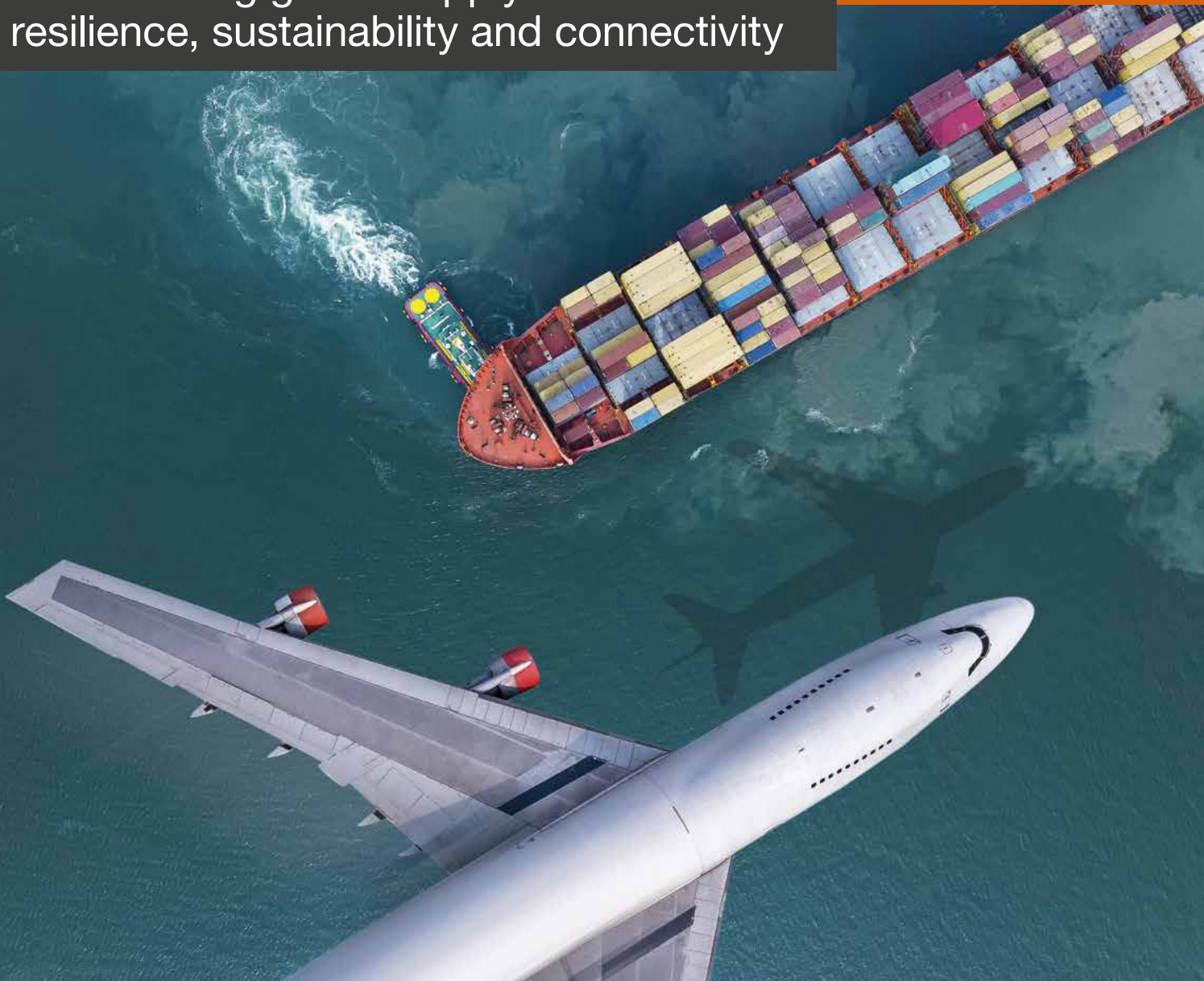


# Supply chain network design: the new competitive frontier

Transforming global supply chains to build  
resilience, sustainability and connectivity



# It's time for network design



The last two years have ushered in a new world of instability and disruption. Global supply chains have been tested as never before, forcing businesses on every continent to take exceptional short-term measures to restructure their supply chain networks.

The sources of turmoil range from large-scale unforeseen events – such as the Covid-19 pandemic and the Russian invasion of Ukraine – to individual and apparently isolated events, such as a strike or service overload at a critical container port, a cyberattack on a key utility, or a simple navigation error in the Suez Canal. Yet any of these eventualities can have a deep impact on global business operations lasting weeks, months or even longer.

The experience of the last few years has shown that supply chain networks that lack the transparency, flexibility and agility to react to unexpected challenges are not robust enough to respond fully either to such events, or to rapidly changing customer behaviours. Adopting only to short-term changes has merely served to highlight the long-term vulnerability of supply chains in the current environment, and potentially to undermine companies' reputations for effectiveness in the face of uncertainty. There is now every sign that supply chain instability has become an enduring feature of global business, demanding a long-term response.

**It is time** to rethink the very concept of the global supply chain.

**It is time** to act to rebuild supply chains for resilience, sustainability, agility, and total cost-effectiveness through holistic supply chain network design.

**It is time** to recognise that lowest-cost supply chains end up incurring higher costs over time as measured by input costs, operational challenges and erosion of market trust.

