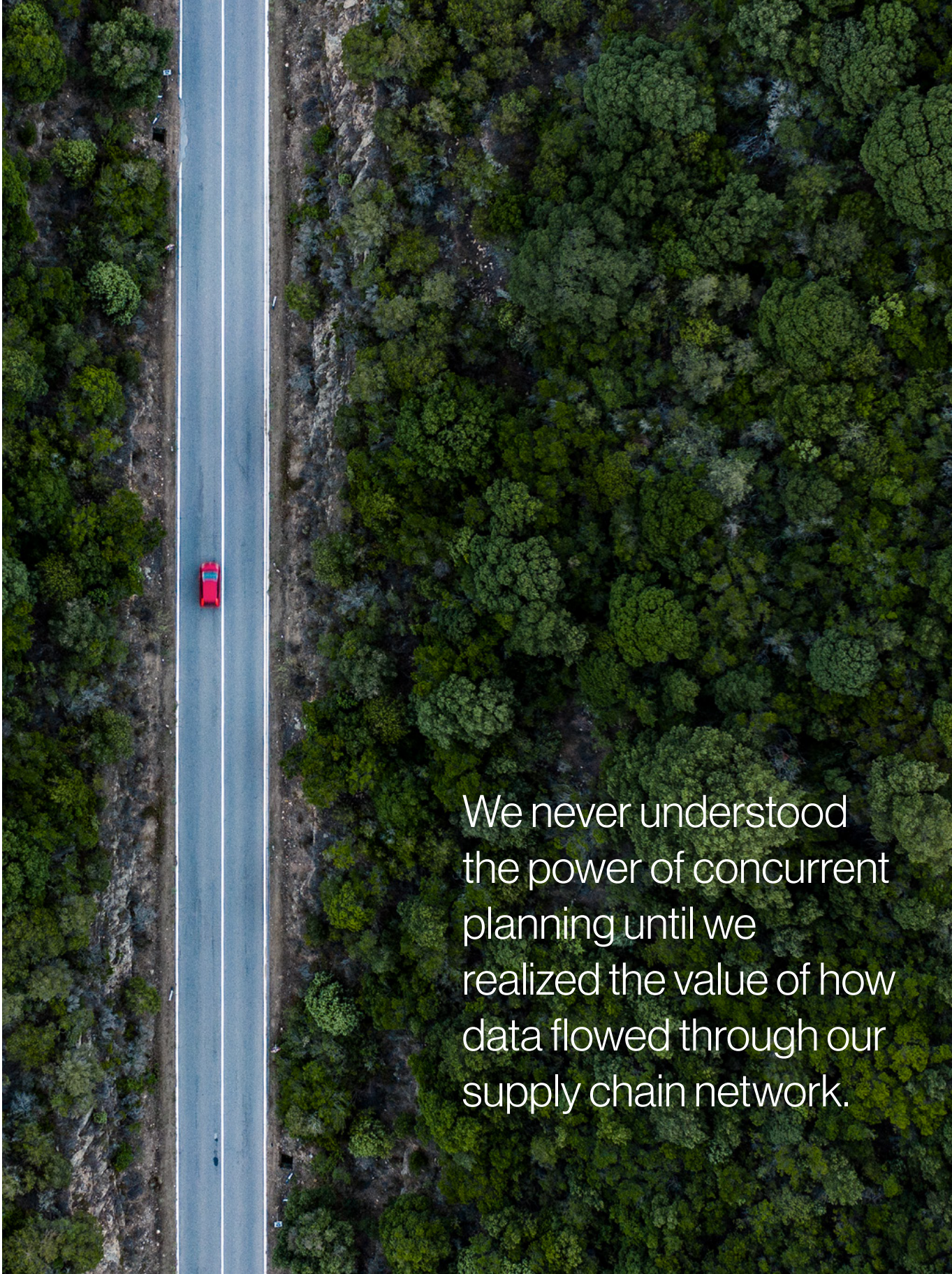
RapidResponse provides a global, scalable business platform that not only supports our demand, supply and inventory planning activities, but all of our other business functions as well. Over the past year, RapidResponse has quickly expanded to our engineering, finance and sales teams.

Connecting our people, processes and systems through a single environment has been a high priority for us at LCI. While our teams are organized by function, it was more important for us to provide access to different inputs from multiple application systems. And it wouldn't have been possible to break down our business silos without a platform capable of connecting all our important data points and enabling us to plan concurrently.

RapidResponse eliminates cascaded business processes

In the past, our teams have used a myriad of techniques to analyze and understand how business changes impacted our bottom line. Teams would spend weeks running reports and combining multiple spreadsheets to understand the impact of a business change. While this process started out as a manual one, RapidResponse enabled our teams to run multiple scenarios to analyze different outcomes.

For instance, last year we dealt with a number of tariffs that were applied to all of our import products. Within minutes, RapidResponse identified alternative sources of supply while calculating the total impact on our


We never understood
the power of concurrent
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supply chain network.

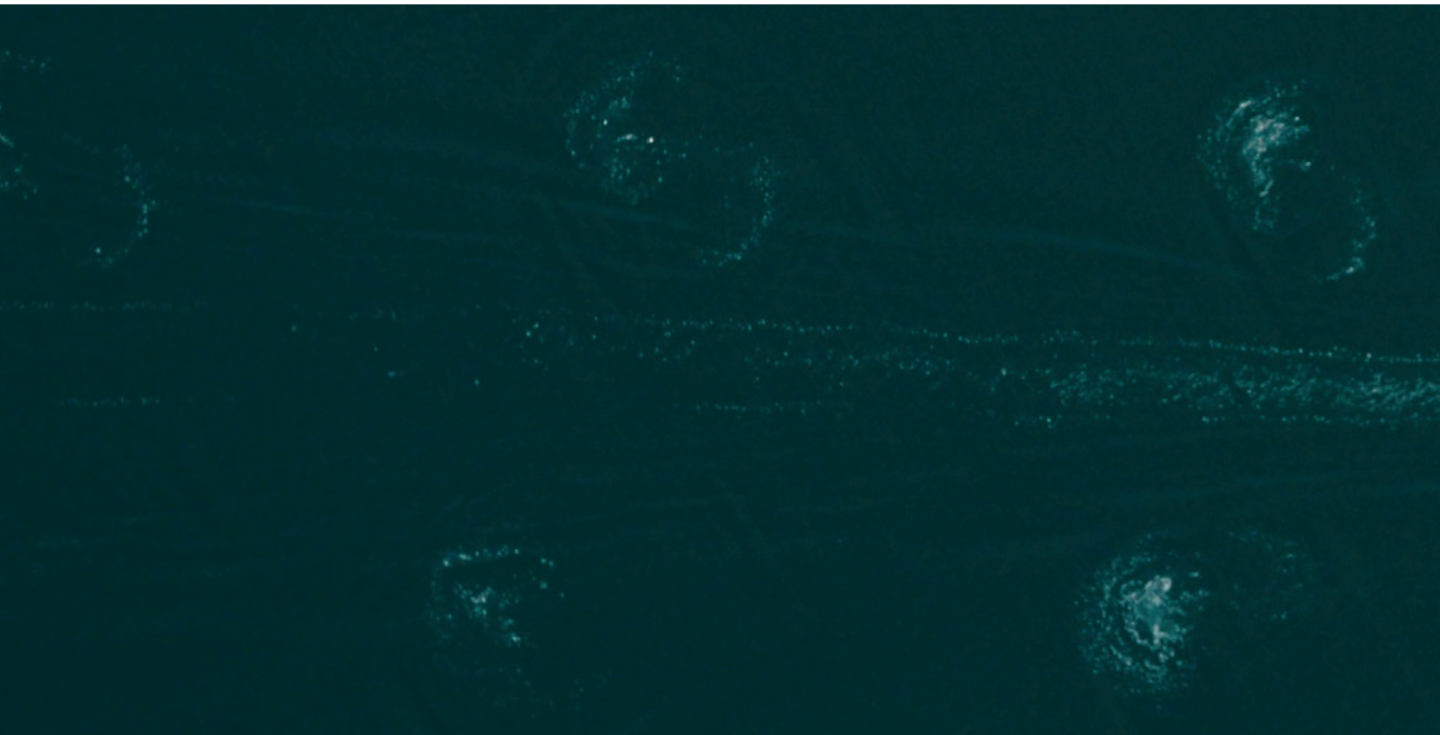
bottom line. Teams were able to collaborate in real time, which allowed us to mitigate the total cost impact and save the company millions.

