

From challenge to advantage Supply network optimization

Global supply chains are under acute stress. As pressure is mounting from all sides, a fundamental rethink of supply network design, planning and operation is clearly in order. A holistic optimization approach centered around the connected supply chain enables manufacturers to adapt, increase resilience and achieve more flexibility – unlocking competitive benefits in the process.

Efficient, global, just in time: Over the decades, manufacturers such as automotive OEMs have acquired a truly impressive degree of mastery in the field of supply chain management. However, after two years of pandemic disruption, it has become obvious that established systems and methods are in many ways too rigid to deal with severe disruptions. The situation is aggravated by the fact that supply chains issues are arising from a variety of sides at once, from the microchip crisis to logistics problems and more. On top of that, the automotive industry, like many other sectors, has been facing the challenge to fundamentally transform its business models since even before the start of the pandemic. Developments such as the increasing localization due to regulatory requirements or the shift to electric vehicles, characterized by the growth of the electrical vehicles market of 63 percent in the EU and 145 percent¹ in China from 2020 to 2021, call for new ways of managing supply. In this context the development of sources of raw materials and the expan-

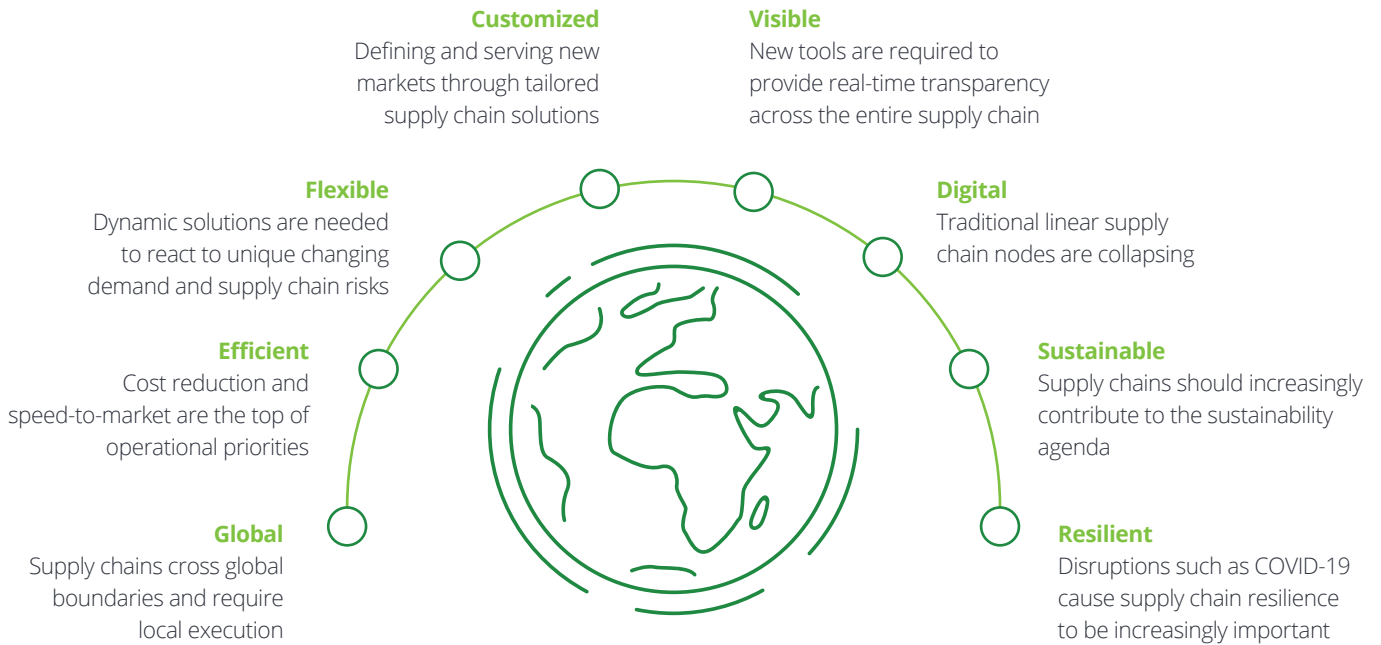
sion of the supplier base present new challenges. The only answer to this broad range of issues is a future-proof redesign of supply chains. The effort is not to be underestimated, as it entails measures in many areas and dimensions, from strategy to operations.