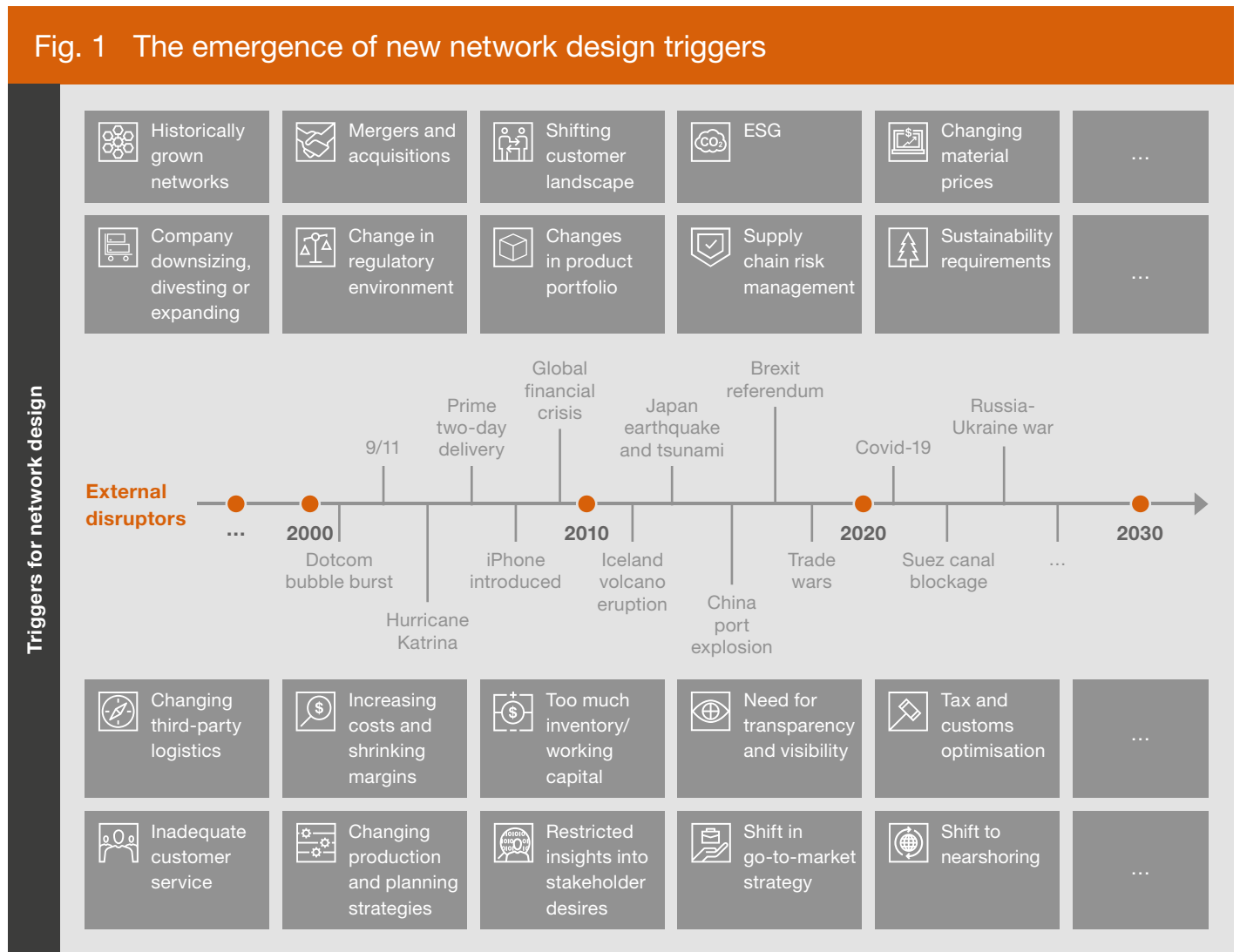
# The new network environment

The need to reconfigure for a changing environment is not new; supply chain network design is a continual evolution.

In the past, the classic triggers for a new network design were often merger, acquisition and divestment activities, when companies chose to reshape their supply chains to serve new corporate structures, or changes

in the business environment such as new regulations. Others included new go-to-market channels or evolving customer expectations – for example, a stronger focus on environmental, social and governance (ESG) concerns – giving rise to new behaviour. The underlying objectives have usually only focused on cost reduction.

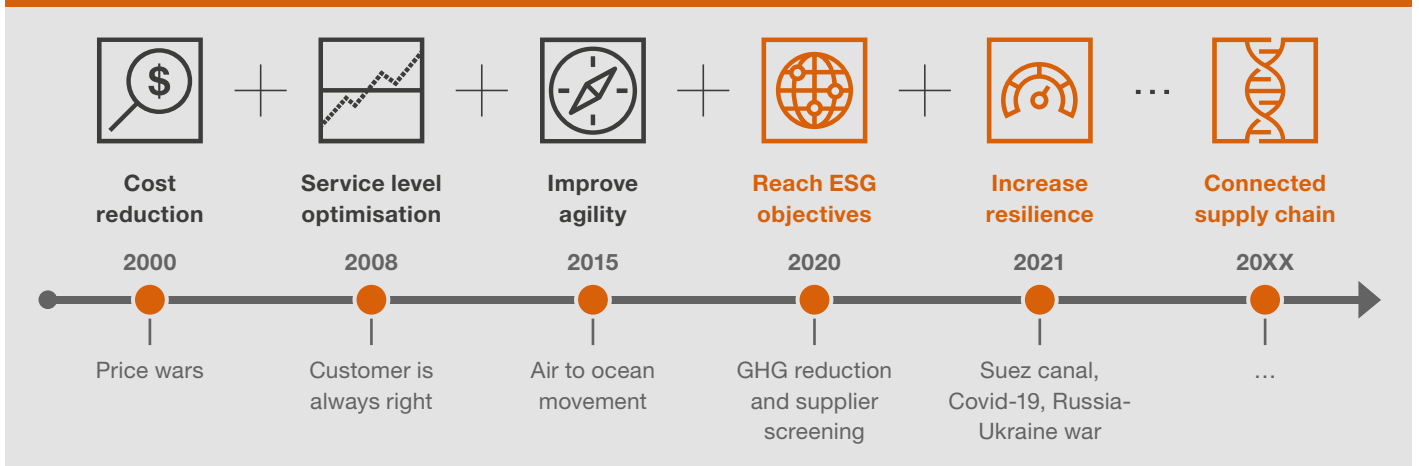
Fig. 1 The emergence of new network design triggers



Today, the network environment has evolved further – and that means that the response must change accordingly. In recent work with our clients, we have experienced a dramatic increase in supply chain design projects that are intended to make supply chains more resilient, agile

and sustainable when faced with challenges. As network designs evolve toward a more holistic model, companies get closer to achieving a fully connected end-to-end value chain: building and enhancing any individual element contributes to enhancing the whole.

**Fig. 2 The increase in key objectives pushing for a transparent and connected supply chain**



This re-orientation reflects two important new forces at work in corporate supply chain thinking. The first is the increasing concern with ESG performance and the regulatory demands that are part of the ESG agenda. These are leading companies to make far-reaching supply chain network changes to drive down carbon and other greenhouse gas emissions, embed recognised labour standards in their supply chains, and increase reporting transparency.

At the same time, companies are increasingly recognising that they are operating in an uncertain world characterised by input and capacity constraints (e.g. driver shortages), price volatility (e.g. container sea freight), conflict

(e.g. impact of Russia-Ukraine war on grain deliveries) and extreme weather events (e.g. yield losses in traditionally strong agricultural regions) – effects that are amplified by the inherent fragility of the supply chain designs that have emerged in response to globalisation.

As a result, the objectives of network design have changed. Headline cost is no longer the driving principle, nor the “triangle” of cost, service and flexibility. Companies are now striving to use the supply chain as a strategic tool to meet ESG goals, increase resilience and agility, and improve alignment and visibility throughout their value chain, including third parties as well as parties within the company.

# The disrupted world: from VUCA to BANI

While companies have always had to plan for adverse events, disruption of their chosen business models, accidents, and disasters, traditional business continuity or disaster recovery planning has typically focused on a single severe shock to the corporate network. This is no longer sufficient.