Our goal is to push and pull business data in real time, which will cut down decision latency when business changes occur.

We never understood the power of concurrent planning until we realized the value of how data flowed through our supply chain network. It required us to think about how production, customer demands, technologies and key stakeholders all impact the financial interest of the organization. RapidResponse has served as the planning platform to help build this connectivity across all of our systems. While all of our teams have enjoyed reduced workloads, the results of implementing RapidResponse have cascaded throughout our supply chain network. Even our suppliers have seen benefits; they are able to plan more accurately, resulting in less waste and greater efficiency and flexibility.

Integrated, harmonized business plans

For Lippert to create a harmonized business plan, our business functions had to be fully integrated with each other to include our ecosystem of suppliers, customers, inventory, production and



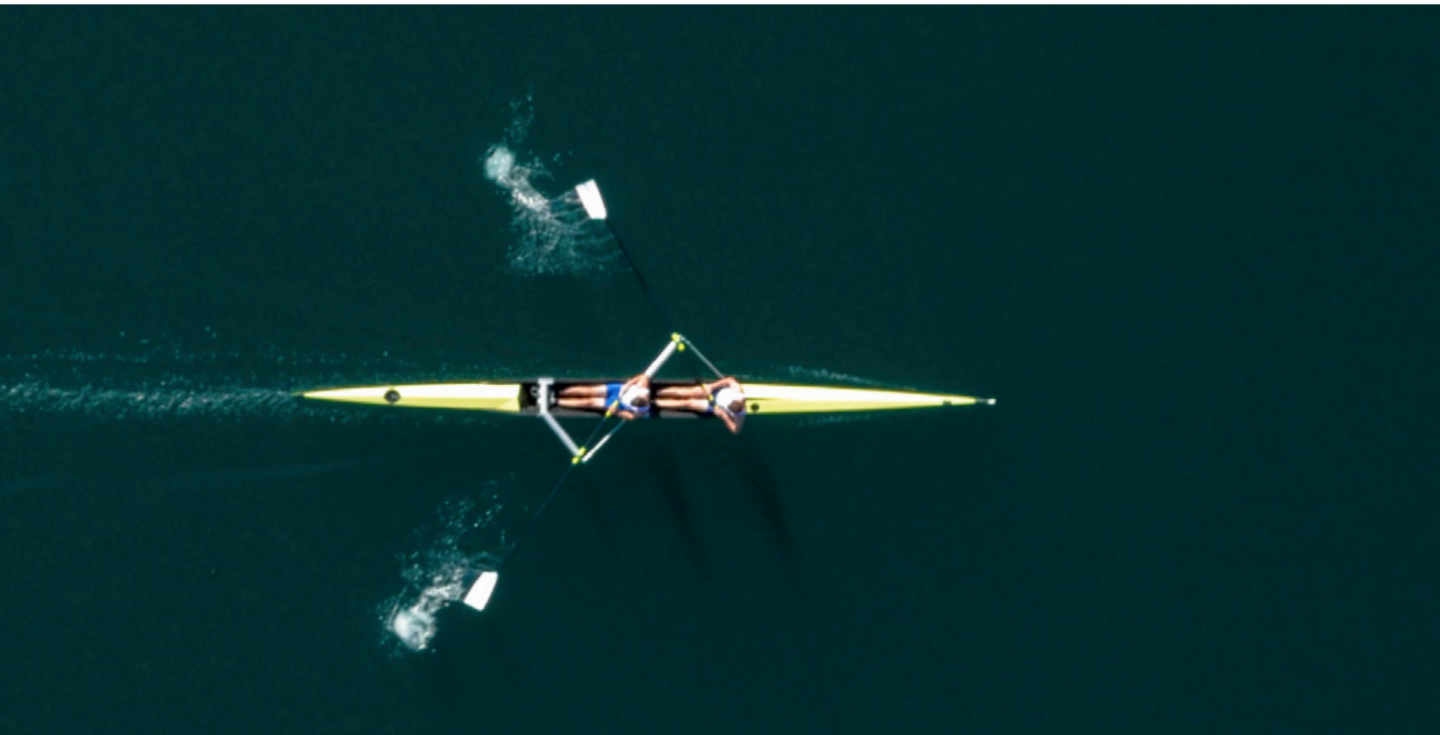
logistics to drive the strategic initiatives of our organization. Simply put, concurrent planning with RapidResponse has provided us the ability to integrate our customer relationship management (CRM) and transportation management (TMS) platforms.

Integrating our CRM tool has given us the ability to recognize new business opportunities, changes, or threats. Our goal is to push and pull business data in real time, which will cut down decision latency when business changes occur. Our teams will gain deeper and broader insights, which will dramatically improve decision-making processes while making our leaders more agile in their decision-making and actions.

We also plan to integrate our transportation management platform, which will allow us to get real-time updates on inbound and outbound shipments. If a natural disaster occurs, for instance if a hurricane comes ashore in South Florida, RapidResponse will flag any shipment that is affected, which will inform our planning teams if that event will prevent us from fulfilling any demand. As we streamline our connectivity between these tools, RapidResponse puts our company's head on a swivel, providing us a peripheral view at every level in the organization

Concurrent planning is about connecting all levels in an organization. Even though our sales and logistics teams utilize different software applications, RapidResponse gives us the opportunity to integrate that data to influence our demand and supply plans.

Unexpected changes and delays have caused chaos in the past. Today, RapidResponse puts an end to the vicious planning cycles, enabling our teams to know sooner and act faster.



Necessity is the mother of invention

The technology that powers concurrent planning

Within the walls of the world's patent offices live some of mankind's greatest inventions and highest achievements. Whether it was magnetic levitation, the quadcopter drone, 3D printing, GPS, or the self-driving car, inventors saw a need and brought ideas to life that changed the world.

JUSTIN KING
Technical Business Consultant, Kinaxis

Conceptually, the benefits of taking a concurrent approach to supply chain planning were clear. But to turn concept into reality, supply chain planning technology had to evolve. No existing database in the world could fit the bill. How could planning solvers and complex algorithms operate concurrently? How would scenarios be handled efficiently?

This game-changing concept needed something new – a database, purpose-built, lighting fast, massively scalable and yet still user friendly. It was time for fresh ideas.

Kinaxis set to the task, looking at bits and pieces of all types of databases, including relational, columnar, graphical and hierarchical. None could do the job, so we invented our own.

A fundamentally different approach

Rather than storing rows or columns in memory, we store records as objects. Then we link related objects together using in-memory pointers. Recognizing that scenarios and their inter-relationships are crucial, we version every record to maintain its source and connection to the parent. Finally, we embed the algorithms into the database code so that latency between the math and the data is minimized. The end result is a brand new type of database purpose-built for concurrency in supply chain that yields speed and capability the world has never seen.

