

Designing a Global Manufacturing Network

Adapting to a new world in manufacturing and logistics



Authors



Bernd Schmidt, partner, Düsseldorf



René Heller, partner, Amsterdam
rene.heller@atkearney.com

Today's corporate networks have been slow to keep pace with global megatrends, resulting in a significant imbalance between manufacturing locations and the timely flow of goods. As more companies struggle with the complexities and risks inherent in their global networks, there is a way to overcome many of the uncertainties. Our approach provides compelling logic for global-network design—while charting a path to sustainable competitive advantage.

With economic globalization regaining strength, many companies are grappling with a significant imbalance in the flow of goods from supplier locations to manufacturing sites and sales regions (*see figure 1 on page 2*). Today, network structure is often determined by a legacy of sprawling site networks that emerged from growth and acquisitions and sales distribution shaped more by individual performance than strategic targeting of markets. And megatrends have dramatically changed the landscape over the past decade in many industries (*see sidebar: Megatrends and the Impact on Networks on page 4*).

Simply supplying global markets and sourcing from best-cost countries is no longer enough. Maintaining competitive advantage requires a thorough review of fundamental global production and value-chain networks, keeping in mind

certain questions that must be asked and answered: How do we ensure that our production network meets the long-term requirements of our corporate strategy? What are the key external drivers for defining network strategy, and how are they best monitored? How do we ascertain the performance of our current network compared to corporate objectives? How do we align the future plant network with our sourcing strategy, R&D footprint, and market needs?

Competing in the new world of manufacturing requires new network-design strategies. Such strategies, when aligned with the corporate strategy, provide insight into what drives competitive advantage in the value chain and identify external indicators that must be monitored while ensuring that investment decisions fit with long-term guidelines.

When configured appropriately, network strategies can reduce costs—overall costs fall by up to 20 percent through the optimal use of technologies, economies of scale, and the use of best-cost manufacturing sites. Also, materials sourced locally can reduce costs by 25 percent in certain categories.

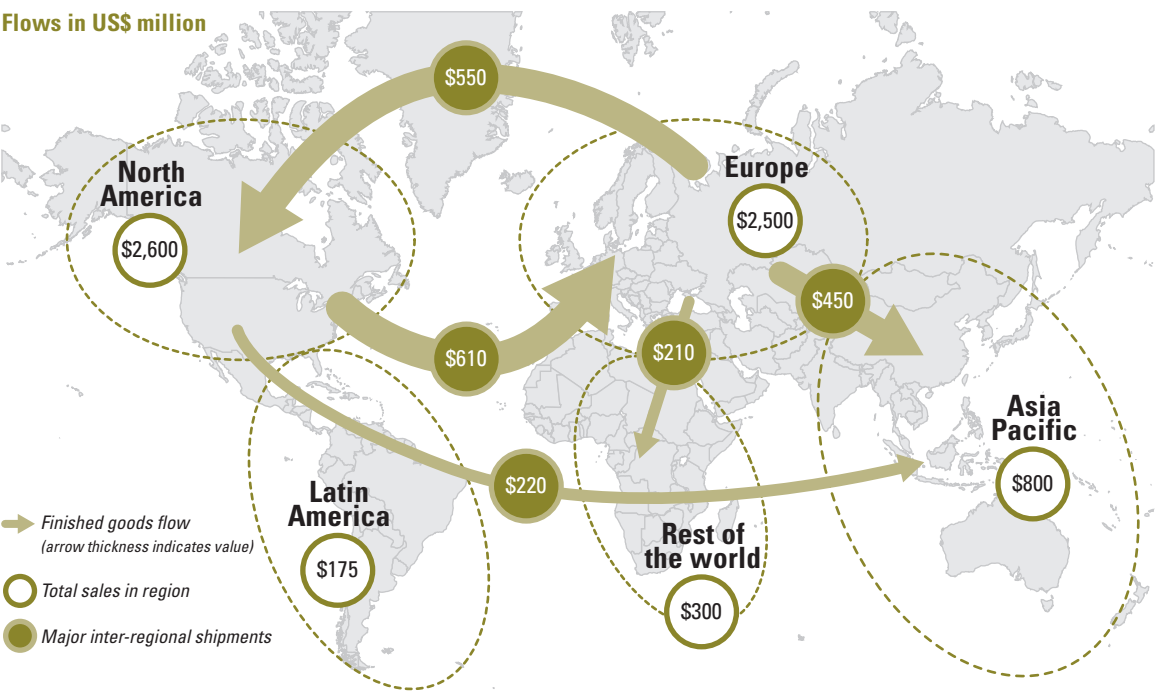
Network Redesign: Focus on Markets, Product Maturity