It has been widely noted that the unexpected has become the new normal. The world of the digital age, which has often been characterised as a world of volatility, uncertainty, complexity and ambiguity (VUCA) is giving way to something even more challenging – a world that is brittle, anxious, non-linear and incomprehensible (BANI).

This new world is **brittle** because systems that appear to function well often break down under only moderate stress, because lowest-possible-cost has robbed them of flexibility.

It is **anxious** because the overload of unstructured or unmediated data makes decision-making harder, not easier.

It is **non-linear** because events with major impacts appear to occur without readily understood causes, undermining long-term planning.

And it is **incomprehensible** as a result of these phenomena. It is impossible to make detailed contingency plans for such a world.

What is possible is embarking on a structured process of review and re-design to create supply chain visibility and to build awareness of vulnerabilities. This means driving forward supply chain digitalisation, capturing supply chain data (e.g. inventory, transport, procurement and distribution channels) on a large scale and maximising its value. Visible, actionable data is the foundation of resilience in the face of enduring uncertainty. Companies may not know what will happen next to impact their operations, but whatever the turn of events, they can act decisively if they have data to hand.

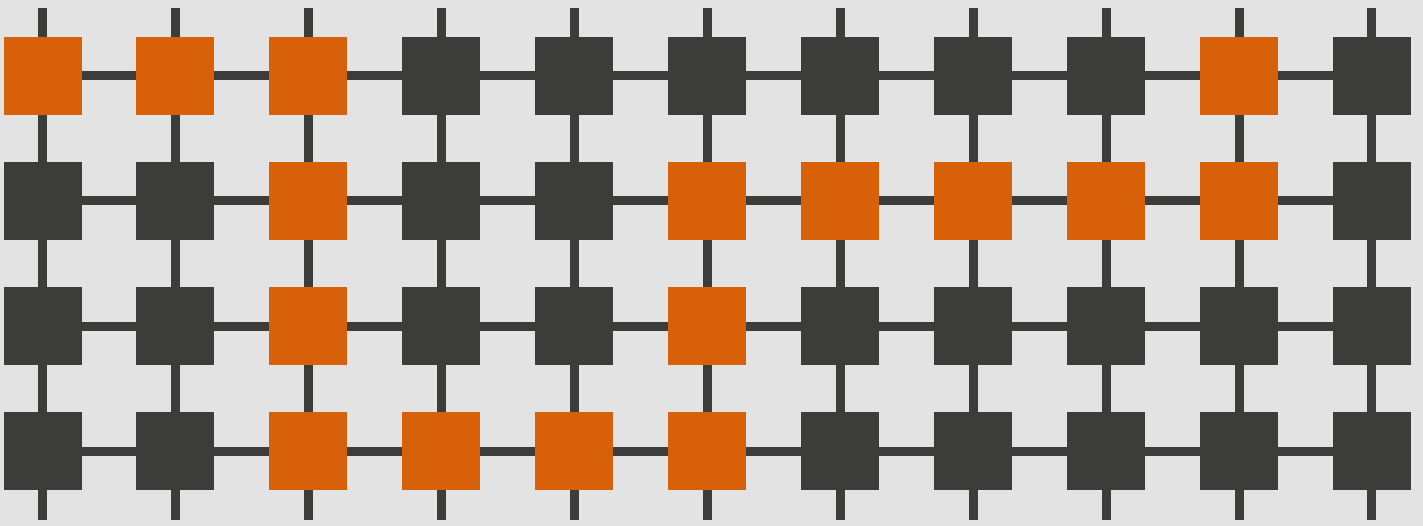
To build effective holistic supply networks, companies need to be able to consider a multitude of internal and external supply chain factors: these include transparency on supply chain flows and stocks, cost awareness on supply chain assets and transport nodes, progressive digitalisation among partners (e.g. warehousing or transport service providers) and competitors, present and future regulatory initiatives that could reshape supply chains (such as the German Supply Chain Act), the growing complexity of tax

structures, and the need to align supply chain design with ESG principles and strategies. Companies that succeed in this challenge will gain a clear competitive advantage on their supply chain efficiency and costs. Supply chains and their supporting physical networks then become an enabler of a company's growth, flexibility and customer satisfaction.

The journey towards supply chain flexibility in the BANI age is a challenging one, calling for complete integration and alignment of supply chain functions and service providers across the value chain.

Given such complexity, our practice is to make graduated step changes that blend caution with decisiveness. We believe that before any changes are made, it is imperative to **review and assess** supply chain network vulnerabilities, and to improve and optimise the data-gathering potential of the network. When changes are made, they should be **rapid**, including moves towards de-globalisation, dual sourcing structures regarding materials and logistics capacity, and the embedding of an agile approach to supply chain decision-making by considering multiple options across the network. Finally, we recommend that companies should work toward developing supply chain network design as a **centre of excellence (CoE)** that leverages the visibility and risk management techniques of class-leading supply chain design.





## Network design Q&A

Creating a holistic network design is, in part, a process of asking and answering a broad spectrum of questions at varying levels of detail throughout the value chain. At one level the questions are simple – about locations such as production and warehousing, and where customers are, about delivery modes (whether road, rail, sea or air), and about the flows within the network. Yet it quickly becomes apparent that the answers to all of these questions create a complex picture of supply chain network design possibilities that map a path to enhanced dynamism and agility through adoption of an optimised, holistic supply network.

Fig. 3 Breadth of typical network design questions



# The network design pathfinder

For every business, the answers to the network design target objectives and guiding questions will be unique to their specific and individual environment, as impacted by BANI. For this reason, supply chain redesign must be an individual process. To navigate this process, PwC's network design pathfinder has been created to help define and prioritise our clients' specific needs and translate them into an individualised and transparent project approach.

Each network design exercise depends on the specific issues to be solved, the digital maturity of the company, the geographical scope, and the organisational character of the business. Network design projects can vary from a fast-paced strategic exercise, typically short-term and guided centrally, to a detailed network design journey driven by bottom-up data sources connected and processed via a specific data architecture set-up involving a wide range of stakeholders and resulting in a multitude of network

