4FLOW
Your supply chain solution

The ultimate guide to supply chain network optimization

Contents

Network optimization in the digital era

Over 60% of corporations want to adopt cutting-edge inventory and network optimization tools in their supply chains in the coming years.[1] The trend towards optimization of entire or partial supply chain networks in recent years has emerged as a way to deal with increasingly complex supply chains, higher customer expectations regarding service levels, and constant pressure to reduce cost in a competitive business environment.

Supply chain network optimization is an important lever for growth. Research has shown that a supply chain network with the right balance of cost and service level can provide a competitive advantage. Organizations with optimal supply chain networks have 15% lower supply chain costs, less than 50% inventory holdings, and at least three times faster cash-to-cash cycles when compared with businesses without optimized networks.[2]

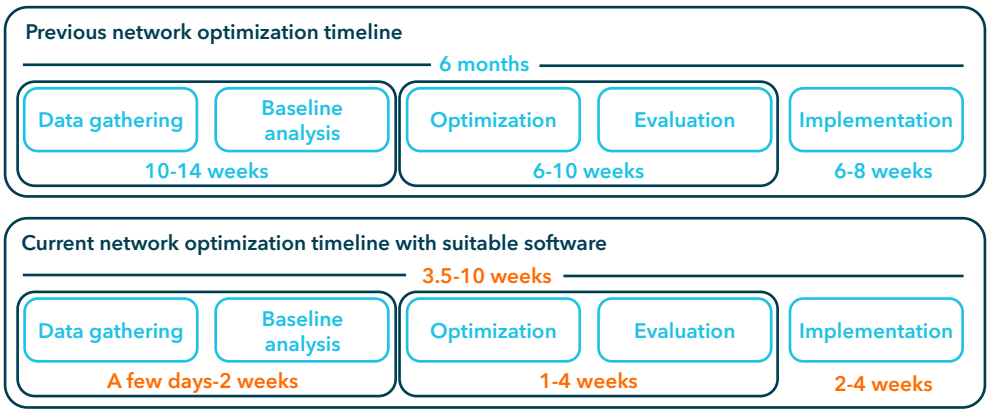
In addition, optimal network design is a fundamental step on the way to sustainable growth as it ensures responsiveness and scalability of the network.

A network optimization process that usually would have lasted six months in the past can now be shortened to one to two months if the data is cleaned and the process is done on a regular basis with the help of suitable technology. First-time or one-time optimization projects might require more time and effort, especially in the steps of data gathering, data cleaning and baseline analysis. In this case, the process will likely take longer than two months.

This speed unlocks great potential to identify optimization opportunities on a more regular basis – a key step, as frequent network design optimization is a must for businesses who want to thrive in this quickly changing world.

Whether you use a professional service provider for network optimization or build up your in-house competence using a dedicated tool for more frequent optimization projects, it's necessary to understand some guidelines and the fundamental steps in supply chain network design to ensure success.

Figure 1



Thanks to technology advancements, supply chain network optimization can now be done faster and more frequently.

Despite the clear benefits, businesses have not been able to perform regular and thorough network design optimization in the past due to capacity, technology and especially data maturity barriers. Thanks to increasing data availability and advancements in digital technology, businesses can now store, process and analyze data in greater detail faster and with more accuracy.

This e-book was written by 4flow experts with over 20 years of hands-on experience in supply chain network design and transportation optimization in various industries. It will walk you through the essentials of the supply chain network optimization process, offer advice on the frequency of optimization, and help you succeed every step of the way. Let's get started.

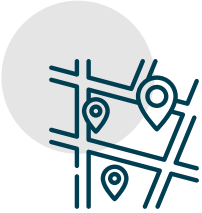
1 Global supply chain management | Statista
2 Supply Chain Network Optimization Boosts Visibility, Cuts Costs | 2022-02-08 | SupplyChainBrain

What is supply chain network optimization – and what is it not?

Supply chain network optimization is the process of enhancing your network to find the best possible configuration of key elements to meet certain goals like cost reduction, improved customer service, risk management or increased flexibility. Examples of possible elements to optimize include suppliers, transportation routes, manufacturing facilities (in inbound networks), and warehouses and distribution centers (in outbound networks). Various tools and strategies could be used to support network optimization.

Figure 2

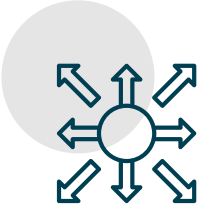
Common questions for supply chain network optimization



What is the optimal number of locations considering the target service level?
E.g., one location in USA vs. locations on east and west coasts

What is the optimal location configuration, including size, supply chain functions and inventory?
E.g., centralization of returns management

What are the optimal site locations given the number of sites and the volume flows in the network?
E.g., optimal locations of east and west coast sites



What is the optimal allocation of customers and flows of goods to locations?
E.g., allocation of customers from Canada, USA and Mexico to east and west coast sites

Many businesses optimize their networks on cost reduction. In fact, 60% of surveyed professionals report that their supply chains have been designed for cost-efficiency. But cost optimization alone is not sufficient.[3] The Harvard Business Review emphasized that supply chains that focus merely on costs tend to deteriorate over time; only companies with agile, adaptable, and aligned supply chains succeed.[4] A supply chain network focused only on cost efficiency is likely not optimal, as maximum cost efficiency almost always has negative effects on other participants within the supply chain – including end customers.

To achieve an optimal supply chain network, the entire network with all target dimensions must be considered.

3 Gartner Survey Finds 87% of Supply Chain Professionals Plan to Invest in Resilience Within the Next 2 Years
4 The Triple-A Supply Chain

Why is optimal network design important?

The importance of network optimization is becoming increasingly clear, especially in a VUCA environment (characterized by volatility, uncertainty, complexity and ambiguity). Specific benefits of optimal network design are outlined here.

60%

of corporations want to adopt cutting-edge inventory and network optimization tools in their supply chains in the coming years.[5]

Reduced total network cost

This is one of the main reasons why businesses begin supply chain optimization. Inefficiencies such as underutilized transportation, overstock, oversupply, poor placement of warehouses or distribution centers, and overall poor strategic network planning can result in increased operating costs and wasted money. By reviewing and optimizing your supply chain networks on a frequent basis, you sustainably save costs in transportation, warehousing and distribution, as well as inventory carrying costs.