In this Point of View, we will outline how the agenda of holistic supply network optimization may look like. Drawing mostly from the experience of the automotive industry that can at the same time be easily extrapolated to other areas of discrete manufacturing, Deloitte experts have identified critical levers and considerations for this endeavor. Three main points stick out. Supply chains cease to be viewed as cost centers and evolve into a competitive differentiator. Moreover, a one-off approach to network design is replaced by strategic network design as a continuous process of improvement. Finally, innovative tool suites, connected supply chain technologies and new capabilities in fields such as automation help organizations to reap the benefits of

digitalization and underpin their optimization efforts with high-quality live data. Connected supply chain data can be used in network design just as well as in operational planning, enabling risk management through increased visibility, efficient partner management and compliance management. In the future, strategic supply network design and everyday operational supply management will converge more and more in an integrated continuous data-driven optimization process that produces superior outcomes. Supply network optimization is no easy task, but one with a lot of chances. After all, creating a network setup that is ready for present as well as future supply shocks and demand trends may very well turn out to be a matter of existential importance for automotive companies and others alike.



Fig. 1 – Chains under duress: Trends and drivers



Source: Deloitte analysis

Resilience and responsiveness, flexibility and efficiency – not to mention sustainability: These are just some of the manifold areas where existing supply chain models currently display shortcomings. Before addressing how to optimize accordingly, it is necessary to have a closer look at the drivers in the marketplace behind those challenges. Many represent general trends, but there are important differentiations as to the geographies involved. A major factor is the current shift

in consumer preferences. The increasing demand for individual customization requires a move away from the traditional Build-to-Stock (BTS) approach towards an adaptation of Build-to-Order (BTO) processes. North American markets represent a salient example of this development, which is accompanied by a general compression of the Order-to-Delivery (OTD) cycle and respective implications for inventory.

Recent material shortages and supply constraints add to the pressures on supply chains, exacerbated by the pandemic and geopolitics. In particular, the impact of the war in the Ukraine highlights this tension in the automotive supply chains. Disruptions in transportation routes, as well as scarcity and increases in the cost of crucial materials and pre-products, resulted in production downtimes at various German automotive manufacturers after the outbreak of war². Overall, 89 percent of companies in the German automotive industry were affected by shortages in April 2022³. At the same time, logistics costs are exploding. Road