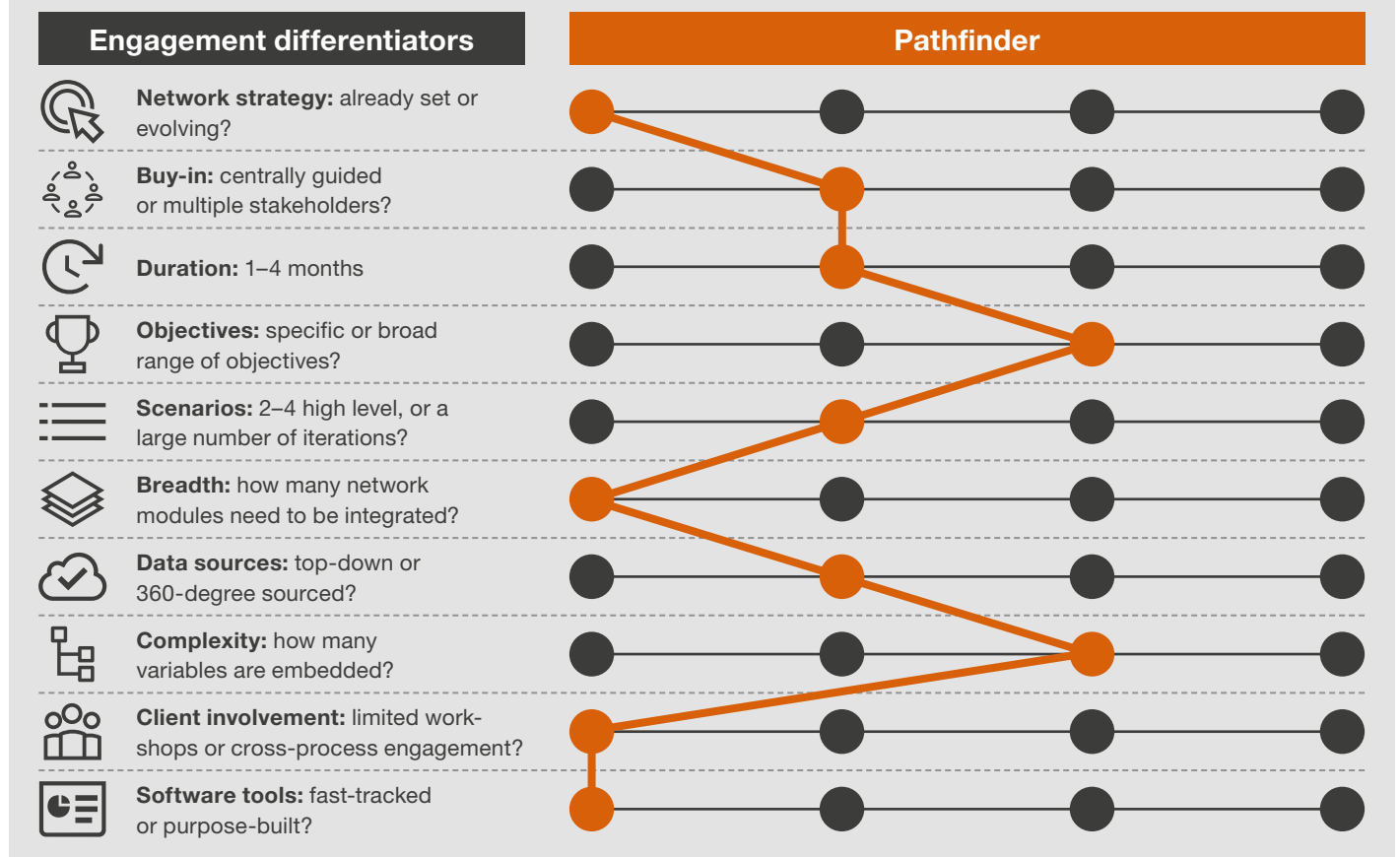
simulations. Ultimately, network design is the translation of a network strategy derived from the overall end-to-end supply chain or value strategy. The company's maturity level – either being able to define a clear network strategy, or simply using the end-to-end supply chain strategy as a guideline – will influence the starting point of a network design exercise and the journey ahead.

Questions and answers related to the ...

- time and effort needed for the project,
- level of detail and data required,
- state of readiness for implementation,
- key stakeholders and decision-making framework,
- data needed, and most appropriate data processing and design tools

... help to make sense of the best-fit approach for individual clients.

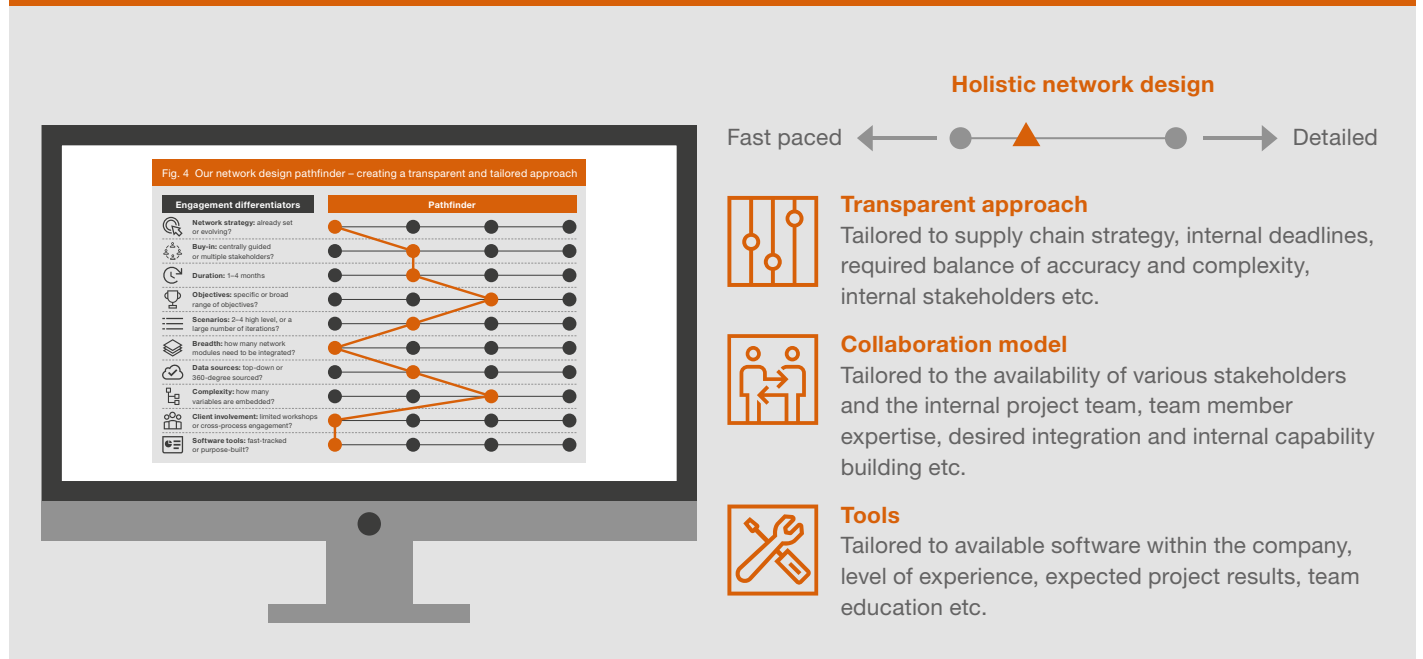
Fig. 4 Our network design pathfinder – creating a transparent and tailored approach



Based on three major approach building blocks, our network design pathfinder helps us to work with companies to co-create the project approach (including the optimal

entry position, defined internal requirements and the preferred way of working), the collaboration model and ensure adoption of the best-suited tools.