Simplified growth management within and across organizations

Whether you're planning a merger or acquisition, intend to enter a new market or are facing changes in your industry, network optimization helps you reevaluate your network strategy and goals. You can design an optimal network aligned with future requirements – for instance, with reduced fulfillment and lead times for new facilities.

Increased customer satisfaction

With an optimal network, you can reduce lead times and execute delivery in the most cost-effective way. In addition to helping you meet customer demand when disruptions occur, network optimization plays a key role in enabling business growth and greater agility.

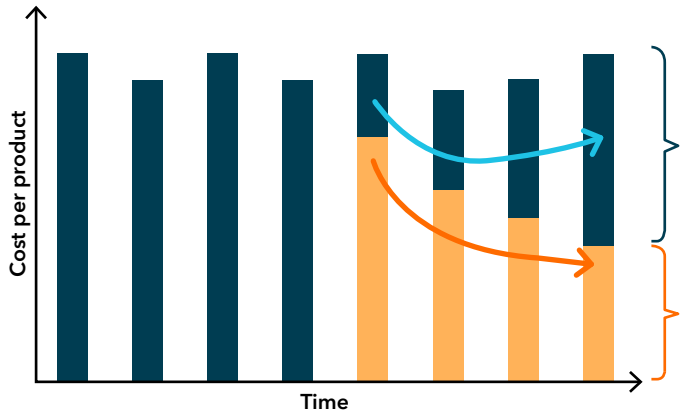
Improved visibility and transparency

One step in supply chain optimization is the identification of inefficiencies and bottlenecks within your entire network (either inbound or outbound). This knowledge helps with network risk analysis and management, predictive forecasting and KPI monitoring. You can gain full transparency of your network, including flows and costs.

Greater resilience in case of disruptions and market challenges

The iterative nature of network optimization empowers you with up-to-date backup strategies in case of disruptions or other challenges – which means you can respond quickly to changes in market conditions.

Figure 3



Infrequent or event-driven optimization reduces network costs per product for the short term before they rise again.

Continuous optimization reduces network costs per product and keeps them low in a sustainable way.

5 Global supply chain management | Statista

How often should you optimize your network?

There is no fixed recommendation for the frequency of optimizing supply chain networks, as it varies depending on your network complexity, the level of variation in customer demand, specific industry dynamics and especially the advancement in supply chain technology available to your business.

For example, for a complex supply chain network with multiple tiers of suppliers, logistics providers and partners, as is the case in the automotive and manufacturing industries, network evaluation once every one to two years used to suffice. However, changes happen more frequently now than ever before. Events like expansion into new markets, mergers and acquisitions, and the introduction of new products mean network studies must be done more frequently now – even continuously.

A business with a less complex supply chain network, as is often the case in retail or FMCG, still needs to keep pace with fast changes in consumer demand and frequent new product releases – all while minimizing logistics and inventory costs. This kind of business should aim to optimize its supply chain network frequently, at least twice per year.

Regardless of business size, industry or network complexity level, businesses need to reassess and optimize their networks any time one of these events occur:

- Supply chain disruptions (e.g., the coronavirus pandemic, natural disasters, geopolitical events, economic crises)
- Introduction of new products or technologies that affect the whole supply chain
- Changes in regulations or trade policies
- Mergers or acquisitions
- Entering a new market

Ongoing monitoring and continuous improvement efforts should be ingrained in supply chain management practices. This way, you can adapt to business changes and optimize your supply chain network's efficiency, responsiveness and resilience.

Network optimization can be done by an internal team using software, by an external service provider or by a combination of the two. 4flow supports you with a variety of needs:

- Expertise in end-to-end supply chain network design to guide your project
- Modern network design software to support your in-house team performing frequent optimization
- Managed supply chain network optimization services, from strategy to implementation
- Know-how, market benchmarks and best practices in a variety of industries

Important metrics in network evaluation

The foundation for any optimization decision is an evaluation of the effectiveness of the supply chain network. This process helps you identify areas for improvement and provides a direction for the whole process.

To evaluate the network, it is crucial to establish a comprehensive set of metrics or key performance indicators (KPIs) to help you measure, monitor and improve your network's overall performance. Depending on your industry and goals, and whether you have an inbound or an outbound focus, these metrics can vary. Examples include total inventory, lead time, cost per unit, on-time performance, profitability and more. Here is a suggestion of seven top metrics widely used by businesses across industries.

1. Operating expenses

Operating expenses play a crucial role in network evaluation and encompass various cost components, including inbound transportation, warehousing and outbound transportation.

Inbound transportation

These costs are related to moving goods and materials into a company's network and ensuring a timely and efficient flow of materials within the supply chain.

Outbound transportation

This cost component pertains to distributing finished goods from production sites to users. These costs directly impact customer satisfaction and service levels.

Warehousing

Warehousing and service costs depend on the specific operating model adopted by a business. For instance, when utilizing external warehouses, expenses may include fees and rent, while for internal warehouses, they may include staff costs, depreciation and maintenance.

2. Capital expenditure

Capital expenditure (capex) refers to an organization's investment in long-term assets like sites, equipment or technology that will be used to improve future performance. It includes acquisition, maintenance and upgrade costs. Capex is an important consideration when optimizing and evaluating the supply chain network, particularly when investing in new buildings and automation infrastructure, as capex can have a large impact on the overall cost and efficiency of the network.

3. Capital deployed

Capital deployed refers to the allocation of financial resources across various warehouses and inventory levels. For example, when inventory is split among multiple warehouses, more capital might be required to maintain adequate inventory levels throughout the supply chain. Factors to consider when evaluating capital deployed include inventory segmentation, warehouse location strategy, inventory turnover, safety stock optimization and warehouse utilization.

4. Implementation costs

Implementation costs, typically considered a component of operational expenses, include expenses related to project management, IT interfaces and relocation of goods, tools or material associated with the implementation of new systems or processes within the supply chain.

5. Service level

Service level reflects the percentage of customers who receive their orders within a specified lead time target. As a KPI, it is primarily relevant for outbound networks and can be represented as a percentage (e.g., XX% of customers must receive their delivery within the target lead time Y). Service level is a crucial indicator of the comprehensive performance within a supply chain network and applies to transportation, warehousing and inventory management.

Transportation service level

This component focuses on the timely delivery of shipments. It evaluates whether goods that are dispatched as scheduled ultimately reach their destinations on time.