This patented database, granted as an “extended database engine

providing versioning and embedded analytics," sets the foundation as our company's fundamentally different approach to technology for supply chain planning. This technology not only addresses speed but also enables massive scalability to support millions of SKUs on top of our multi-terabyte data models. Our "always-on" planning algorithms are then built into the database to eliminate latency and the dreaded "batch cycle" and long runtimes. All of this is offered to customers in SaaS mode, deployed in the Kinaxis private cloud, providing a single-tenant, SOC 2 Type 2 certified environment proven by industry-leading annual security penetration tests.

While Kinaxis technology lives among other great inventions, we are certainly not finished. We surround our planning database with a powerful platform that enables our customers and partners to extend and adapt Kinaxis RapidResponse to their unique needs, and make it their own. The platform includes machine learning capabilities that drive the Self-Healing Supply Chain™ and provides insights into planning data that we never had before. We frequently release new features and enhancements that allow our customers to constantly stay on the cutting-edge of planning technology.

At Kinaxis, we realize that legacy technology just doesn't cut it – not for today's complex global supply chains. We recognized that concurrency required a different approach, so we invented it.

Four steps to enabling concurrent planning

ALEXIS ROTENBERG
VP, Strategic Services,
Kinaxis

MATTHEW MONTGOMERY
Managing Partner, Professional Services,
Kinaxis

As the pace of technology change accelerates and markets become more unpredictable, companies are looking for new, more agile planning techniques to prepare for the future. Concurrent planning provides that foundation. Advanced and predictive analytics, machine learning (ML), artificial intelligence (AI) and the internet of things (IoT) open up new perspectives for the next industrial revolution, where the incredible horsepower of the machines introduced during the first industrial revolution will be enhanced by new types of intelligence from robots.

For industry, this creates new possibilities, namely, to put the customer back at the center of their supply chains and provide them a totally new experience that will deliver unique value and allow organizations to become more agile, enabling timely responses to the demands of a dramatically changing world.

The journey towards a more customer-centric supply chain powered by concurrent planning can be defined in four steps:

1. Implement Kinaxis RapidResponse.
2. Embed continuous learning and automated decision-making with ML/AI and other emerging technologies.
3. Extend the implementation from supply chain problems to comprehensive business decisions.
4. Put the customer back at the center.

Step 1. Implement Kinaxis RapidResponse

Normally, it takes time to make an informed decision. But imagine not needing that time while simultaneously improving the quality of your company's decisions.

Making the best possible decisions will always require a complete view of your supply chain inventory and constraints, real-time flagging of important events and changes, and collaboration between different functions with aligned goals to resolve any issue.

> He who lives by the crystal ball will eat shattered glass.
>
> **RAY DALIO**

Integrated planning and execution across the end-to-end supply chain, with KPI dashboards covering the planning process from demand to “available-to-promise” is the ultimate assurance a RapidResponse implementation can provide.

RapidResponse puts the experts across the organization in full control of

business goals. This allows them to plan and leverage the power of the network rather than silo their objectives, providing them with options and scenarios to address each event across the supply chain in near real-time.

Step 2. Embed continuous learning and automated decision-making with ML/AI

In a concurrent planning environment, advanced analytics and machine learning give the team the capability to predict and react to short-term and long-term events, long before a traditional planning organization could make a decision.

Cross-functional scenario preparation, data collection and omnipresent meetings typically delay important decisions in large corporations. Often, the events that matter are not even brought to the attention of the decision-maker in time for the solution to be effective.

With more predictive and embedded self-healing capabilities, advanced analytics can show decision-makers what is in play, along with the consequences and root causes, long before an event materializes.

In this environment, humans and machines work hand in hand to anticipate any event, constantly learning from their efforts to continuously improve and automate future decision-making.

> Planning is bringing the future into the present, so you can do something about it now.
>
> **ALAN LAKEIN**

Step 3. Extend the implementation from supply chain to comprehensive business decisions

What happens in your supply chain network impacts sales, marketing, engineering and finance. As a company matures using concurrent planning, plans related to the supply chain become the heart of the operation and can be directly translated into sales, marketing and financial scenarios. What started as Sales & Operations Planning (S&OP) will have evolved into Integrated Business Planning (IBP).

Financial implications, including impact on revenue, cost, market and product priorities affect more than the metrics of the supply chain executives. Visibility into winning scenarios for better service prioritization, inventory hedging, or risks for increased costs and higher inventory build-up to secure supply must also be brought to the attention of the entire corporation.

Step 4. Put the customer back at the center

In an era, where customer experience (CX) dominates all business discussions, it is of utmost importance to connect the customer, your customers' customers, your company, its suppliers and the suppliers' suppliers across the extended supply chain network in a collaborative model to allow them to read and respond in near-real time to what is happening in the market and in your supply chain.

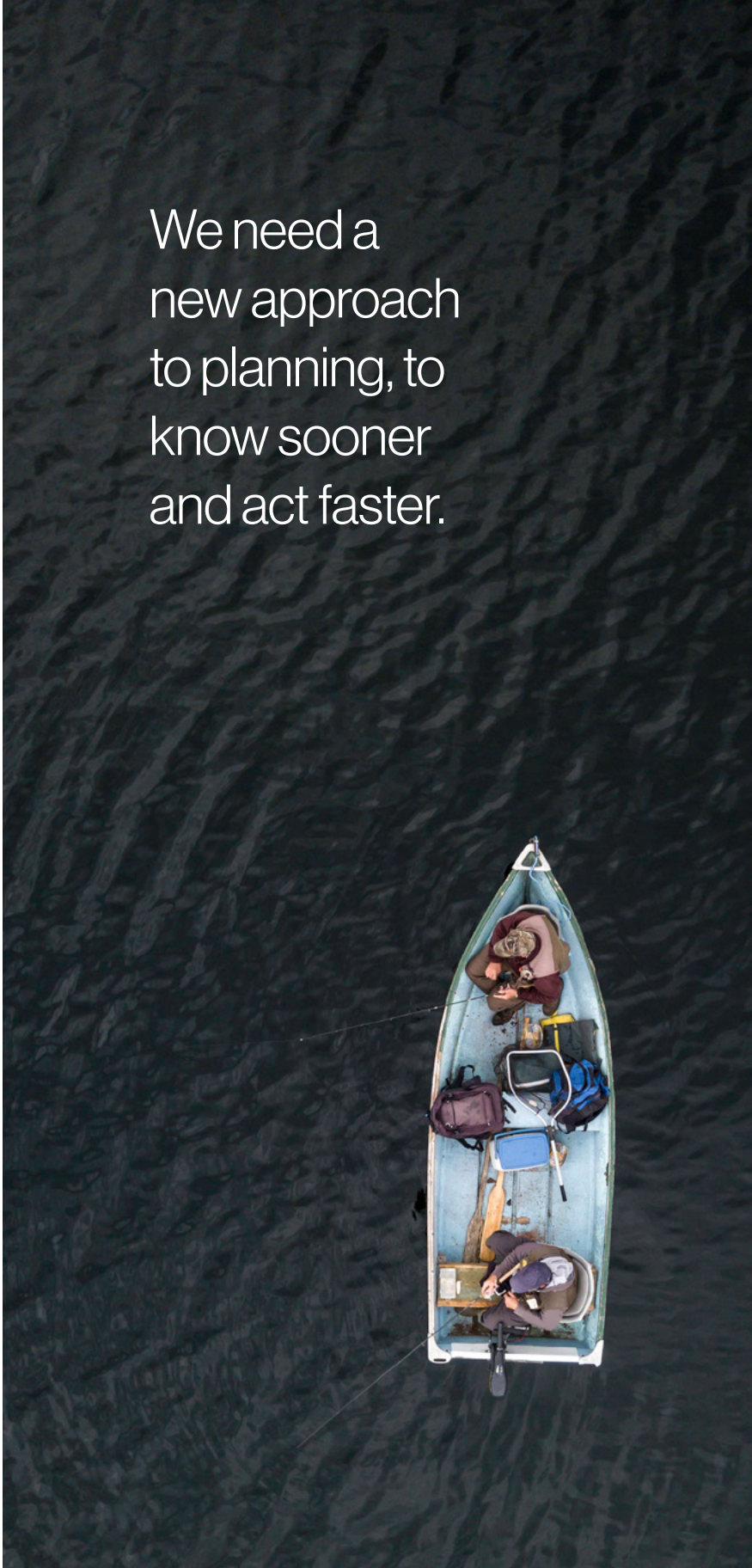
Without this capability, it is hard to anticipate market changes and supply chain disruptions early enough to be ahead of the competition. Without concurrent planning, companies cannot be in sync with modern day customer expectations. This is the promise of concurrent planning.