**Fig. 5 Three major building blocks ensure the success of a joint network design exercise**

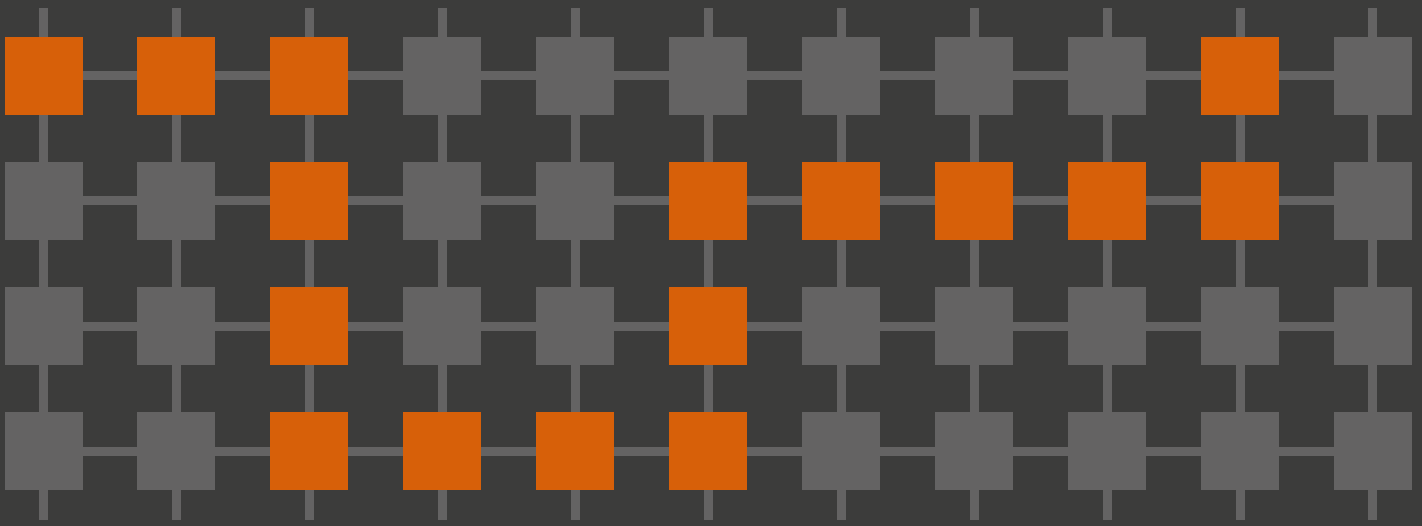


Every **network design project** is unique, but the individual orientation of the client as well as the expected benefit and success are always in the foreground. By considering various details and depth depending on the outcome of the pathfinder, we jointly define the best-fit approach based on factors such as the required balance of accuracy and complexity, the need for tailoring to the supply chain strategy, or internal deadlines.

Next, it is critical to define the specific **collaboration model** for each network design exercise. That means setting an agreed level of engagement with our clients, considering the resources they have to deploy and the capabilities they wish to develop. Some of our clients want a sparring partner to focus and accelerate their network design process; others are at a much earlier entry point and would like a complete

guidance and training process. In each case, PwC offers an individual collaboration approach designed to achieve the targets of the network design exercise.

Lastly, based on the depth of the optimisation exercise, various **network design tools** could be of use. A broad spectrum of possibilities exists, starting from either internal or hybrid tool development and going into a wide selection of potential external software vendors with varying focus areas, capabilities and price tags. PwC has a wide range of proven methodologies to help clients, both with internally developed tools and in combination with system partners, to jointly select the ideal system and design a supportive IT operating model based on trustful collaboration.