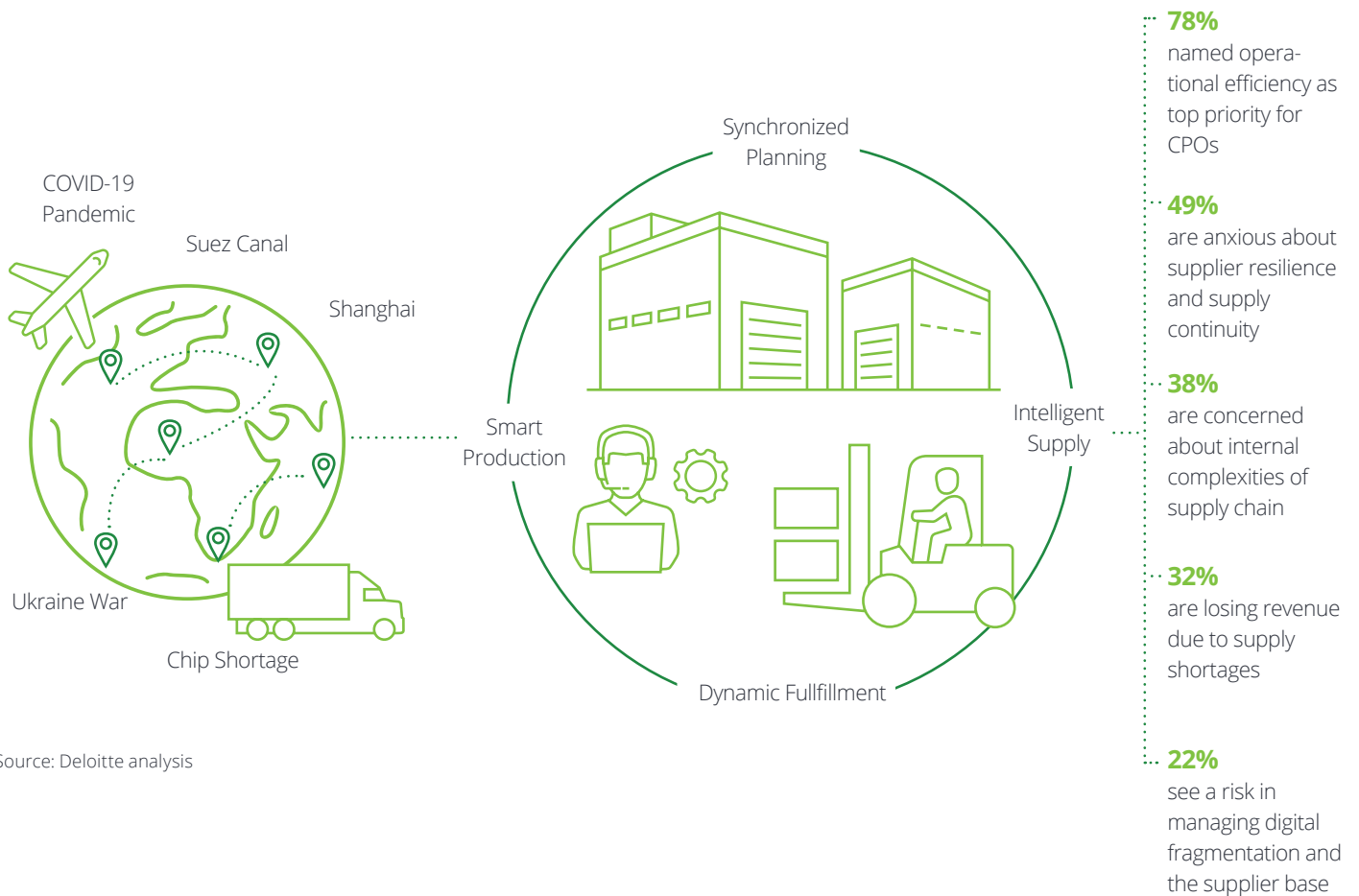
transport capacity is scarce, fuel costs rise, the OPEC raw oil prices are on the highest level since 2013⁴, and sea rates have increased up to sixfold during the last twelve months. Another important aspect is the regulatory trend towards localization requirements. In markets such as Brazil, India or Turkey, global organizations need to increase local production or else run the risk of fines and taxes. Chinese manufacturers also increase their local activity in Europe, motivated in part by the necessity to reduce COVID-related supply chain problems. Finally, the overarching sustainability mega-trend introduces a whole array of separate challenges for

supply chain management. From the point of view of social sustainability, the German supply chain act requires companies to pay much more attention to partners and suppliers. Optimizing operations by CO₂ footprint becomes a major issue. Circular economy approaches also demand a more sophisticated management of the supply network. The impact of all this on operations is significant.