Inventory service level

This component concentrates on maintaining appropriate stock levels to ensure customer orders can be fulfilled promptly and delivered as expected.

Warehousing service level

This component addresses the efficiency of warehouse operations, specifically assessing if goods received for picking are processed and dispatched in a timely manner.

The overall service level is determined by combining these individual service levels. A failure in any of these functions – inventory, warehousing, or transportation – can lead to a decline in the service level, ultimately impacting customer satisfaction.

6. Carbon emissions

More and more businesses are considering carbon emissions metrics in their supply chain network as more governments implement regulations and standards related to greenhouse gas emissions. For instance, the German Supply Chain Act that came into force on January 1, 2023, requires businesses across the world to observe supply chain due diligence on every aspect of ESG, from human rights violations to compliance with environmental standards.[6] Another example: the United States' Environmental Protection Agency's (EPA) Greenhouse Gas Reporting Program requires large greenhouse gas emission sources, fuel and industrial gas suppliers and CO2 injection sites to report and publish information on greenhouse gas (GHG) data and relevant information.

Incorporating emissions as a metric for network evaluation can help organizations ensure compliance with regulatory requirements and achieve sustainability goals, while achieving cost savings with energy efficiency improvements and optimized logistics.

7. Customer-specific qualitative assessments

This metric involves evaluating the unique needs, preferences and requirements of your individual customers in the context of your overall supply chain. By considering customer-specific factors such as delivery time preferences, quality level, communication effectiveness and service expectations, businesses can create a more responsive and customer-centric supply chain network that adds value and creates a competitive advantage.

6 CSR - Supply Chain Act (csr-in-deutschland.de)

Guidelines for network optimization

Once you've identified the key metrics that are relevant to your business goals and will help you recognize areas for improvement, your business is most likely ready to start the optimization process. Our network optimization experience across industries has helped us gather several guidelines to ensure process efficiency and achieve the desired objectives.

Here, we've collected the crucial principles that underpin the design of an efficient, resilient, transparent and cost-effective supply chain network.

1. Set clear objectives

When beginning a network design project, it is crucial to have a clear understanding of the objectives, desired outcomes and intended capabilities of the future network. These might include cost reduction, service level enhancement, product quality improvement, increased flexibility in transportation and inventory management or reduced environmental impact.

Businesses often ask whether a network study will enhance their network, but this question cannot be answered without establishing specific goals and definitions beforehand – eventually it comes down to the question:

Which areas of the network do we want to enhance and to what extent?

2. Establish a clear strategic framework

No matter the objective of your network design project, high-level corporate and supply chain strategies must be integrated into the network design, as those strategies are made to shape the overall structure of the supply chain. Examples of strategic elements that should reflect corporate strategy include fixed locations, regional development, sustainability targets, zero capex or the choice of suppliers and partners.

Compliance with over-arching strategies requires a thorough understanding of the strategic elements that could affect the supply chain network. These can be identified, aligned and documented in corporate workshops and integrated as parameters in subsequent planning phases. When all relevant strategic guardrails are respected and solidified in the planning process, it is easier to secure the commitment of top management.

4flow best practices

Joint workshops are a key step we take with every customer to collect all business requirements, strategic guidelines, network restrictions and targets. This way, we can ensure the project results align with overarching business strategies.

3. Create a theoretical data model

Creating a theoretical data model is a must before gathering data for the project as it provides a conceptual framework that defines the data elements, relationships and constraints involved in the design of a supply chain network. Through defining what data is needed to create a network model and how to get that data, the theoretical data model serves as a guide for collecting data and linking it to network design and analysis.

4. Remember that strategy is distinct from operations

Businesses sometimes confuse strategic network studies – which primarily address questions like the configuration of locations or the distribution model – with more tactical inquiries, like the implementation of a milk run to a specific location. A milkrun is essentially a matter of tactical optimization rather than strategic network design.

Mixing strategic and tactical levels can cause organizations to lose track of the strategic decisions being made. It is important to recognize the advantages of a strategic model and decide if a different tool would be better suited to answer non-strategic questions. Avoid attempting to answer detailed questions with the same model used for broader, more general questions.

5. Compare apples with apples: as-is cost is not to be compared to modeled costs

In network design, it is essential to create a cost baseline when incorporating your current network reality into a cost model, and then compare the resulting baseline with target scenarios.

A common mistake is to compare as-is costs from financial reports (and not a modeled baseline) directly with the modeled future costs (to-be status). This approach is not suitable because the background calculation, effects and variables that make up as-is cost and modeled cost may vary to a certain extent.

To achieve reliable results, it is crucial to compare the desired future state (to-be) and the current state (as-is) using the same cost model. By doing this, you ensure that both scenarios are analyzed consistently, providing a fair basis for comparison.

Figure 4

Comparison between as-is cost and modeled cost

	As-is cost	Modeled cost
Basis for calculation	Includes indirect supply chain costs like inventory carrying costs, order processing costs, quality costs and more	Based on assumed transportation costs, production capacity and demand patterns
Present costs	Reflects actual costs incurred	Model of current costs which should closely match actual costs
Future costs	Cannot be determined	Model of future costs which help determine network design outcomes

6. Identify key levers in network design

When designing a network, especially a complex network, there are numerous variables that can be modified. However, it is essential to identify the top levers that will have the most significant impact on the network structure to achieve the identified objectives.

For example, if the goal is to optimize returns management, key levers could be the centralization or decentralization of returns management, the number and location of distribution centers or the inventory management strategy. Analyzing these key levers and their potential impact on the network enables informed decisions about the network's design.

By concentrating on key levers, it is possible to minimize the number of potential scenarios and maximize the value of the analysis.

4flow best practices

Focus on at most five key levers, as combining multiple effects in one scenario can make it even more challenging to accurately evaluate the impact of changes on the network structure.

4flow draws on over 20 years of experience working with leading global businesses in various industries to support you and identify key levers with the greatest impact on your network.

7. Maintain a flow of accurate, up-to-date and accessible data

Data-driven supply chain network optimization utilizes prescriptive analytics, mathematical programming and operations research to offer valuable insights for decision-making across strategic, tactical and operational levels within the supply chain. To accomplish this, businesses need to maintain a reliable flow of relevant, updated and accurate data.

In addition, the data should be easily accessible and available in a format that can be used by the network design team. This may require integration with other systems, data cleansing and data mapping.