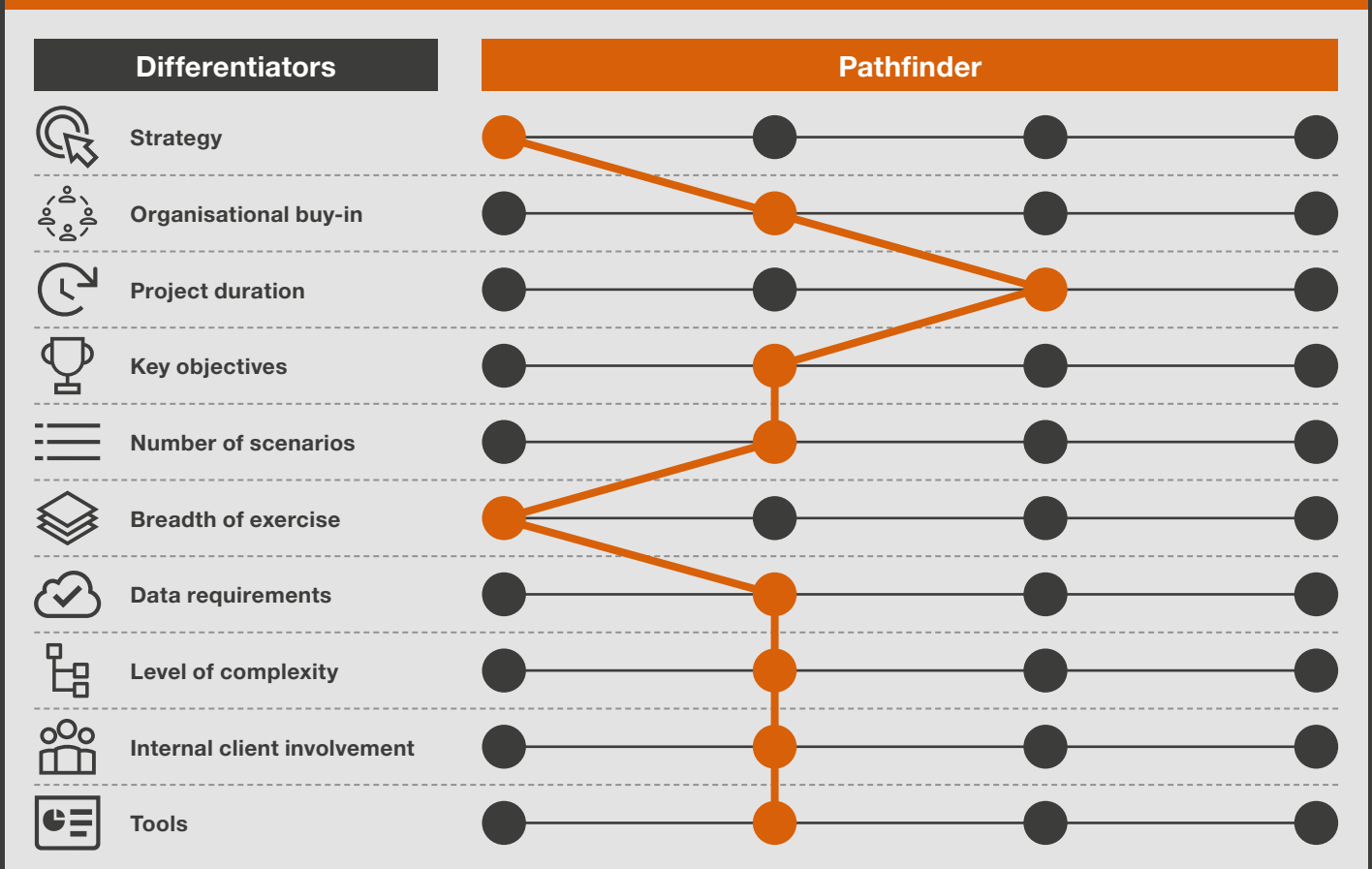


## PwC client case study

International drinks group

Task: evaluation of distribution network and warehousing operations for optimal sourcing strategy and value-added services, including a tendering process. Logistics were segmented and service levels were defined to identify key criteria for the future network, including options for greenfield and brownfield development scenarios according to global travel retail forecasts and resulting bottling volume allocations. A business case and implementation roadmap were developed.

Fig. 6 Fast-paced network design exercise with strategy focus



# Rolling out network design and building up a CoE

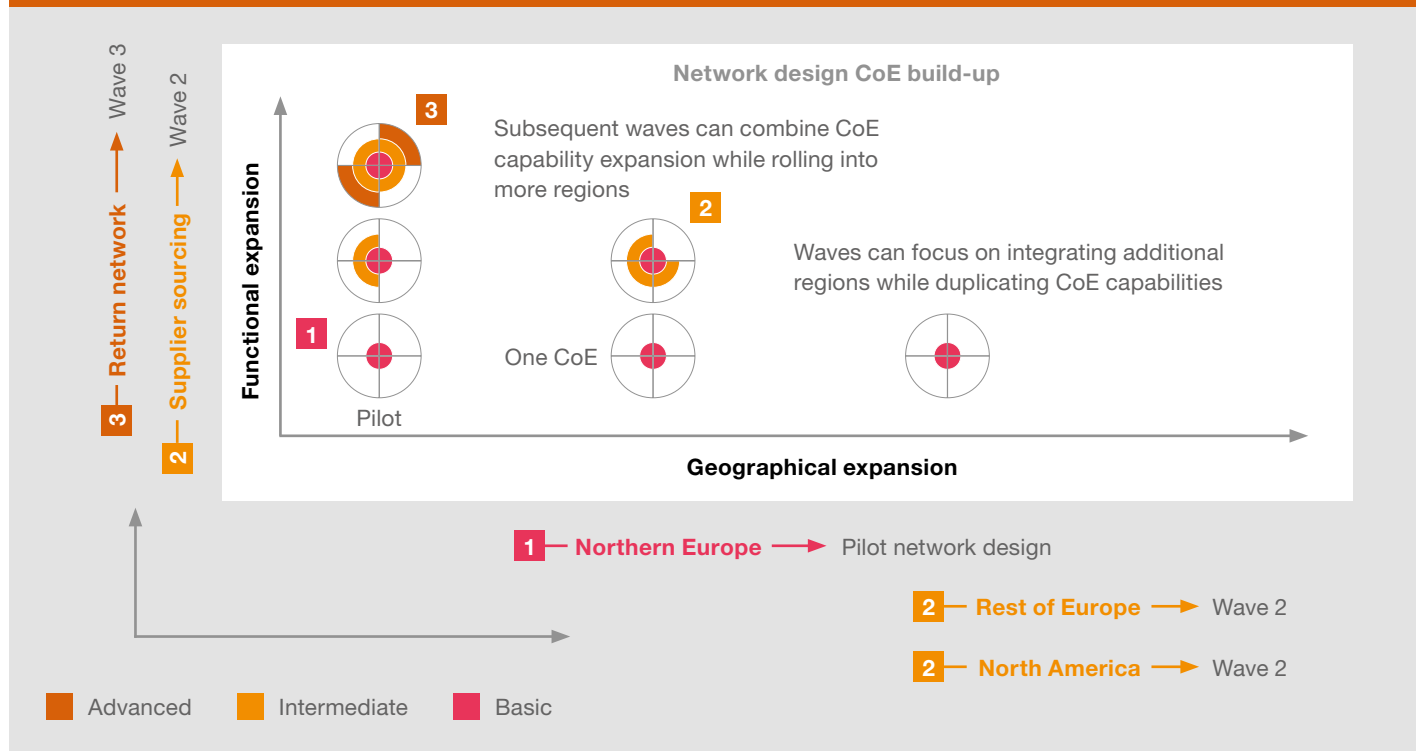
Network design exercises are not self-contained, one-off projects: they typically take place in agile waves in which the network design scope gradually increases in terms of geographical reach, functional expansion and integration of the value chain.

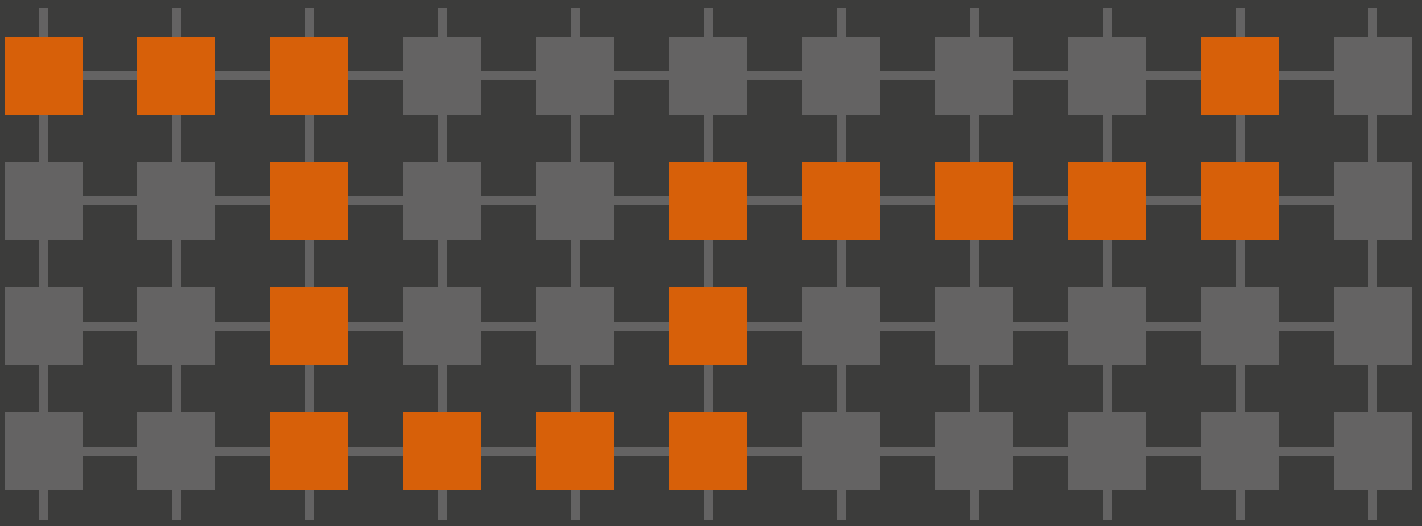
During these successive waves, the mode of collaboration may shift to reflect clients' changing needs. Where the aim of our clients is longer-term knowledge and capacity building, the network design process can gradually build up a centre of excellence (CoE) for network design. The role of the CoE is to jump-start transformations, ensuring continuous buy-in within the company across regions and functions. In the first waves of change, the