Fig. 2 – From global risks to local impacts

Supply Chain Network

Factory SC Operations



Source: Deloitte analysis

² Source: VDA

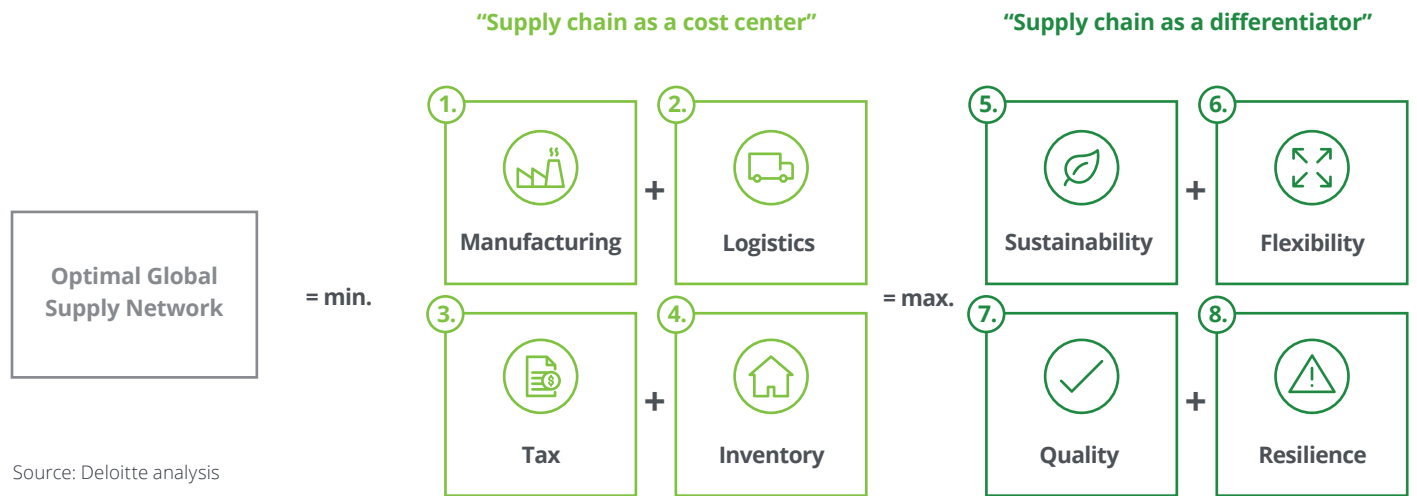
³ Sources: statista, ifo

⁴ Source: statista

**Unchaining supply as a strategic asset:
Network design**

Maybe the most important aspect in designing resilient supply networks is the conceptual shift from cost center to competitive differentiator.

Fig. 3 – Setting up an optimal global supply network



Source: Deloitte analysis

Segmentation

In the trade-off between a central setup (economies of scale, ability to invest in automation, limited inventory risk) and local setup (close to consumer, responsive, high service) there is no clear winner. Supply networks need to be segmented, making network design choices for parts of the assortment/channels or markets.

Defining optimal

One of the main challenges in optimizing a global supply network is to define what optimal means to your company. What is the relative weight of inventory risk, compared to operational cost or a certain amount of CO₂ emissions. Key starting point will be to align these definitions to the business strategy.

End-to-end resilience

Anticipating, reacting to, and facilitating the recovery from the unexpected (e.g. COVID-19, container shortage, blockage of Suez Canal) becomes a key driver for success and requires to reconsider the end-to-end network (including manufacturing) as well as routes to market (e.g. rail from China to Europe).

(Re-)design considerations traditionally focus on the physical supply chain perspective (manufacturing, logistics, inventory). Yet this approach risks missing out on aligning the network to the bigger company context, and may introduce weaknesses with regard to tax, customs, regulatory and location aspects. As a remedy, network optimization needs to strengthen capabilities that benefit the competitive position, such as the aforementioned aspects of resilience, flexibility, sustainability, and also quality. In doing so, it is vital to harmonize network choices with a company's individual business strategy and risk profile. "Defining optimal" implies different things relative to the industry – consider the special emphasis on the inbound network in the automotive sector.

A holistic end-to-end network design approach should focus on business segments rather than functions, as well as on the competitiveness impact of both upstream and downstream dimensions