4flow best practices

Different network design questions require different degrees of data granularity. For example, for a center-of-gravity analysis, only material flows (measured in tons, kilograms, pounds, or cubic feet) need to be considered, while warehouse allocation analysis requires article-level data.

Dedicated network design software can reduce your effort to map source data and perform data validation – and ultimately leads to quicker and more accurate results.

8. Consider nonquantifiable data, as well

Besides quantifiable information, qualitative data must be considered in the network optimization. Below are some examples.

Willingness to change

The degree of willingness to change varies among organizations, and this can impact the range of solutions that can be implemented. For instance, a business with a lower willingness to change may prioritize minimizing alterations over potential savings.

Supplier relationships

Consider the quality of relationships with suppliers. Strong partnerships can lead to better communication, flexibility, and collaboration, which are essential for addressing unexpected challenges.

Public relations and branding

For businesses with a prominent brand, public relations and branding are particularly crucial. Opening or closing a new facility, particularly a manufacturing site, can often attract media attention. Businesses should consider the public's response and the potential impact on their brand.

Local infrastructure and logistics

Evaluate the quality of local infrastructure, transportation networks, and logistical capabilities in different regions. Efficient transportation and distribution are essential for a well-functioning supply chain.

Risk

Global supply chains face risks such as political instability, port closures and long shipping distances between origins and destinations. Unexpected changes in demand also present a risk for supply chains relying on single-location production or operating at capacity.

Union versus non-union

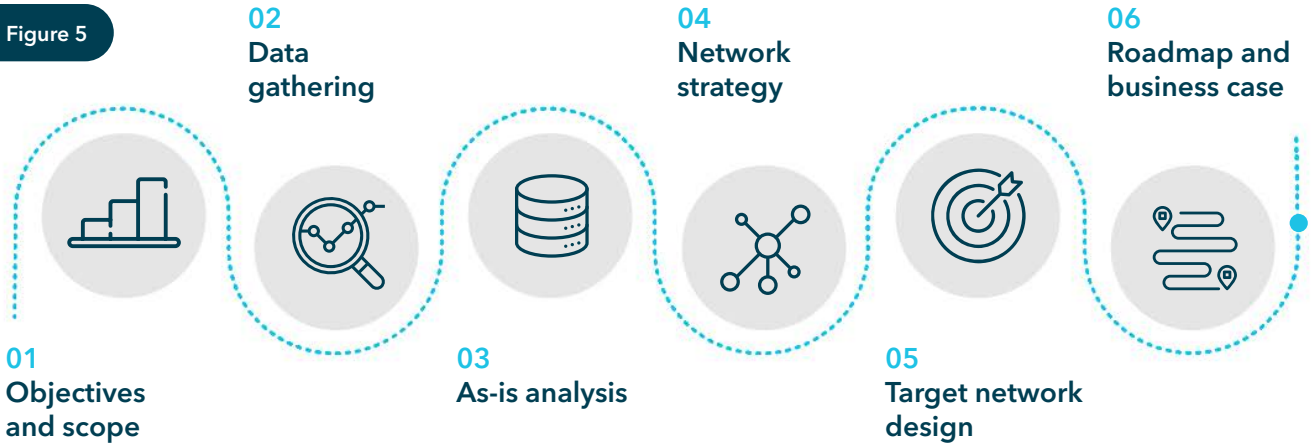
Some companies have strict policies regarding union membership or union contracts and want the chosen locations to align with those policies.

The six phases of network optimization, step by step

Now that you're familiar with the key guidelines and elements involved in network design optimization, you're ready to get started. In this chapter, we will explore the six key phases of strategic network design step by step, including objectives and scope, data gathering, as-is analysis, network strategy, target network design and roadmap and business case.

By following these key phases and leveraging the latest tools and techniques, businesses can develop a comprehensive strategy for the supply chain network that optimizes performance, reduces costs and delivers a competitive advantage in their industry.

Figure 5



Six-phase process of supply chain network optimization

Phase 1: Objectives and scope

The objectives and scope phase of strategic network design is critical to defining the goals of the project and determining the boundaries of the study.

Step 1: Define clear objectives

In alignment with the strategic guardrails discussed in the previous chapter, clear objectives for network design should be set. Objectives should define the desired outcome of the design process and future capabilities of the network. Common objectives might include but are not limited to cost reduction, improved service level or fewer carbon emissions.

Step 2: Identify the key levers of network design

The objectives determined in step 1 should be used to identify the key levers in the network design. These levers could be related to customer demand, cost optimization, product mix, service levels or other factors that impact the supply chain network.

For example, if your objective is to improve your customer service level, levers to be considered include reducing lead time, increasing inventory levels, implementing technology such as a warehouse management system (WMS) or transportation management system (TMS), improving customer demand forecasting and enhancing supplier performance.

Step 3: Clearly define the scope of the project

The project scope should include:

- The scope of the network: facility locations, transportation, inventory, supplier management, customer service level and risk management
- The products and services offered
- The geographic coverage of the network (e.g., global or just a specific region)

Phase 2: Data gathering

The data gathering phase involves the collection and analysis of data that is critical to the strategic network design process.

Step 1: Develop a theoretical data model

Before data can be collected, a theoretical data model (mentioned in the previous chapter) must be created to identify the required data and define how the pieces of data will be linked. This should happen in close alignment with the project's objectives.

This model should identify the relationships between data elements and ensure that the data collected is relevant and complete with regards to the objectives and scope of the project. This may involve reviewing existing data sources, as well as developing new sources where necessary.

Depending on the identified objectives and questions to be answered, a certain data granularity must be determined. For instance, if the question is about flow types, product-level data is unnecessary, which reduces the amount of data and the complexity in handling.

Step 2: Collect data

Once the theoretical data model has been developed, the next step is to collect and analyze the data required for the network design process. This may involve the collection of data from internal sources like a TMS and external sources, such as suppliers, customers and logistics service providers.

The collected data should then be cleansed and transformed into a format that is suitable for analysis. This may involve removing duplicate or irrelevant data, as well as converting data into a standard format that can easily be analyzed.