Conclusion

RapidResponse allows companies to evolve towards concurrent planning, a modern planning technique that empowers humans to collaborate across the traditional silos of a company, bringing the suppliers and their customers together to make better decisions by learning from scenarios.

This innovative collaboration model is enriched by more predictive and advanced analytics, ML, AI and the IoT to put the customer at the center of a company's operations, restoring the agility needed to cope with a world faced with continuous new market realities and technology disruptions.

We need a new approach to planning, to know sooner and act faster.



Network planners

Transcend the traditional to experience far-reaching results

In today's complex supply chain planning environments, speed of execution and incisive decision-making are becoming increasingly important as consumers demand higher service levels and adaptive supply chains. As such, companies are beginning to rethink the traditional planning paradigm to meet these challenges. In recent years, the notion of a “network planner” has come to the forefront as companies adapt to address constantly shifting priorities and find ways to resolve them profitably.

BARKAWI Management Consultants
a genpact company

QUENTIN DOMSCH
Senior Director,
Barkawi Management Consultants,
a Genpact Company

Network planners transcend the traditional supply chain planning functions such as demand, supply, inventory, production and deployment by allowing a single individual to address a disruption as quickly as it occurs.

In a traditional supply chain model, latency is inherent to the process, simply by the fact that planning functions are siloed by planning area. When a supply chain disruption occurs, it often requires handling the problem in a serial or sequential process. With the latest advancements in enabling technologies, i.e. advanced planning systems (APS) and artificial intelligence (AI), companies can leverage the power of advanced analytics and what-if scenario planning to quickly identify several alternatives; this is a benefit of concurrent planning.

To gain maximum benefit from concurrent planning, organizations need to move toward implementing the network planning model. Similarly, the network planner cannot be successful without concurrent planning.

Network planners require a broad knowledge of several planning functions, such as consensus demand planning, aggregate supply planning, supply demand balancing, distribution requirements planning and more. Additionally, a network planner must have a good grasp of the planning parameters used to set up the APS and leverage strong collaborative skills to resolve issues as they arise. Given this breadth of planning responsibility, the scope of parts or products planned will become very narrow. A demand planner may be responsible for generating and

Network planners transcend the traditional supply chain planning functions by allowing a single individual to address disruption as quickly as it occurs.

managing forecasts for hundreds of parts whereas a network planner may be responsible for less than a hundred.

In other words, rather than being aligned vertically by planning function, network planners are aligned horizontally by product line or category. However, achieving the goal of horizontal integration takes time, and most companies take incremental steps to get there.

Companies may initially group the planning functions that make the most logical sense, (e.g. demand and supply planning or deployment, warehousing, and logistics) but integrating all functions into one overall planning role requires intentionality. The goal is not to reduce overall planning headcount per se as much as it is to build an organization that is agile and responsive.

When an unexpected event occurs, such as demand that far exceeds supply or a raw material quality issue that impacts production, or a port strike that constrains inbound delivery, having the ability to quickly define, model, and decide on alternatives is key to success.

As these events occur outside the normal planning process, the network planner can jump into action by leveraging the APS to create a private “sandbox” and begin modeling alternatives and utilizing what-if scenarios to solve any problem in the supply chain.

From customer priority, to finding alternate sources of supply, to making production line trade-offs, to varying transportation modes and service levels,

the network planner will generate several recommendations to share with the broader leadership team before deciding.

Network planners must not only be cognizant of how these changes may impact their own products, they must also take into consideration and quantify the impact to other service lines as well, for example production line scheduling, impact to the transportation budget, etc. Once these scenarios are created, they are reviewed by the leadership teams to make the final decision – balancing operational metrics, customer needs and priority, and minimizing any negative financial impact to the bottom line. Once consensus is achieved, the network planner again jumps into action to execute the agreed plan of resolution. Often the network planner must balance the immediate needs in the near-term execution period versus the long-term planning horizon. Equal weight must be applied to both so as not to sacrifice one for the other.

While the concept of network planning may be newer to the scene, attempting to quickly resolve supply disruptions is not. Having a toolset to enable these new, concurrent planning capabilities is critical in achieving the goal of minimizing any negative impact to both customers and the company. What would typically take weeks to quantify and solve for can now take days or even hours. Transitioning a typical supply chain planning organization into network planning roles, supported by enabling technologies, will help any company reduce their response time and increase their flexibility to meet demand with supply.

Change management

How it streamlines the introduction and adoption of concurrent planning

At Kinaxis, customers subscribe to our cloud-based planning service with the aim of introducing a new planning technique into their supply chain operations, one that enables agility, visibility and flexibility in their supply chain networks. The challenge, as it is when introducing any solution to an enterprise environment, comes from the amount of change management required when adopting a new technique.

ALEXIS ROTENBERG
VP, Strategic Services, Kinaxis

A successful transformation delivering excellent business results requires our complete attention to ensure the new technique is fully embraced by all involved. Concurrent planning impacts your entire organization, its processes and its ways of working. The task of transforming old habits is a challenging exercise that requires specific focus.

We are what we repeatedly do. Excellence is then not an act but a habit.

ARISTOTLE

To successfully deliver RapidResponse to our customers and enable concurrent planning, we adhere to a proven formula, which we have found very effective. The process includes:

1. Educating the project team about the main change management concepts
2. Building a Center of Excellence (COE)
3. Providing the COE with an education plan
4. Equipping the implementation team with an integrated change plan
5. Coaching the planning teams and their executives to success

When combined, these five change management activities ensure a successful implementation. An integrated change plan prevents the project team from considering training, education

and change support activities as an afterthought. Coaching customers aligns the vendor with your vision and helps the vendor demonstrate the benefits and the day-to-day reality of the solution.