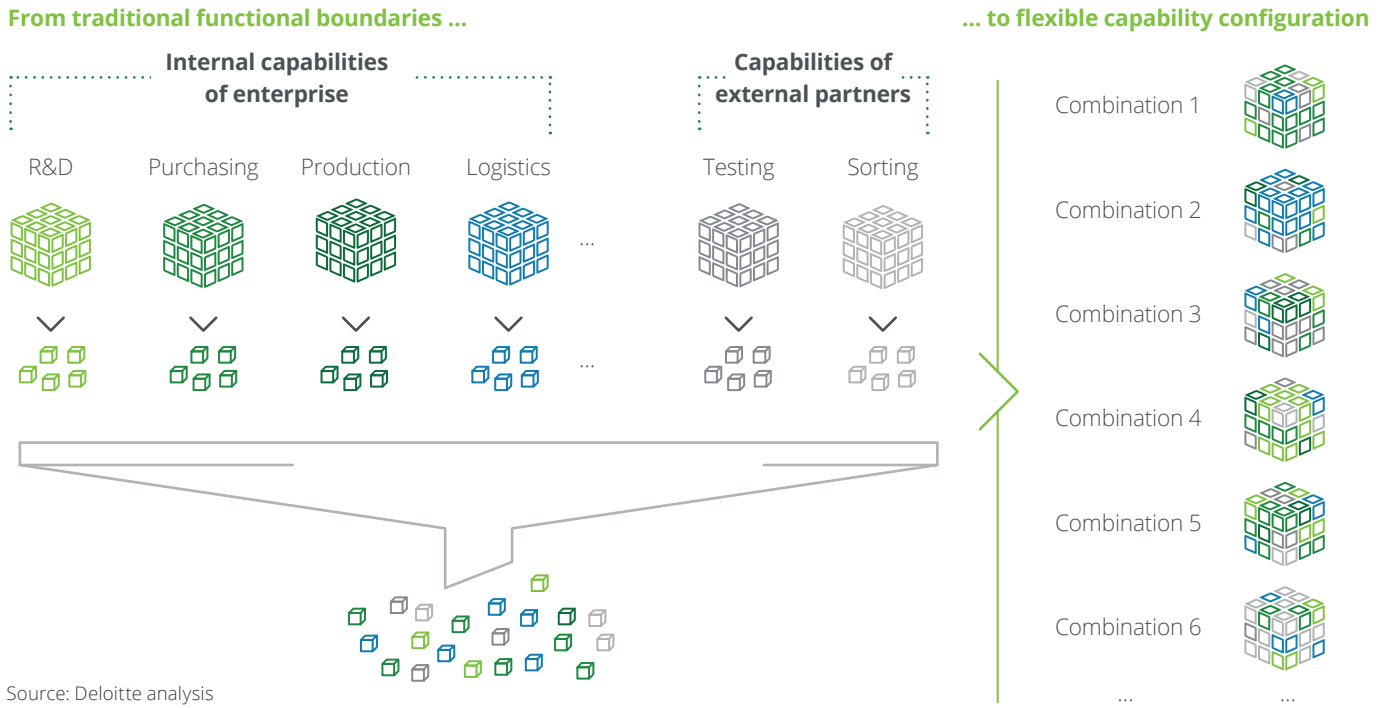
with regard to the industry lifecycle. A clear view on trade-offs such as cost vs. service level is required, and fundamental decisions between a centralized and a local setup have to be made. Centralization offers advantages such as economies of scale, automation options, and reduced inventory risk, whereas local setups offer maximum proximity to consumers, increased responsiveness and good service levels. Yet for global organizations, a unified blanket approach to the choice between such options is hardly viable. Network design decisions need to be segmented in relation to the specifics of respective channels and markets. The design shift away from the purely physical approach to a view on the supply chain as a differentiator will increase end-to-end resilience in the face of further future shocks to the supply chain, provided it is based on a multi-disciplinary approach that includes the dimensions of customer and localization requirements, corporate strategy, business model, tax and sustainability issues.

Capability-centric supply networks

The traditional network design around physical nodes has served the industry well for many years. Today, it results in an increasing amount of bottlenecks and inflexibilities.



Fig. 4 – Breaking traditional boundaries



A further increase in network density is not likely to be the adequate response to demand hikes, for instance. Establishing a capability-centric network can address such issues by equipping physical nodes according to actual requirements. A dynamic re-configuration of capabilities enables the company to respond swiftly to fluctuations in demand. In order to address this problem with a capacity-centric supply network, capabilities need to be analyzed and managed on a more granular level rather than according to their traditional functional context.