Figure 6

Data to be collected depends on the project goal

Location data
- Total number of locations
- Location type
- Name, address
- Restrictions

Material flow data
- Material master data
- Storage and material handling technology

Sales and demand data
- Representative sales sample for customer groups
- Sales plan per customer and product group
- Range of coverage
- Seasonality

Transportation data
- Logistics service provider (LSP) data
- Modes, equipment, service levels, lead times, Incoterms
- Origin-destination pairs

Cost data
- Location costs
- Inventory costs
- Cost tariffs, tour tariffs, matrix tariffs

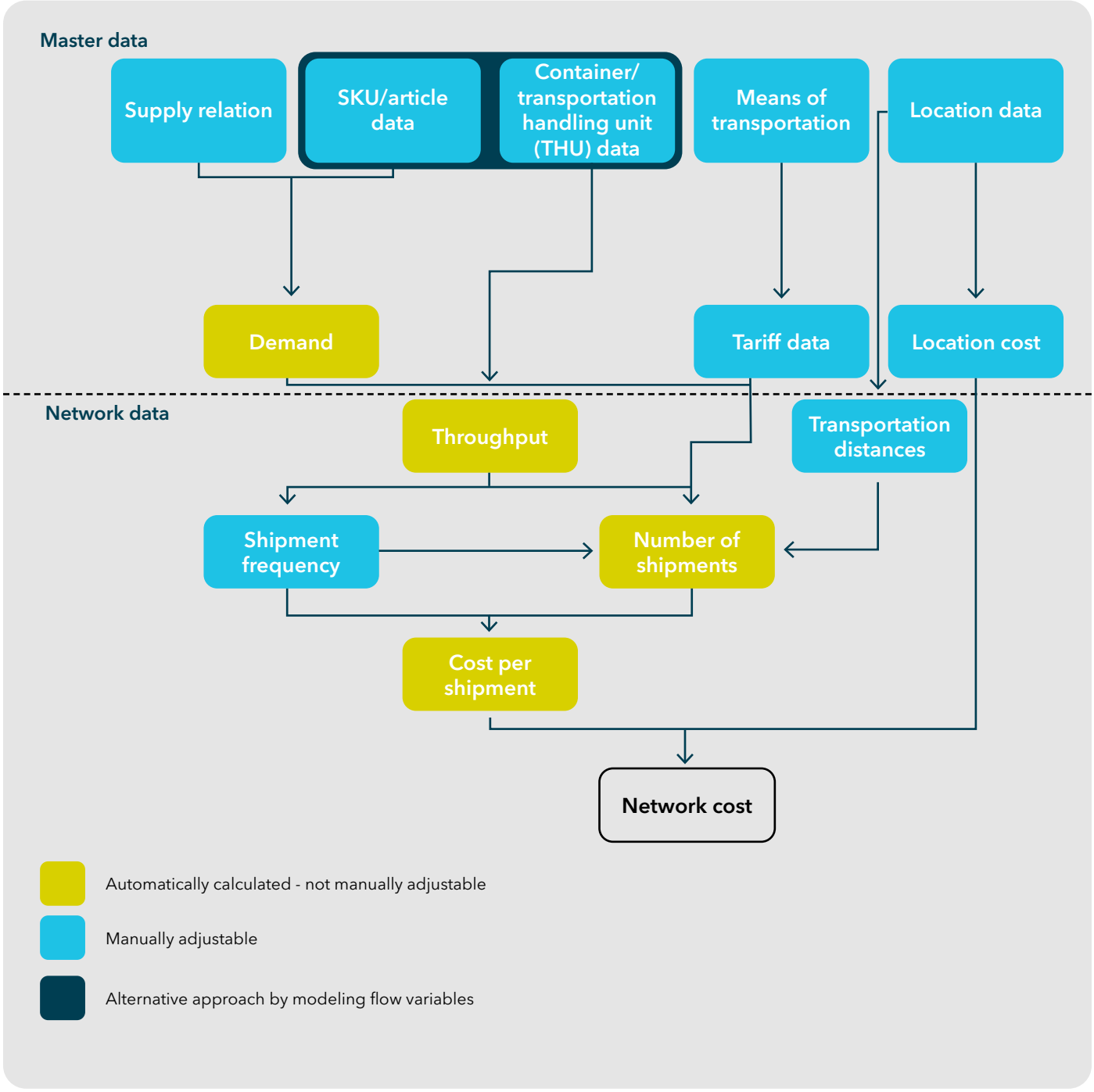
Inventory and empties data
- Stock level
- Safety stock
- Product groups
- Value

Step 3: Analyze the data
Data analysis requires a variety of tools and techniques. This may include statistical analysis, machine learning algorithms and other advanced analytical methods. The goal of data analysis is to identify patterns and trends in the data that can be used to inform the network design process.

By developing a theoretical data model and collecting and analyzing data in a systematic and structured way, organizations can ensure that their network design process is informed by accurate and relevant data.

Figure 7

Example of how network cost data is collected and analyzed by 4flow vista®, software for network design