Production networks—whether for specific products or product groups—are configured from three types of plants. The lead plant is where new products are built and launched, and where new and improved production processes are developed. The server plant resides closer to customers,

serving regional or local markets to better meet market or customer requirements or to reduce transportation costs. The offshore plant is an extended workbench for the lead plant, securing efficient production at a lower cost. Several different types of plants are often co-located on one site.

Redesigning a network requires a clear understanding of how the current product portfolio is positioned in the market, customer requirements, and the maturity of products and processes. All operations strategies begin with the markets—a rule that’s often neglected in traditional approaches to footprint design. The network analysis should identify both the characteristics and constraints of the production network.

Figure 1
Imbalance of finished goods flows among regions



Note: Sanitized client example; only finished goods flows greater than US\$100 million are shown

Source: A.T. Kearney analysis

Figure 2 illustrates a market-product maturity matrix. In complex markets, manufacturing should be close to customers and R&D, while mature products and processes can be manufactured remote from a lead plant. Thus the appropriate network can be configured. But the question is how easily production can be moved to the best-cost locations.

Evaluating Network Scenarios

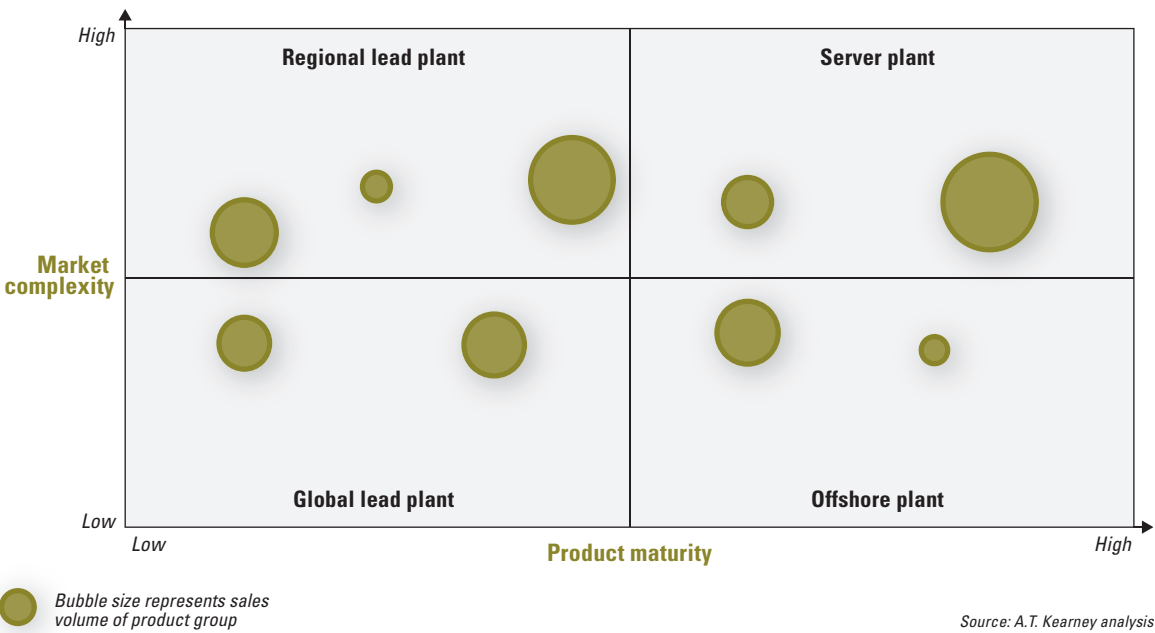
A.T. Kearney’s approach to network design brings together the perspectives of sales, logistics, manufacturing, sourcing, and macroeconomics to develop fully balanced strategies for global competition. We believe selecting the relevant scenarios for evaluation and applying rigorous business logic in defining them is much more important than choosing an evaluation tool or simulation engine. Our approach consists of the following:

Create a baseline. We begin by consolidating all required information on sales volumes, products, cost structures, headcounts, and logistic flows. It is a good idea to compile a fact book to document the operations baseline, strategic assumptions, technology and product road-maps, business plans, market research, and customer and competitor intelligence. This creates a common basis for use later in strategy discussions.

Develop corporate guidelines. Corporate guiding principles and constraints should be discussed in the early stages of every network-design initiative, both as a way to engage decision makers early in the process and to help everyone understand the internal dynamics and identify potential hot buttons. Examples of typical guiding principles include:

- Produce as close to market and customers as economically feasible

Figure 2
A market-product maturity matrix and preferred plant types



- Consider social responsibility and avoid layoffs wherever possible
 - Aim for small, agile units; plants should not exceed a certain number of employees
- Corporate guidelines serve to focus the analysis and weed out impractical scenarios.

Develop network scenarios. Next is developing potential network scenarios. This process helps in delegating elements of the analysis to experts and determining which scenarios are

appropriate—and which are not. Our approach focuses on five areas:

Market. Analyze market complexity versus product maturity for all important product groups to determine the relevant local, regional, or global strategy irrespective of factor costs.

Evaluate costs: factor versus transport. Evaluate factor-cost advantages against transport costs. This helps to group products into those suitable for global production and those requiring

Megatrends and the Impact on Networks

Knowing today’s global megatrends and predicting tomorrow’s is an essential element of designing a global network. Before calculating scenarios, we always get agreement on major economic parameters and their projection over the evaluation horizon. There could be strong economic constraints from tariffs or local content requirements in specific

countries that must be taken into account.¹ Consider today’s trends: The big new industrial players from emerging economies are growing quickly—both in size and competence—and competing effectively in all markets. The 10-year power shift in the truck and bus industry is indicative of this trend (*see figure*).

The global shift in buying power, largely to the BRIC nations (Brazil, Russia, India, and China), means that these countries represent a larger portion of total global demand for investments, and for consumer and luxury goods. The demand for best-cost source locations is encouraging more than a few supplier industries to form in emerging economies. The availability of technical talent is always worth chasing—and the faster growth of such talent in emerging countries than in traditional industrial ones constitutes a megatrend. And continuing consolidation, also the result of new industrial giants from emerging economies (ArcelorMittal, Tata, Huawei, and Vale are typical examples), is changing the global power base and decision structures.

These and other trends are having a significant impact on manufacturing networks worldwide.

Figure: Emerging market players are taking on the old guard

Top 10 truck and bus manufacturers
(by production units in thousands)

1998		
Company	Units	Country
1 DaimlerChrysler	315	DE
2 Volvo	157	SE
3 Navistar	129	US
4 General Motors	116	US
5 Dongfeng	103	CN
6 FAW	96	CN
7 Paccar	92	US
8 Ford	88	US
9 Fiat	79	IT
10 Tata	58	IN

2009		
Company	Units	Country
1 Daimler	240	DE
2 Dongfeng	205	CN
3 FAW	187	CN
4 Toyota	184	JP
5 Tata	132	IN
6 CNHTC	121	CN
7 Volvo	101	SE
8 Beijing	94	CN
9 Isuzu	93	JP
10 MAN	97	DE

 Emerging market players

Source: worldsteel.org; IHS Automotive; A.T. Kearney analysis

¹ See A.T. Kearney’s Global Business Policy Council at www.atkearney.com for information on megatrends and business risk.