How does this work in practice? Take the case of an automotive company that realized that the capabilities of a particular port warehouse were too limited. Originally, the warehouse was designed for import declaration and inspection processes. However, a lack of repair, customization and software installation capabilities meant that emerging business demands could not be addressed appropriately, resulting

in long delivery cycles and problems with customization. The problem was solved without creating a new physical node. The company added required capabilities to the existing facility, thereby moving closer to the customer and decreasing the delivery cycle considerably. Software is now no longer pre-loaded but installed during the local customization process.

Operationally, the efficiency of capability-centric networks is greatly enhanced by the connected supply chain approach. Digital solutions facilitate monitoring and tracking, which makes it necessary to establish respective KPIs and ensure the required data quality internally, but also across the partner network (stock levels, capacity, production state, etc.). The implementation of a supply chain control tower, advanced analytics solutions and the use of external data sources (traffic, weather, market data) all contribute to a real-time picture that enables companies to monitor risks, anticipate problems and react

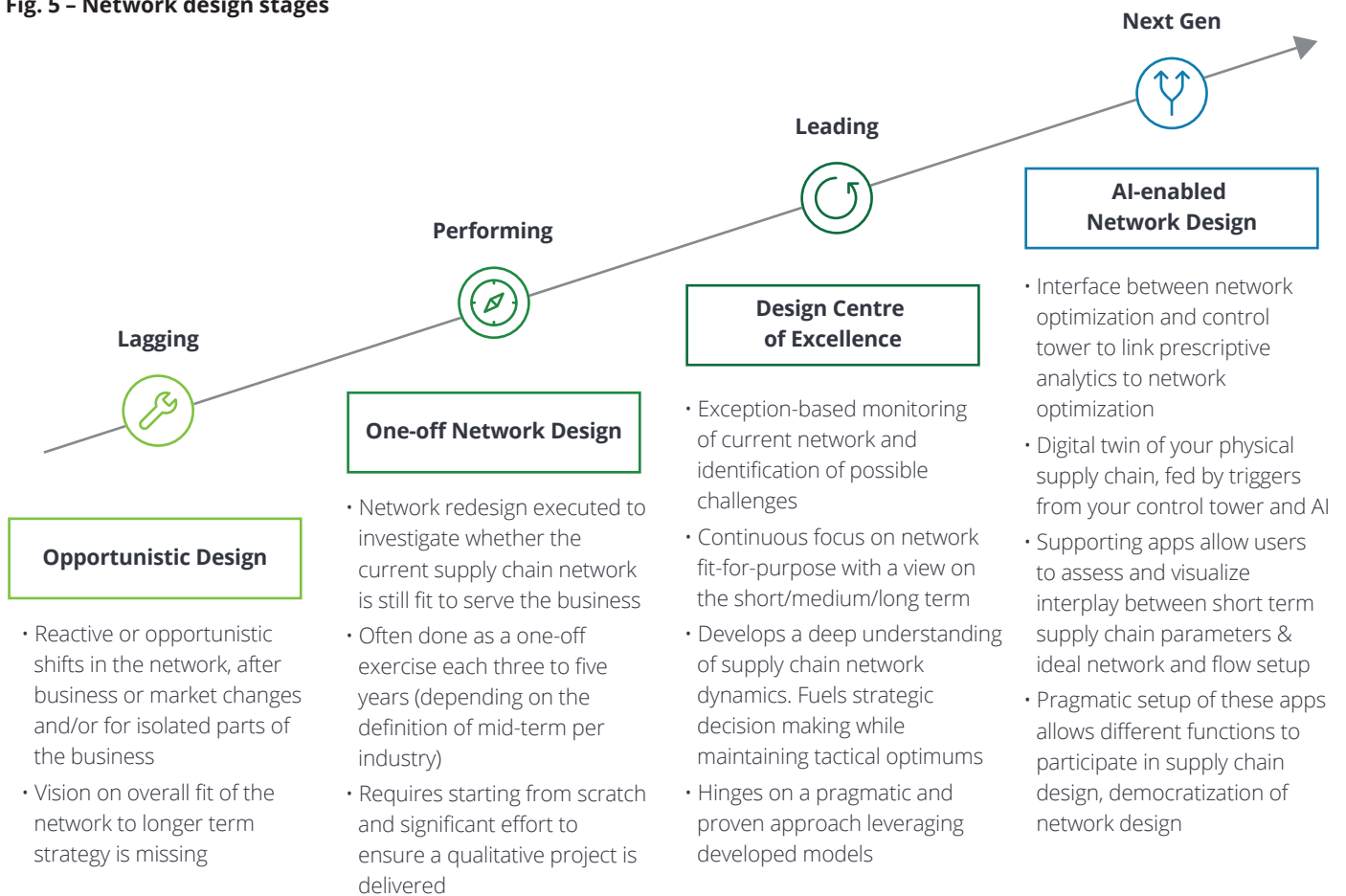
promptly. Right-time deliveries, route and load optimization improve short-term outcomes. Predictive analytics enables advanced planning in the smart factory, and scenario planning helps with longer-term network management.