Phase 3:
As-is analysis

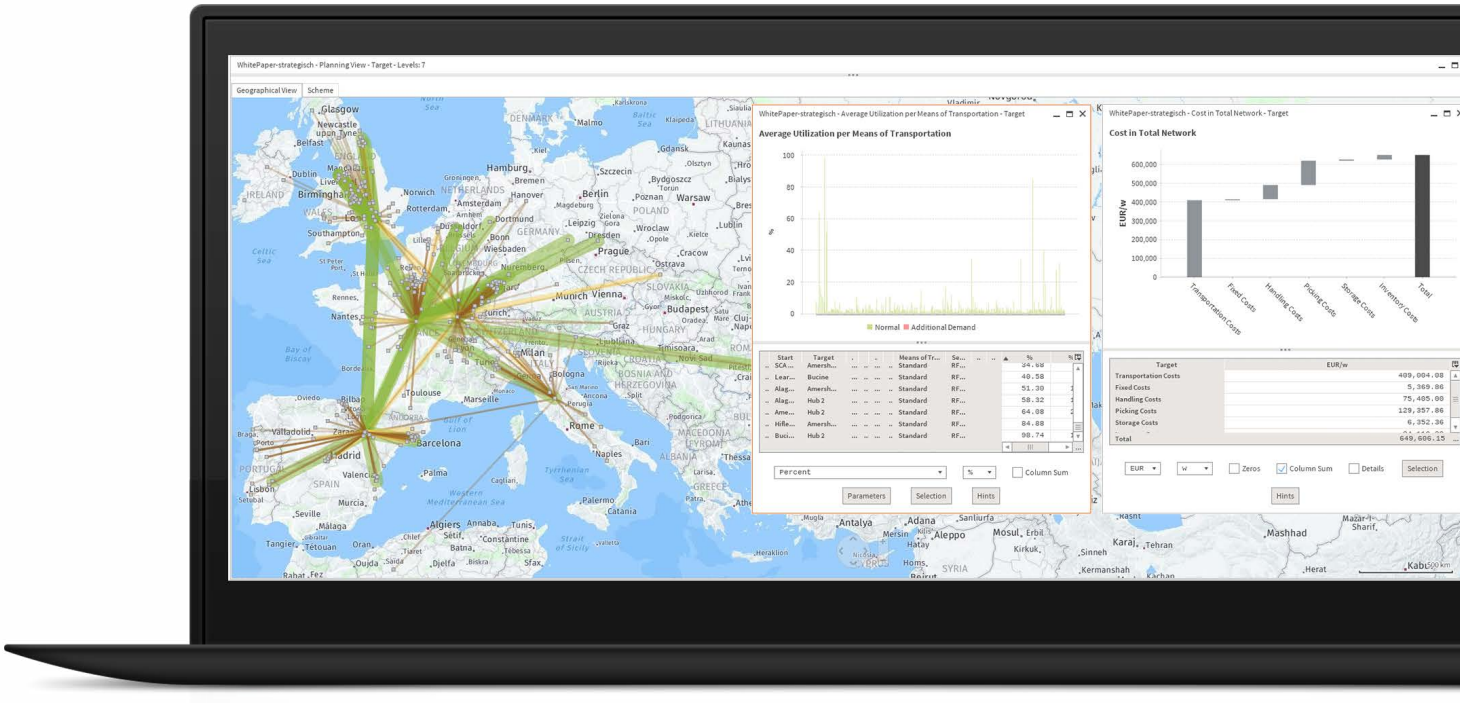
The baseline analysis phase involves a comprehensive assessment of the current network design to identify opportunities for improvement.

Step 1: Develop a baseline model
This model should include all relevant data that accurately reflects the current network design, including transportation, distribution and inventory data.

Step 2: Identify key performance metrics
The key performance metrics measure the effectiveness of the current network design. In addition to the common metrics discussed above, further metrics like total cost, lead times and inventory levels can also be considered based on the project goals.

Step 3: Identify improvement opportunities
Based on the analysis of the baseline model and key performance metrics, slow, unreliable or inefficient parts of the supply chain network can be identified. Examples could be low FTL (full truck load) utilization rates, long lead times, high transportation costs or excess inventory levels.

Figure 8



Low utilization of means of transportation can be identified in the network design software 4flow vista®

Phase 4:
Network strategy

The network strategy phase involves developing a strategic approach to the network design, which is aligned with the objectives and scope of the project.

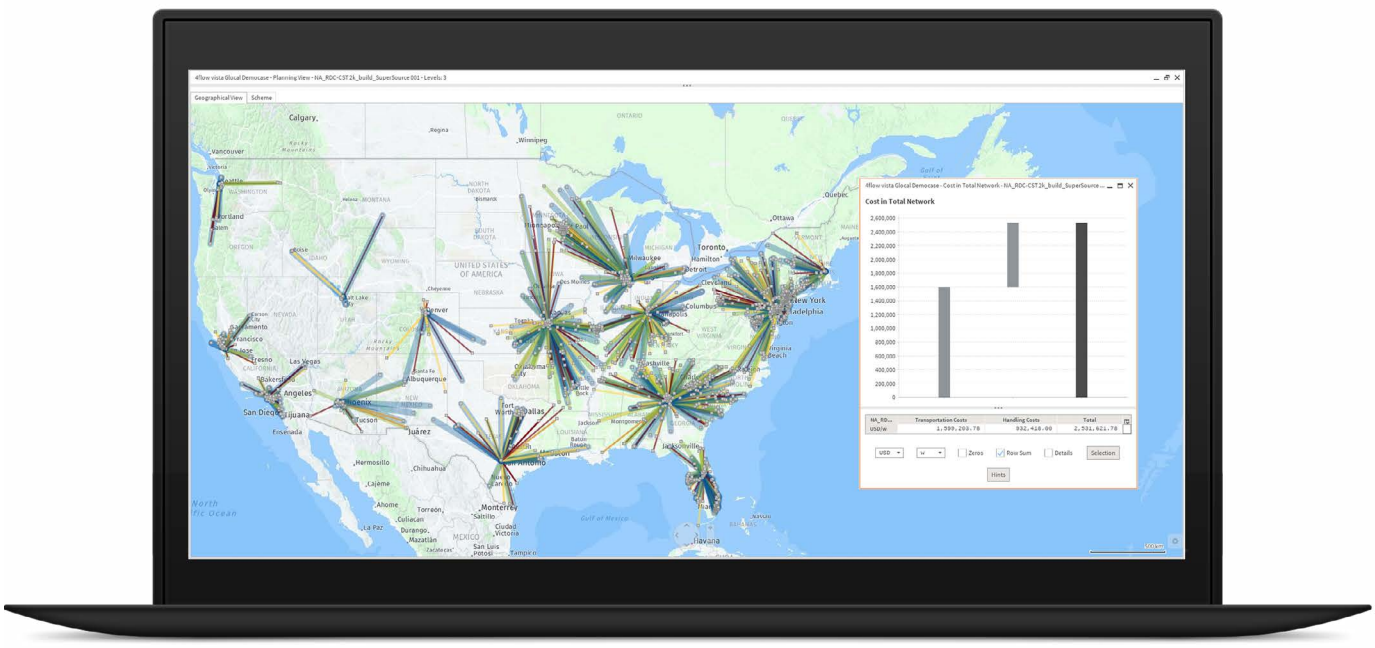
Step 1: Create network scenarios

Using the network design levers identified in phase 1, the next step is to create network scenarios. This involves developing a range of possible network configurations that consider different combinations of design levers. These scenarios should be evaluated quantitatively based on their ability to deliver the desired outcomes, as well as their feasibility and cost.

This quantitative analysis focuses on measuring and comparing scenarios based on numerical data and objective metrics like costs, service levels, lead times, throughput, utilization and inventory. Clearly negative scenarios can be eliminated, narrowing down the number of options to choose from.