main focus is on executing an initial pilot and shifting the mindsets of stakeholders by ensuring consumer centricity, differentiation and cross-business unit consistency and alignment.

This is a process that encourages former regional silos to break apart and opens up new design opportunities in an integrated and agile way. The CoE becomes the locus of growing client capabilities and skills so that future network design exercises can be accomplished by the organisation itself. Technological expansion can also be made into more advanced network design tools and the first steps can be taken towards a truly connected supply chain.

Fig. 7 Sequential roll-out of network design exercise while building up a centre of excellence



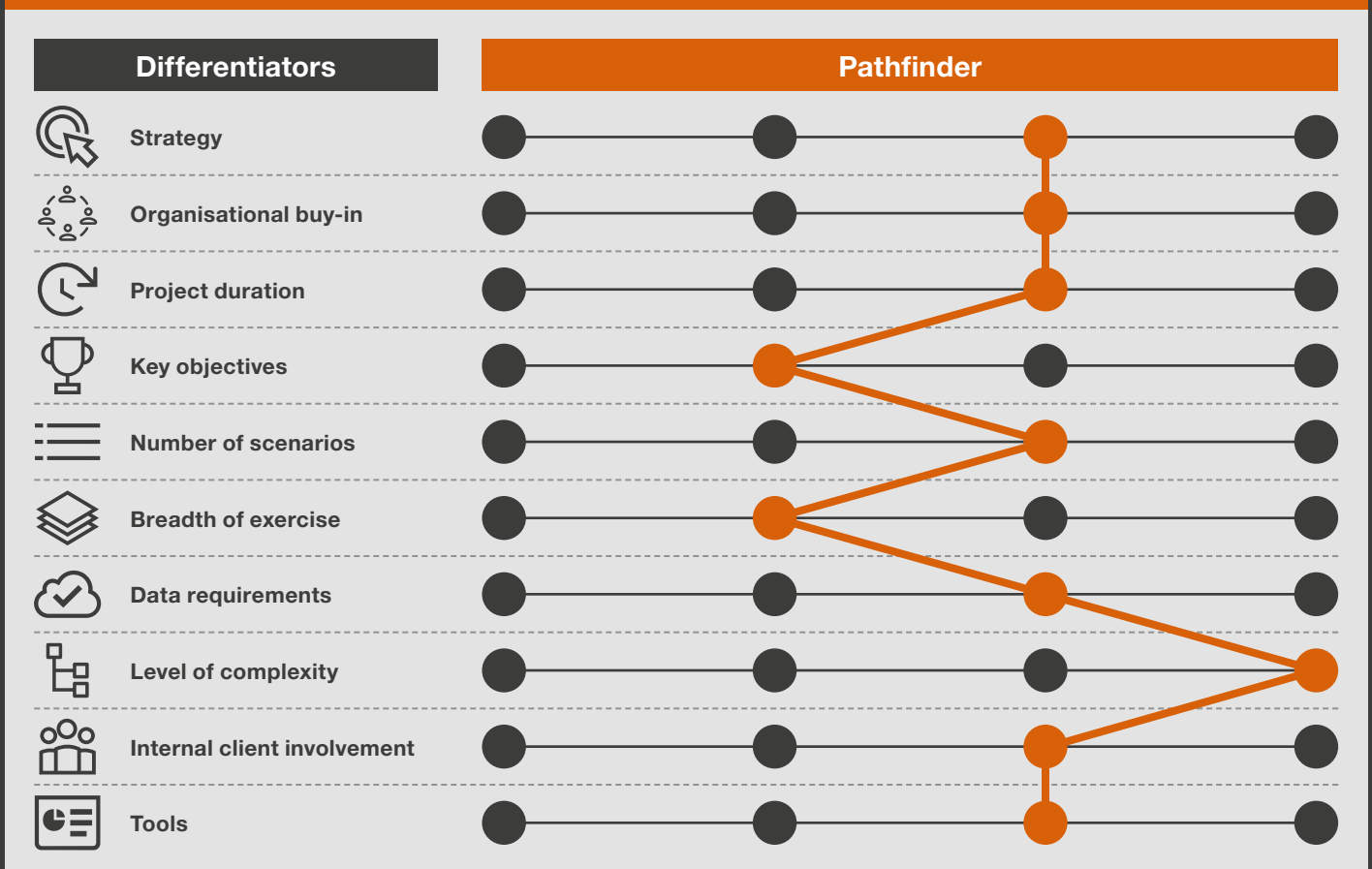


## PwC client case study

Global life sciences group

Task: a post-merger integration involving more than 300 global supply chain network sites. A detailed cost and service optimisation network model was developed for the key North America and Europe regions, factoring in financial, tax, regulatory and legislative dimensions. A global CoE was established with a warehouse excellence programme to define strategic warehouse locations, with final implementation in close collaboration with the corporate procurement function.