Towards continuous network optimization: Process and approach

The range of relevant considerations in network design is vast. However, it is not necessary to address all of them at once. One advantage of moving towards network design as a continuous process is that it enables a much broader scope while at the same time it resolves issues according to priority. Furthermore, this improvement process takes place in lockstep with operations, for instance through live input from data sources along the connected supply chain. This data-driven approach ensures that decisions are anchored in what actually happens in the network, increasing transparency and flexibility.

Typically, supply networks evolve according to a company's changing business development stages. While start-ups focus on support, growing companies at the intermediate stage emphasize cost. Moving on to the advanced stage of mature companies, it can be very challenging to transform the existing supply management structures into a dynamic, resilient and flexible end-to-end network. The key step is to transcend one-off network design and to start an ongoing process of continuous design development and adjustment.

Fig. 5 – Network design stages



Source: Deloitte analysis

The common one-off approach is often based on three to five years cycles. To this low frequency corresponds a very high level of effort, as the aim is a comprehensive redesign. At the same time, the one-off approach obviously lacks mid-term and short-term responsiveness. By using a network Design Center of Excellence, companies build more responsive continuous design capabilities based on current monitoring. Strategic decision-making also benefits because it is now informed by high quality operative data. Adding state-of-the-art digital enablers such as digital twins, prescriptive analytics and supporting smart apps, the approach can be leveraged to the next-gen level of network design (see fig. 5). One particular advantage of an apps rollout is the potential extension (“democratization”) of network design input, as different functions and stakeholders may now participate in its development.

The optimization aims to transform network design from a one-time effort into an ongoing process. However, in order to kick-start this transformation, a dedicated one-off effort is still necessary. In the experience of Deloitte experts, an optimization project usually takes between 14 and 20 weeks. This timespan includes project setup (team mobilization, scope), supply chain analysis (data gathering, site visits, restrictions analysis, data analysis, network baseline & model), network design (evaluation criteria, network options, future scenarios, business assessment, validation), business case and transition plan development.

It has to be acknowledged: The optimization project agenda does look substantial. The rewards are more than worth it, however. The connected supply chain optimization approach achieves so much more than a one-off exercise in efficiency, as neces-

sary and welcome as this may be. New potential is created by intertwining network operations and design on the basis of the connected supply chain, and incorporating continuous improvement processes into everyday supply chain management. With these steps, companies from the automotive sector realize the true aim of next gen network design optimization: not only to optimize the network, but also the design process itself.