By identifying network design levers and creating network scenarios, organizations can develop a strategic approach to the network design process. This approach helps ensure that the supply chain network is optimized to deliver the desired outcomes, while also considering the constraints and trade-offs involved in network design, as well as the organization's strategic objectives.

Figure 9



4flow vista® enables users to create and compare scenarios in terms of cost

Phase 5:
Target network design

This phase involves the development of a detailed network design based on the network scenarios. This includes defining specific network design elements, such as the number and location of facilities, transportation routes and inventory policies.

Step 1: Develop a detailed network design

Based on the network scenarios developed in phase 4, a detailed network design can be made for the selected scenario that achieves the project objectives. This may involve the use of modeling tools and network optimization models to determine the optimal configuration. The network design should consider a range of factors, including cost, service levels, lead times and capacity constraints (see discussion of metrics above).

Step 2: Evaluate the new design

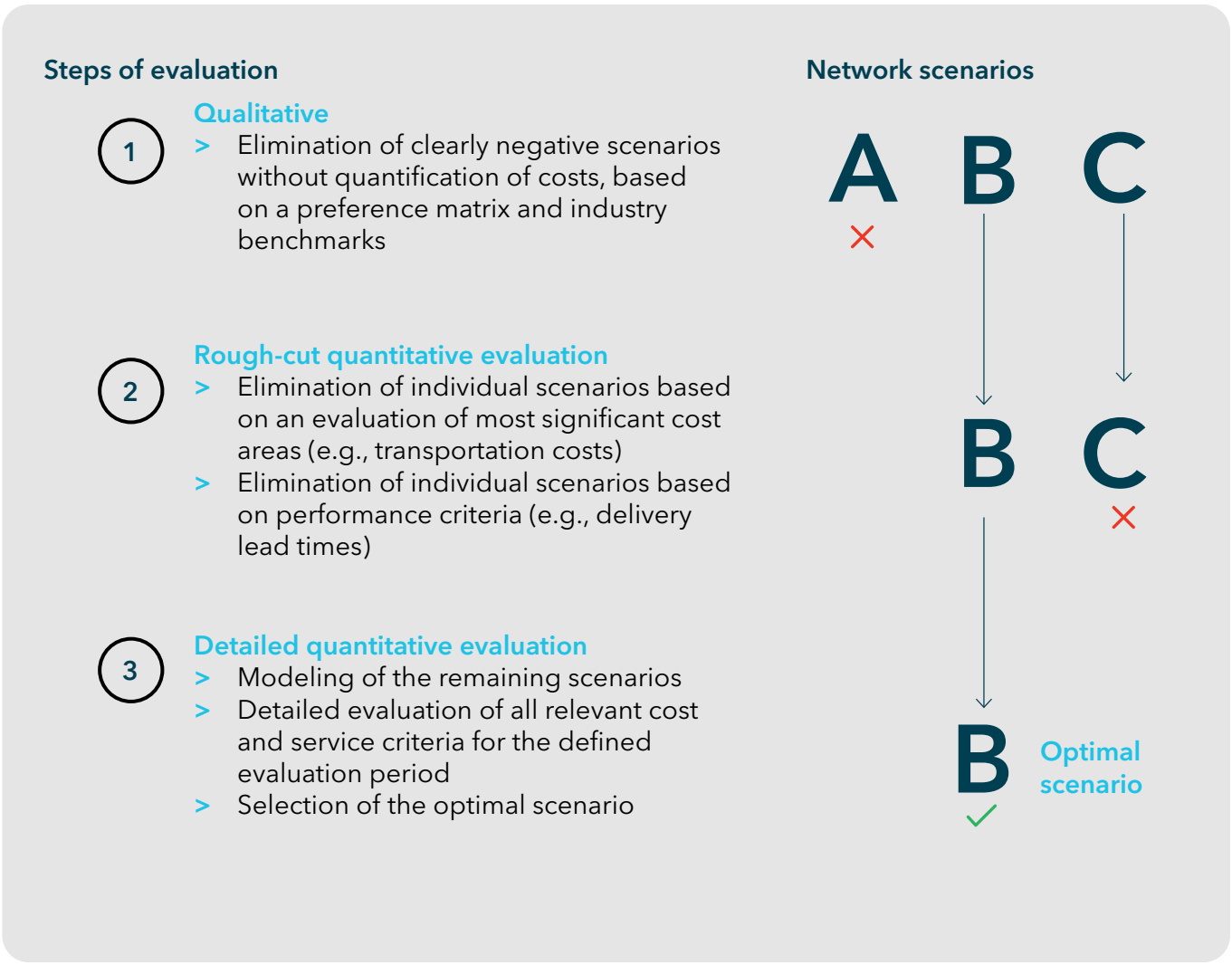
Using key performance metrics that have been identified in phase 3, evaluate the new design to ensure it meets the objectives and scope of the project. This includes a detailed analysis of the various network scenarios, including their potential costs, risks and benefits. The results of this analysis should be presented to the project team for their input and feedback.

Step 3: Refine the new design based on feedback from the project team

In this step, it is important to use qualitative scenario assessments in addition to the quantitative analysis from phase 4 to evaluate the new network design model. This involves a more subjective analysis of the various network scenarios and their potential impact on the business. Key considerations for qualitative scenario assessment may include factors such as risk, agility, scalability and customer service, all aligned with the organization's strategic objectives.

By utilizing both quantitative and qualitative analysis in the target network design phase, organizations can develop a more robust and comprehensive strategy for their supply chain network. This approach ensures that the new network design not only optimizes key performance metrics such as cost and service levels, but also takes into consideration other important elements such as risk and supply chain agility.

Figure 10



A step-by-step process to reduce the number of alternative network scenarios

4flow best practices

A dedicated network design tool like 4flow vista®, which uses optimization algorithms developed in-house, can automatically generate possible scenarios. It also makes the optimization trade-off for individual parameters and scenarios clear, so you can easily identify the optimal network structure.

Phase 6: Roadmap and business case

The roadmap and business case phase involves developing a detailed implementation plan for the chosen scenario and creating a business case for the new network design.

Step 1: Develop a detailed implementation plan
The plan should include a timeline and budget for the implementation of the new network design. It should also identify key stakeholders and their roles in the implementation process.