Fig. 8 Detailed network design exercise with a high level of complexity



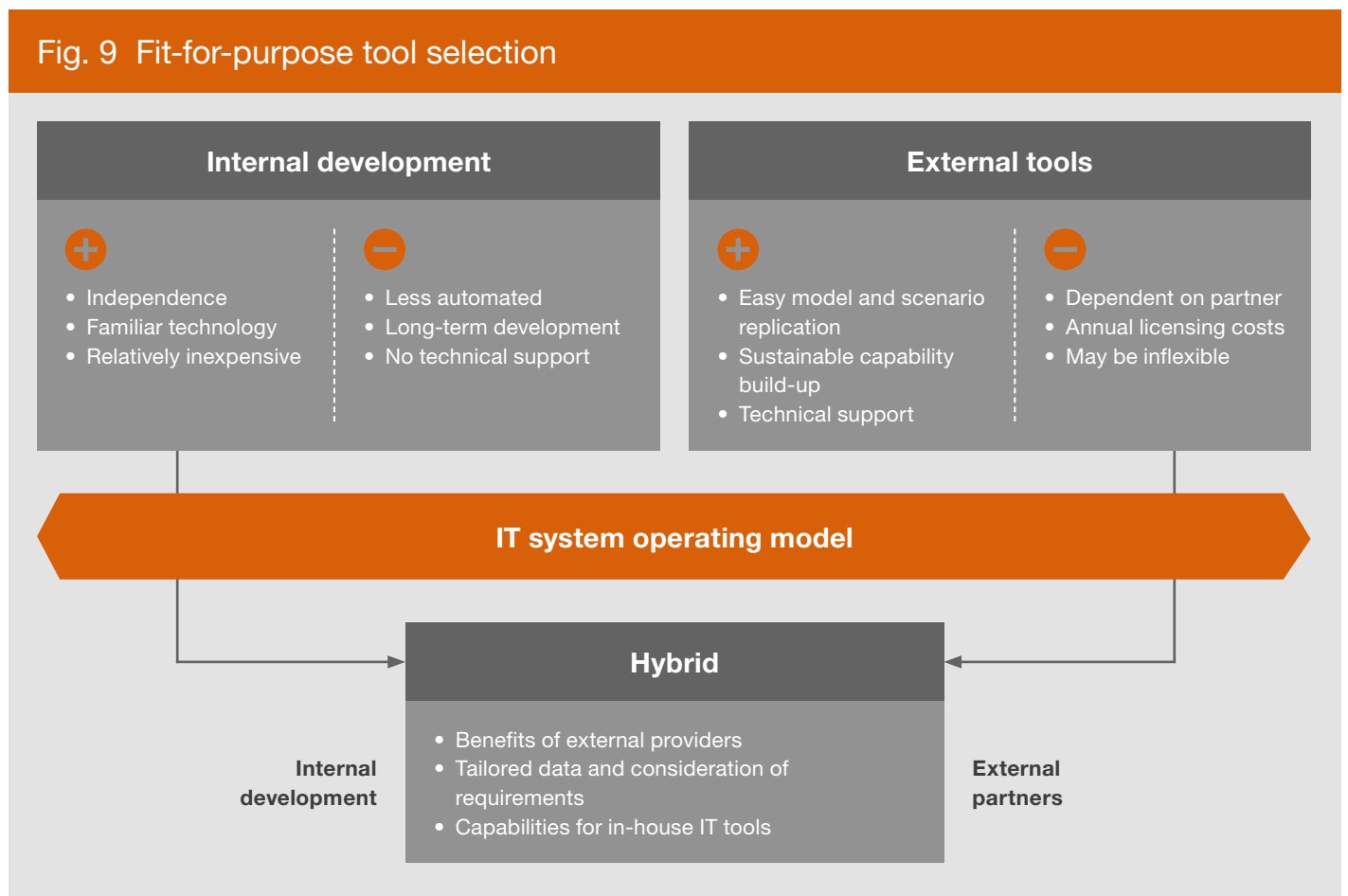
# Software tools: decide on build or buy

Finally, there are also critical decisions to be made from the earliest stages in the network design process about the appropriate software tools to deploy, and whether they should be sourced internally, externally or configured as a hybrid system.

A self-developed system offers clients independence and familiarity with the system; externally sourced tools are likely to provide more functionality and easier scenario

replication. To combine the advantages of both worlds, companies are increasingly using hybrid solutions by creating custom apps that bolt on to off-the-shelf solutions. In either case, PwC has experience with a wide range of proven operating model examples and system partners which can be leveraged to jointly select the ideal supporting tools and design an operating model and IT architecture that delivers transparent process governance.

Fig. 9 Fit-for-purpose tool selection



# The size of the prize

Companies ready to engage with the considerable challenges of a supply chain network redesign can expect tangible and quantifiable benefits on top of strategic and tactical competitive advantages.

At PwC, we have a proven network excellence track record of achieving 5% to 20% annual logistics cost reductions through network cost-saving in three major dimensions:

- **Transport** (reduced distance travelled, load consolidation, mode optimisation, penalty avoidance etc.)
- **Warehousing** (economies of scale, site and overhead rationalisation, improved warehouse management, functional optimisation including automation etc.)
- **Inventory** (optimised inventory spread and overall reduction, lower inventory holding costs and costs of capital etc.)

Improvements in service levels through customer proximity and reduced lead times, greater reliability through reduced complexity, and standardisation through uniform processes are early cost wins. Longer-term gains include reduction of greenhouse gas emissions (which are set to become increasingly costly), responsiveness to changing quality demands, and agility in the face of disruption, including building up a digital twin through the tool-supported ability to simulate network alternatives.

The key variables that determine cost-saving potential are the complexity and maturity of the logistics network. High complexity with low maturity can create project benefits with yearly logistics savings of up to 20%, while low complexity and high maturity leads to lower savings.



# Network design is a journey



We believe that business supply chain design has been tested and found wanting. Supply chain networks built for a world of relative certainty and predictability are no longer fit for purpose. Anxiety and unpredictability are the new normal: supply chains need to reflect this reality, and companies need to find a route to achieve that change. The need now is to acquire the full complement of capabilities to create a supply chain network that is resistant to both localised and global shocks, and is fit to self-replicate right across the corporation.

This is the journey from cost-driven globalised supply chain design to network flexibility and resilience in a disrupted world. Achieving those goals in an individualised way requires an approach and scope tailored to each company. PwC's network design pathfinder, in combination with our customised network design approach, is designed to jointly define the best point of initiation and the ideal set-up for a network design project, to embark on a journey together. Every business is unique: the pathfinder recognises that uniqueness and responds accordingly, outlining a tailored and transparent network design approach, ideal collaboration model and best-fit tools.

This is a journey towards a new mindset. Supply chain network design is no longer a matter of execution detail. It is becoming part of the competitive posture of large businesses, shaping the ability of companies to meet customer needs, regulatory demands, and the challenges of the great transition to net zero.

This is a complex, challenging transition. And PwC's mission is to support companies – whatever their needs – every step of the way.

# Why PwC?

## About us

Our clients face diverse challenges, strive to put new ideas into practice and seek expert advice. They turn to us for comprehensive support and practical solutions that deliver maximum value. Whether for a global player, a family business or a public institution, we leverage all of our assets: experience, industry knowledge, high standards of quality, commitment to innovation and the resources of our expert network in 152 countries. Building a trusting and cooperative relationship with our clients is particularly important to us – the better we know and understand our clients' needs, the more effectively we can support them.

PwC Germany. More than 13,000 dedicated people at 21 locations. €2.61 billion in turnover. The leading auditing and consulting firm in Germany.

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