Building blocks and enablers

Supply network optimization is self-evidently an attractive proposition. But what about the technological foundations that enable it in the first place? Deloitte experts use a varied tool kit with standard application suites as well as proprietary solutions for design, planning and management processes. Among third party packages, Coupa Llamasoft represents a strong tool with broad capabilities particularly suitable for very complex optimization challenges. Other recommended vendors include AIMMS and Anylogistix, both of which offer powerful dedicated optimization software. In other areas, Deloitte’s experts developed a host of specialized assets, based on their own subject experience:

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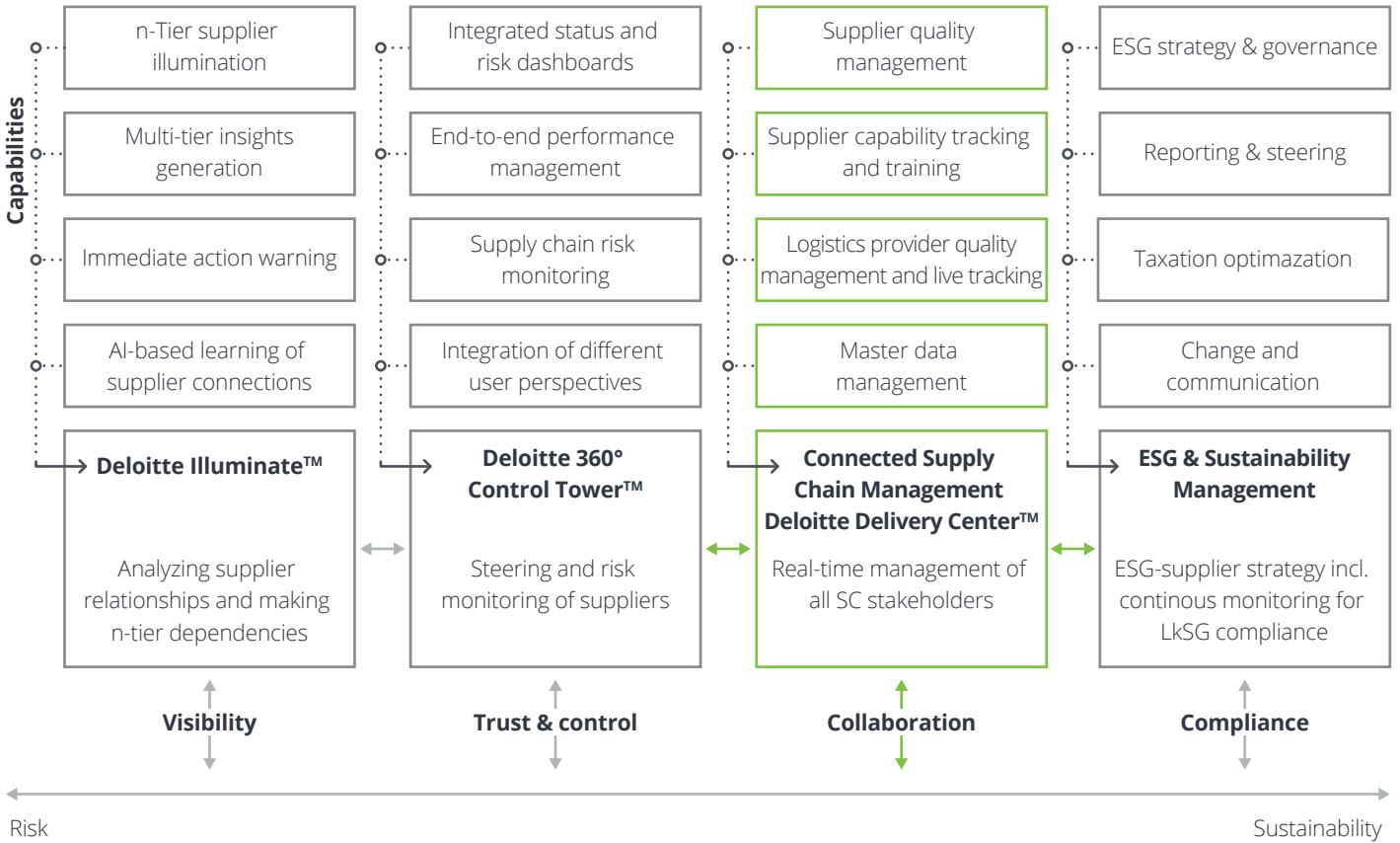
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Fig. 6 – Solution building blocks



Source: Deloitte analysis

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Issue 07/2022