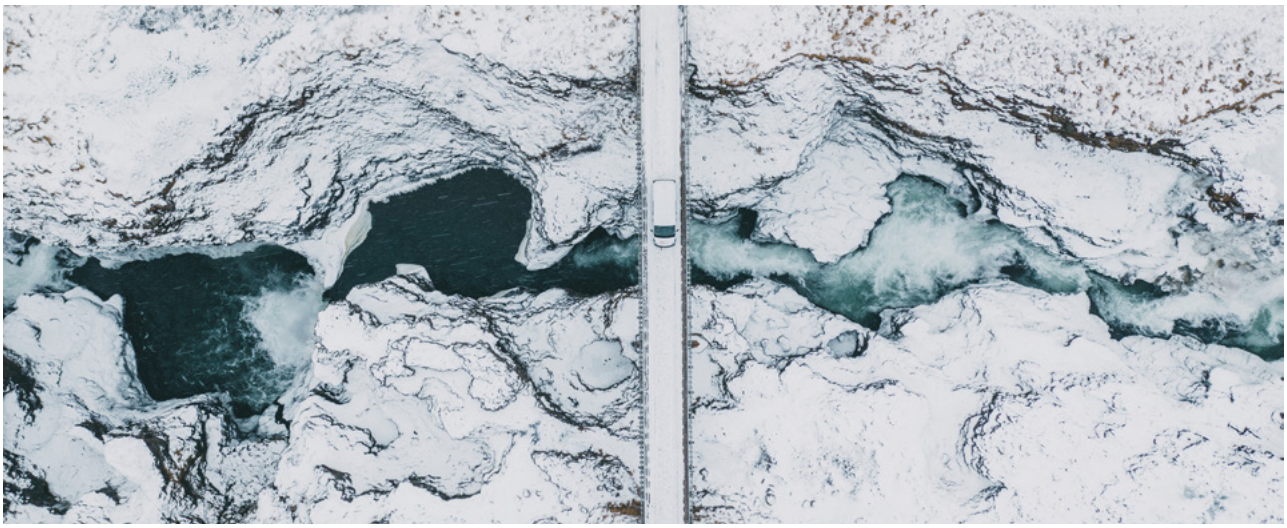
1. Educate your project team about the main change management concepts

The introduction of a new concept like concurrent planning requires winning the hearts and minds of everyone, from top executives to planners. The right vendor will help you show everyone the benefits and motivate them to go the extra mile so they can better understand and familiarize themselves with the new future.

At Kinaxis, we nurture internal champions and work with opponents to understand the deep motivations that create resistance to change. Negative attitudes, perceptions and beliefs are uncovered and addressed. Political balances, longstanding behaviors and the nuances of organizational power must often be considered.

The tasks of resourcing, budget, quality assurance and project management typically fall to a project team. But project teams are often not familiar enough with the essentials of change management and the activities they will need to carry out.

With this in mind, Kinaxis offers training and certification designed to address our technology and present new ways of working, using sound change management practices. A basic understanding of change management is prerequisite to setting up a COE and driving effective change across your organization.



2. Carefully design a Center of Excellence

The first step in building a COE is to identify a model that will align with your corporate culture, project's objectives, available resources and solution deployment strategy.

Clarifying team roles and responsibilities is critical to the COE's success. Therefore, it's important to consider different approaches and concepts to set up and organize a COE. Typically organized atop the Program Management Office (PMO), the COE's IT roles must identify the first line of support. These are the individuals who are tasked to provide user access and perform upgrades.

On the business side, three roles are absolutely essential:

- **Ambassadors** who are influential leaders and process owners facilitating the adoption of your new solution and ways of working.
- **Change Agents** who drive business transformation through communication, collect concerns and feedback, and manage the change plan activities.
- **Super Users** who are the future solution experts who possess significant knowledge of RapidResponse and its processes and can help others use and adopt the technology.

3. Provide the COE with an education plan

With the COE established, it is vital to provide each role a customized learning path in line with learning objectives and the project timelines. At Kinaxis, experts known as Learning Architects can help and advise our customers on the best way to familiarize themselves with the new solution and the associated processes.

Learning Architects leverage the Kinaxis Knowledge Network, Kinaxis Learning Center and Certification program to personalize the education of each stakeholder and to streamline the setup and configuration of user learning paths and track compliance with the agreed tracks.

4. Equip the project team with an integrated change plan

Change management goes beyond education. In addition to online and classroom training, Kinaxis recommends structured change support, communication and applied learning tailored to the needs and budgets of each customer.

Change management support can include roadshows to educate the wider corporation about the ongoing project. Other assets such as videos and project marketing campaigns can be leveraged to inform the company about the coming change. A mix of structured feedback surveys and

impact assessments can help gauge the responsiveness of the user community and allow for adjustments in the implementation process to satisfy concerns.

Meanwhile, business simulations and ongoing customer care helps supply chain planners become familiar with their future working environment. Running activities such as “day-in-the-life” workflows with the support of a specialized coach in parallel with the old supply chain planning system eases transition, giving planners a solid footing before the new system is introduced.

Finally, custom training lab environments give vendors the opportunity to provide planners with deep dives into specific areas such as analytics and custom workflows.

If it doesn't challenge you, it won't change you.

FRED DEVITO

5. Coach the planning team and its executives to success

Once an integrated change management plan becomes available, educational experts and executive advisors can be engaged to support the organization through the transition.

Coaching under these circumstances takes many forms, but it is mindful design of the change management plan that will mitigate resistance to change and help overcome any barriers to solution acceptance that arise during the course of the project.

Conclusion

Taking a systematic approach to ensure acceptance of an enterprise solution such as concurrent planning from Kinaxis is one thing. Ensuring the project team embraces the change management concepts to drive organizational change is quite another. Only when the two work together will success be realized.

Kinaxis training and certification helps activate new ways of working, detailing how roles within the customer's COE support new product and process introduction. Supported by the Kinaxis learning platform, the COE works to ensure user adoption through accountability and continues to expand planners' capabilities and improve the way they work over time, long after initial implementation is complete.

How supply chain planning is coming of age

A new look, autonomous meritocracy is the key to success

DAVE ALBERTS
Partner,
Crimson & Co

It is time to forget everything you know about supply chain planning. The hierarchical roles, the linear processes, the ageing frameworks. We have been living in a 1980's APS software paradigm time warp, and it's time to let it go.

It's true that digitization has brought some (much needed) disruption to the supply chain recently, and it's also fair to say that value chain collaboration, combined with a greater need for real-time decision-making, has woken leaders up to the prospects of what lies ahead. A new era of supply chain planning is waiting in the wings – one driven by concurrent planning. This modern approach, enabled by the latest emerging technologies, requires a whole new path from the supply chain workforce and gives us concurrency, transparency and agility.

Skilled people working independently but also aligned

Concurrent planning enables your talent to focus on their tasks but with one single view of the supply chain in mind. Coordination, collaboration and synchronization become easy. Simultaneous and seamless planning of multiple scenarios across various time horizons delivers what's needed at precisely the right moment. The technology is here to enable this – but the other essential ingredient its success lives or dies by is the people.

As organizations move toward this new way of planning, supply chain analysts, planners and forecasters will see their job titles and functions change. Planners

will be selected by skill and merit rather than function. The overall goal is to build a team of highly skilled network planners who operate with new degrees of freedom and speed supported by concurrent planning and the latest emerging technology and information. Exciting times. So, what are the barriers preventing firms from starting?