Step 2: Develop a business case
A business case includes the expected benefits and costs of the new network design over time. This should also include a risk assessment and a sensitivity analysis to ensure that the new network design is robust and resilient.

A sensitivity analysis is used to identify the robustness and stability of each scenario by understanding the impact of changes in assumptions, parameters or variables on the outcome of a scenario analysis. This can be done by systematically varying the key parameters (for instance cost rates, transportation rates, changes in target or source regions) within a range of suitable values to see which factors significantly affect the outcomes of the targeted scenarios. Ultimately, decision makers can understand the potential risks, uncertainties and limitations associated with different scenarios.

At the end of phase 6, the strategic supply chain network design optimization is nearly complete, but the whole process should not be terminated here. After implementing the new design, it is essential to monitor and continuously improve the design.

Supply chain network optimization – a continuous process

Optimizing network design is an ongoing process; the best possible result can only be achieved when supply chain performance is continuously monitored and adjusted over time, as market variables and demand are constantly changing. Continuous optimization may involve developing a set of key performance indicators (KPIs) included but not limited to those mentioned in phase 3 to measure the performance of the network. These can be used to regularly review and refine the network design.

Depending on the timeframe, resources and expertise available, supply chain network optimization can be carried out by either an in-house team with suitable and efficient tools or a consulting agency with a wealth of expertise and experience in your industry.

Extra tips and conclusion

The guidelines, recommended metrics and process phases presented in this e-book form a comprehensive guide to network design optimization. In this section, we've compiled some final tips to support your network optimization based on 4flow consultants' cross-industry expertise.

Use a holistic approach

Strategic network design should consider the entire supply chain from end to end, including suppliers, manufacturers, distributors and customers. This holistic approach will help identify opportunities for optimization and cost savings across the entire supply chain.

Consider multiple scenarios

Strategic network design should consider multiple scenarios to identify the optimal network design. This may involve developing and evaluating several network scenarios based on different assumptions and constraints.

Don't forget about capex

Capex is often forgotten in network design. As capex refers to investment, it should be considered from the beginning, just like implementation cost, to make sure the network design roadmap is financially feasible.

Involve stakeholders early on

Strategic network design should involve input from relevant stakeholders right from the beginning. For instance, for the outbound network, sales, logistics, finance and planning should all be involved. And for the inbound network, the procurement and supply management teams should not be overlooked.

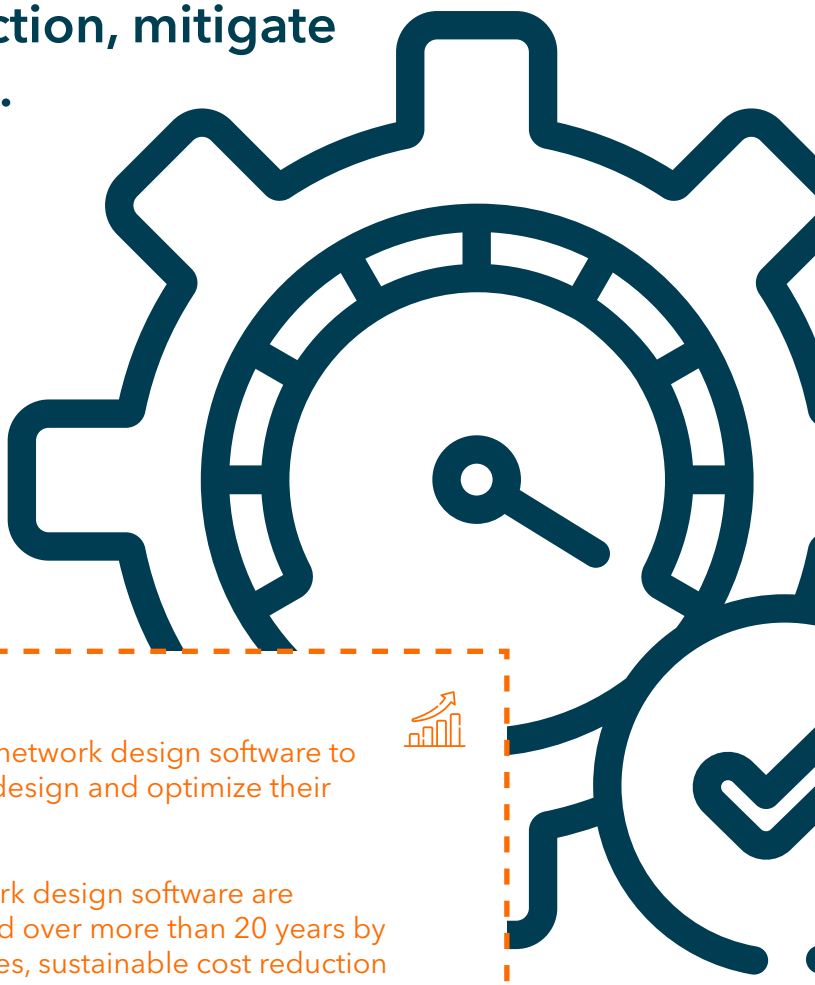
Involving stakeholders ensures that the new network design meets their needs and is aligned with the organization's overall strategy.

Consider the impact of technology

Manually optimizing supply chain networks, for instance with traditional Excel worksheets, may seem like a good way to save some operational budget. Often, it results in a more time- and resource-intensive process, which ultimately costs more. With the increasing complexity of networks and growing amounts of data, manual optimization might not be scalable to accommodate changes in the supply chain – and even if it is scalable, this approach can take longer and result in delays in decision making.

The use of automation and other digital technology can have a significant impact on the network design process. It helps increase accuracy, improve agility and save manual effort – and most importantly, it is scalable. Consider the potential impact of technology on network design and incorporate technology where appropriate.

Optimizing a supply chain network is often an iterative process involving significant amounts of data, resources and expertise. If businesses clearly identify the project goal, establish workflows and allocate appropriate resources (budget, capacity, tools) to the project, the outcome is worth the effort: businesses can stay competitive, reduce costs, improve customer satisfaction, mitigate risks and drive innovation.



Did you know?

4flow offers a range of modern and intuitive network design software to help users from different industries analyze, design and optimize their supply chain networks.

The optimization algorithms of 4flow's network design software are developed in-house and have been improved over more than 20 years by supply chain experts to enable faster run times, sustainable cost reduction and reliable improvement of transportation utilization.

Visit our website to get more information about 4flow's network design software.

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