New processes and setup

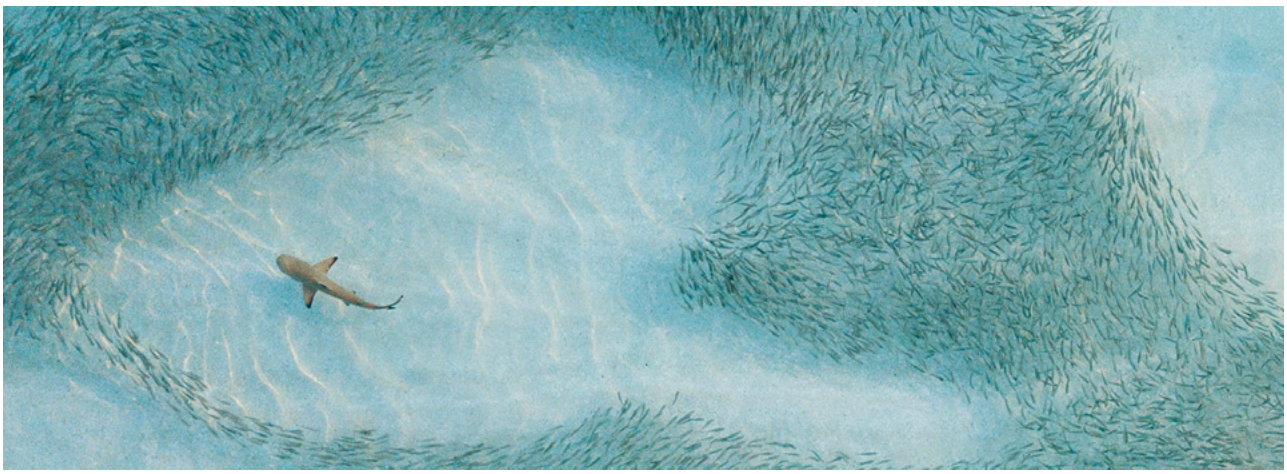
We are back to the time warp again. Traditionally, supply chains have tracked performance against measures that are functionally aligned, look backwards not forwards, and don't take into account important strategic (but non-financial) success factors, such as customer service and loyalty. They don't link end-to-end thinking or measure speed or agility in decision-making. In other words, they are 50 years out of date. Also, for the new generation of network planners, these measures just aren't fit for purpose.

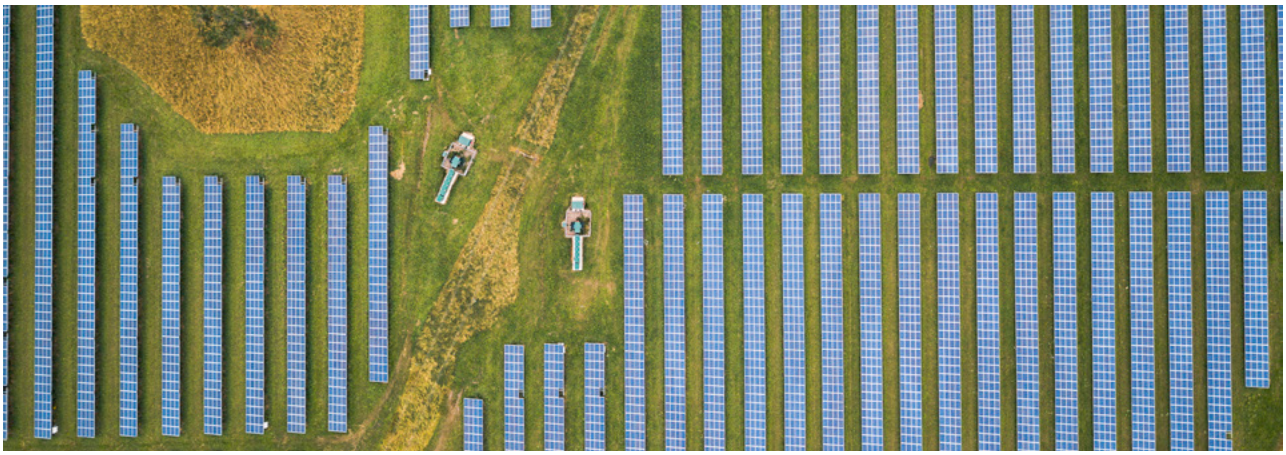
Functional organizational structures, which bring with them conflicting KPIs, contradictory views on the supply chain trade-offs, and behaviors reinforced by individually-based reward mechanisms and objectives, are also ingrained and embedded, and reflect the old school thinking. It's time we started with a blank sheet of paper on this. The way in which we interact, share and solve problems has changed radically across that time period. Our measures need to reflect this.

Blank sheet of paper for job titles

It is also crucial that we re-examine how we look at people's job titles and descriptions in the new regime. It's not that our supply chains are made up of people who are not doing their jobs well and as defined. The problem is the definition of what these roles should do.

It's not necessarily about changing where people sit functionally in the





new era – although maybe that needs to change too – it's more about how people behave regardless. It's about the understanding, desire and willingness of what needs to change and building that desire into your skillset, and then doing your job as part of the new meritocracy.

The new network planners that make up this meritocracy are going to be masters of the what-if scenarios. They respond quickly to unexpected problems and thrive on increasing levels of ambiguity. They'll drive non-linear processes, break out of the traditional forecast demand, determine required inventories, optimize capacities, and plan step-by-step demand and supply approaches. These network planners will be financially numerate and actively monitor current and projected business results. They'll need a blank sheet of paper organizationally, but there are many compelling reasons for doing so.

A new revolution in supply chain planning

Where do you start? Well, this needs to be driven from the top down because big changes are needed. But the reasons are sound. A common mistake when driving big change this way is to get hung up on business cases and return on investment (ROI) when justifying something new. That is missing the point. It's in the speed of response, productivity and quality of decision-making where most of the benefits of concurrent planning lie, and these things cannot be measured via a simple ROI calculation because their benefits and the effect they have on the transformation of the supply chain and how things are planned are not just financial. Nor do they come to bear fruit over a specific period of time. So, it's complex to measure this way. But a new regime calls for some new rules. The future state of your supply chain planning is your ROI!

Concurrent planning in action

9:00am Bob (Commercial SVP), embarking on a flight, reviews live key metrics and spots a gap between a future annual plan and planned demand for a product category.

9:01am Using the Collaboration Center, Bob asks Yvonne (supply chain orchestrator) to try and fix the gap issue.

9:04am Yvonne spots a message on her digital dashboard.

9:06am Yvonne identifies a new product being launched with no forecast, so she creates one using history from a similar product.

9:10am In closing the gap by adding volume for new product, demand at risk is created.

9:11am Yvonne identifies where the demand at risk is coming from and who is responsible for it. She identifies a capacity issue and creates an additional scenario to test a fix.

9:15am Yvonne runs an evaluation scorecard to understand the financial implications of the activity created at a company metric level.

9:16am Mo (manufacturing line leader) approves the revised capacity scenario.

9:20am Yvonne feeds back the latest activities to the Collaboration Center using the dashboard.

9:22am New, late supply issues are identified.

9:26am Camille (Procurement), using dashboard alerts, quickly identifies that there was a missing purchase order (PO).

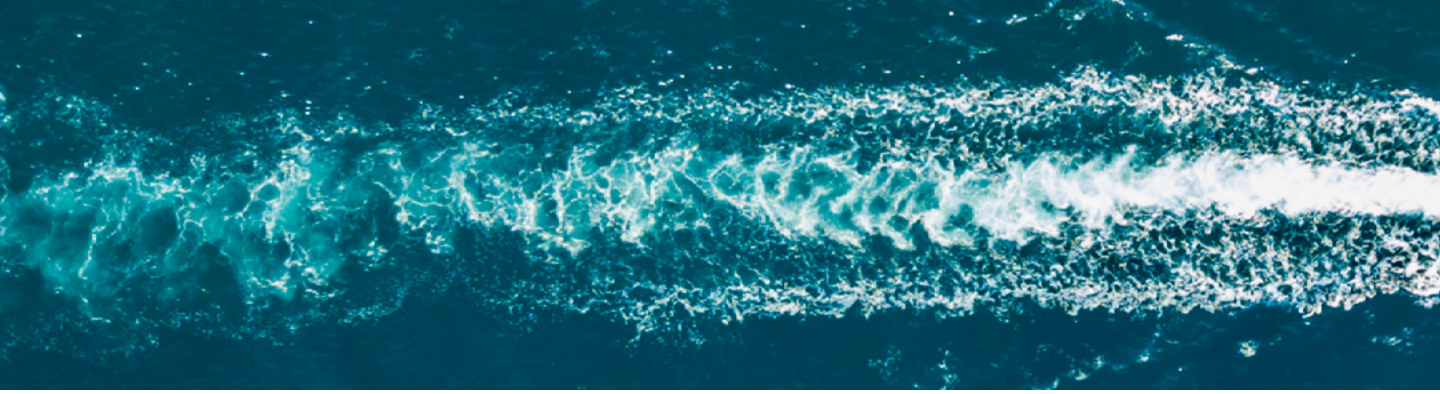
9:29am Camille immediately understands the impact of the missing PO (across the BOM) and runs a test scenario to bring the component in by air freight.

9:31am This has associated cost implications, so Camille alerts Yvonne and an evaluation scorecard is run to understand the financial impact of that decision.

9:34am The decision is made to execute the above plan approved by Bob before the flight departs.

9:35am All issues resolved – the gap is closed!

9:36am Yvonne, Mo, Bob and Camille then pause for a virtual high five!



Applying artificial intelligence and machine learning to supply chains

First analytics, then big data, data science, and now artificial intelligence (AI) and machine learning (ML). How can you separate the signal from the noise in the hunt for competitive advantage, when the landscape constantly shifts? What do all these terms mean, and why should you care?

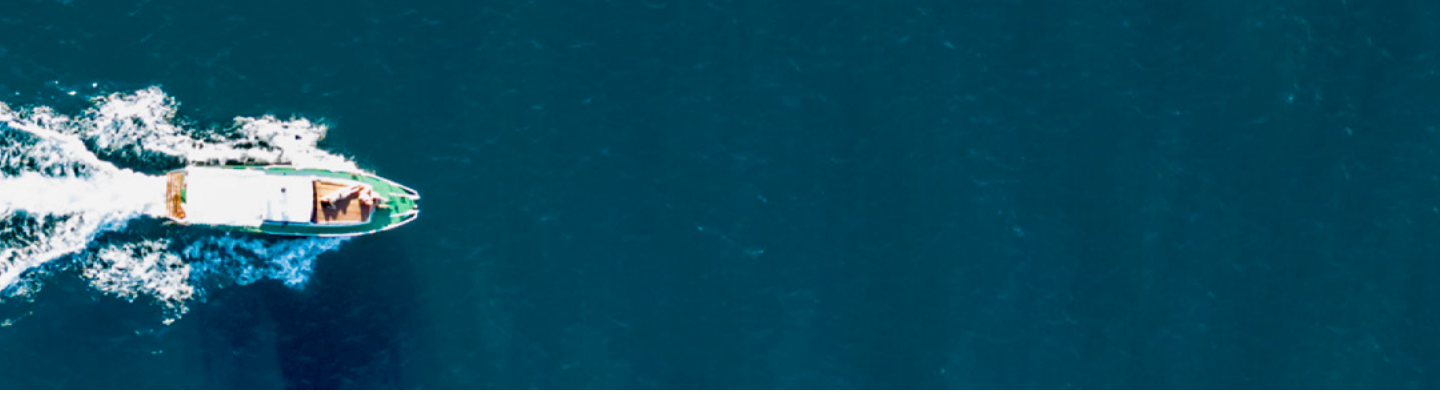
POLLY MITCHELL-GUTHRIE
VP, Industry Outreach and Thought Leadership, Kinaxis

ANNE G. ROBINSON
Chief Strategy Officer, Kinaxis

Let's start with a simple definition from the Institute for Operations Research and Management Sciences: analytics is the scientific process of transforming data into insights for the purpose of making better decisions. Big, buzzy words can sound impressive, but better decisions are a clear goal that add business value.

According to a Deloitte survey, only 37 percent of companies rate themselves as analytically mature. Most have started only with descriptive analytics, such as a report that states “27 percent of your orders are late”. But as longtime analytics leader and former UPS executive Jack Levis likes to say, “Insight that doesn't lead to a better decision is trivia.” The analytically-mature organizations in the Deloitte survey were twice as likely as the 63 percent without a strong analytics culture to significantly exceed their business goals, a great proof of the power of better decisions.

For any company, customer service is at the core of better business performance. Serving the customer better means making reliable promises on customer orders, and keeping those promises. And, for analytics to make a non-trivial impact, we need to know why orders are late and what to do about it. These kinds of insights



happen by moving up the analytics maturity curve to deploy predictive and prescriptive analytics. As Wake Forest University professor Jeff Camm writes, predictive analytics can help us understand what is likely to happen (through a statistical forecast or predictive model from regression or machine learning techniques). Prescriptive analytics go a step further and advise a course of action, typically using mathematical optimization, heuristics, or other rule-based systems.

The demand for the skills needed to increase analytical maturity is at an all-time high, so given the challenge attracting this kind of talent, at Kinaxis we have embedded predictive and prescriptive models into our software, so that "pure" data scientists with PhD-level credentials are not required.

In our Self-Healing Supply Chain, we use an approach called AutoML, a form of modeling automation that doesn't require a planner to understand the math under the covers, because the machine learning that drives this automated modeling is invisible to her. She just needs to know her business and understand factors like what variations in lead times she can tolerate. Based on tolerance factors she sets, we configure processing rules for what actions to take, so we can improve her decisions with machine learning. The planner can focus on those decisions that matter the most and let the math automatically handle those that are more trivial, thus saving her time and shortening the gap between planning and execution. The math doesn't replace a human – it works alongside her.

Deloitte has proclaimed this to be the era of "cognitive planning," one that is enabled by computing advances, the maturation of ML and data available in connecting systems. They envision "synchronized planning" – a world in which data can constantly flow throughout the interconnected digital supply network, allowing organizations to far more accurately match production of supply to demand than ever before. At Kinaxis, we call this concurrent planning, to illustrate the importance of being able to plan, monitor, and respond to changes in real-time across the supply chain in a single, harmonious environment.

I can provide a laundry list of boosting meta-algorithms, dimensionality reduction and vector quantization techniques we use, or we can just call it advanced analytics. Either way, with advanced analytics built on a foundation of concurrent planning, your business will have better decisions, faster, a signal that stands out above the noise.

Conclusion

Making the case to rethink your supply chain planning

If you've read all or even some of the articles in this book, the need for a new approach to planning is clear: concurrent planning.

Case in point

For today's global supply chains, even small changes – not just big events – have big reverberations. A shift in one part of the supply chain ripples across the other functions in an instant, upending schedules, transforming plans, challenging planners and risking bottom lines. And that's just normal daily operations. When larger unexpected events occur, the potential damage to supply chains is tremendous. It's a style of working that seems to mock the adage, “business as usual.” But a disruption in the supply chain doesn't have to result in total chaos.

For many companies, the concept of concurrency is replacing the “usual” routine. Concurrent planning enables a faster pace of planning to meet daily disruptions while being flexible enough to encounter the unanticipated challenges of tomorrow.

It's expanding global operations while adding greater-than-ever visibility

Building global supply chains used to come at the expense of transparency and control. Not anymore. With concurrent planning, companies are connecting their people, processes and data to improve visibility and enhance decision-making. Concurrent planning eliminates functional silos to increase collaboration and eliminate the “I didn't know” excuse. Planners are able to see across teams and planning timelines, uniting daily execution with long-term strategic plans to reduce waste and risk. All of these factors combined creates a faster, more

responsive system despite crossing continents and time zones.

It's improving accuracy without chasing perfection

With greater visibility, companies are able to make decisions in time to make a difference. This increases the robustness of planners' analysis and forecasts. It also frees them from the pressure of creating the singular, flawless plan. Instead of predicting every possible risk months in advance, supply chain planners can make near-instant adjustments as problems arise. This agility empowers planners to make more accurate and more confident decisions.

It's reaching superhuman speeds while putting people first

With concurrent planning, planners' quick-thinking is re-prioritized – enabling them to know sooner and act faster when disruption hits. Artificial intelligence and machine learning built directly into a concurrent planning platform automate repetitive, daily tasks so planners can respond to the issues of greatest importance and urgency.

Freed from mundane work, these planners are able to take on new responsibilities. Some become more proactive within their functions, identifying strategic opportunities to advance the business. Others take on new roles, like that of the network planner, working horizontally across functions to coordinate the right response to unexpected challenges.

In a volatile world, concurrent planning is the new norm

Yesterday's planning tools and techniques are no match for today's complex global supply chains and the volatility they face every day. With the pressure to meet customers' rising expectations amidst day-to-day supply chain disruptions, changing market conditions, extreme weather events and more, companies still using legacy planning systems and sequential processes will be hard pressed to keep up with demand. For these companies, it's time to rethink planning and turn to the only possible option – concurrent planning.

Meet the only vendor offering concurrent planning: Kinaxis

Trusted by top brands across multiple industries, Kinaxis gives people the confidence to know they are making the best supply chain planning decisions to maximize business performance. We solve complex business problems in easy-to-understand ways by combining human and machine intelligence to plan for any future, monitor risks and opportunities and respond at the pace of change. With the support of our community of supply chain experts and using our unique concurrent planning technique and single integrated planning platform, customers can realize higher revenue, lower costs and fewer risks.

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John Sicard assumed the role of President and Chief Executive Officer of Kinaxis in January 2016. Since starting at Kinaxis in 1994, John has held several senior management roles in development, professional services, business consulting, sales, marketing and customer support.

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Robert Kugel is responsible for the Office of Finance and business research, focusing on the intersection of information technology with the finance organization and business. His research agenda includes the application of IT to finance and business process optimization.

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As Vice President of Industry and Solutions at Kinaxis, Harish Iyer is responsible for defining, launching and evangelizing the company's solutions to target industries and geographies worldwide.

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As a technology evangelist, Justin is an integral part of the Kinaxis Sales Team working with prospective customers to understand the Kinaxis industry-leading technical platform. Justin has spent his entire career in supply chain technology, including both retail and manufacturing verticals.

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Since joining Barkawi in 2016, Quentin Domsch has utilized his expert industry knowledge to fill roles as both business architect and delivery manager for complex, multimillion-dollar supply chain projects.

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Dave Alberts has spent years in supply chain, specifically focusing on designing, managing and delivering supply chain planning systems and S&OP implementations in aerospace, construction, FMCG, food and drink, and life sciences.

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Polly Mitchell-Guthrie is growing Kinaxis' ecosystem of influence through thought leadership, industry outreach and university relations. Polly's past roles in advanced analytics and interest in innovation led her to Kinaxis, because of its vision for how analytics and machine learning can transform supply chain.

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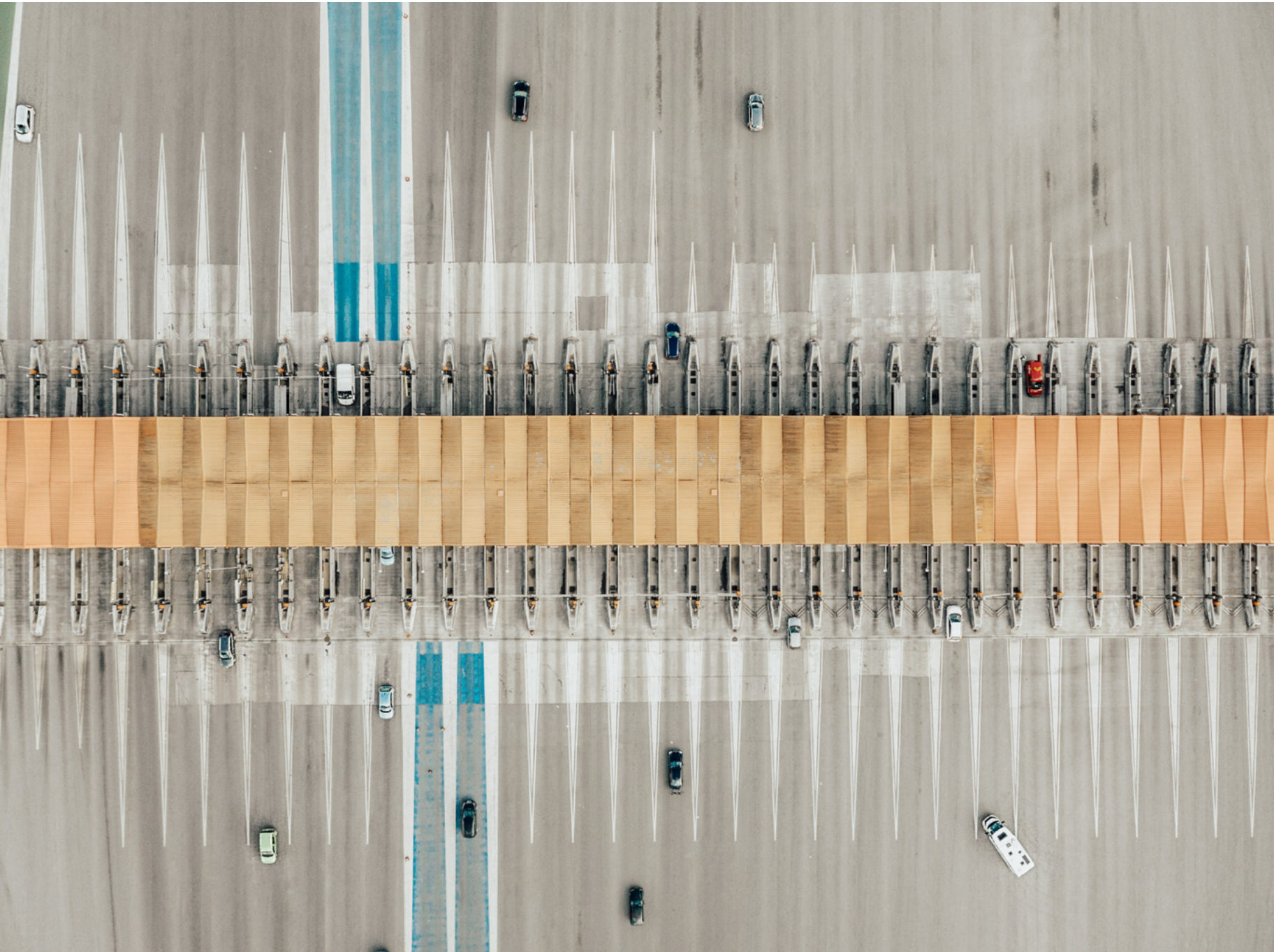
As Chief Strategy Officer, Anne Robinson is responsible for accelerating Kinaxis strategy development to add further value to customers. Prior to joining Kinaxis, Anne was Executive Director, Global Supply Chain Strategy, Analytics and Systems at Verizon.



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