A prerequisite for setting up manufacturing operations in a variety of regions is to understand the availability, risk, and complexity of local supply.

local manufacturing, and to determine sensitivity to labor-cost differences.

Gauge critical mass. Understanding critical mass and scale effects in key manufacturing technologies provides the basis for defining competitive technologies, required volumes for a regional site, and deciding on a make-or-buy strategy.

Determine local supply globally. A prerequisite for setting up manufacturing operations in a variety of regions is to understand the availability, risk, and complexity of local supply. The cost advantages of local sourcing may reach the same magnitude as the factor-cost advantages for manufacturing. Knowing the implications of localizing bills-of-material and processes is essential to developing network scenarios.

Chart a master plan. Lastly, it is time to test each potential scenario against the agreed-upon design principles and create a master plan. This, along with a filter screen of qualitative criteria (such as the stability of certain regions and availability of personnel), reduces the number of possible scenarios to evaluate. The right scenario-modeling approach you use depends entirely on your company's unique situation and requirements. We typically evaluate scenarios based on recurring cost effects, differentiated by main drivers such as tariffs, taxes, labor, transport, and capital costs. Scenarios are then validated by a sensitivity analysis.

As global trends shift the business focus from one strategy and market to the next,

in hopes of capitalizing on new opportunities, maintaining competitive advantage has become an increasingly complex endeavor. A well-designed global network can offer some much-needed order to this new world of manufacturing. Following are three A.T. Kearney case studies that illustrate the results achieved when manufacturing networks are truly global.

Case Study 1: Building a True Global Leader

Our recent work for a company in the automation solutions sector provides insights into how a well-designed global network can support global sales growth. This family-owned global company is a showcase for the highly successful German Mittelstand (small- and medium-sized) companies. With annual sales of \$2.15 billion, the company boasts a strong brand, a history of profitable growth, and recognition as a technology leader. Our goal was to help create an operations infrastructure capable of doubling sales (balancing sales in all industrial markets) within seven years—providing a springboard for the company to become a true global player.

Challenge

The firm's past growth had been entirely organic, with smaller manufacturing sites in Eastern Europe, the Americas, India, China, and Singapore. While half of future sales were projected to be outside of Western Europe, more than 80 percent of manufacturing was still located in Germany.

The company's current network could hamper its ability to realize a future strategy. Our focus was on redesigning the network, specifically helping the company to:

- Manage growth in operations while maintaining quality and service levels
- Improve its cost position to increase market share against strong Asian competitors
- Build up the required competencies and manufacturing capacities in the regions
- Avoid disrupting the key German sites

Approach

A joint A.T. Kearney-client team went to work. We analyzed market requirements throughout the company's value chain to determine the correct balance between factor-cost advantages and transport costs, to quantify scale advantages, and to understand the capabilities of regional supply bases. From the analysis, we developed different network scenarios—using simulations to calculate costs, headcount, and logistics—over several years. After gauging strategic fit, implementation feasibility, and risks, we crafted an implementation roadmap to the company's future network.

Results

Following the four-month project, we delivered the following:

- New insights into the company's competitive strategy and future value-chain design
- Agreed-upon network guidelines, mission statements, and competence-development needs for each site
- A footprint design to support future sales and 15 percent reduction in conversion costs
- Implementation roadmap and longer-term timelines for relocations
- Human resource strategy to avoid layoffs at the German sites

Case Study 2: Redesigning a Manufacturing and Logistics Network

This global manufacturer of automotive and industrial consumables saw an increase in consolidation and acquisitions. As a result, the firm built an extensive European network of 20 plants and more than 100 distribution centers.

Challenge

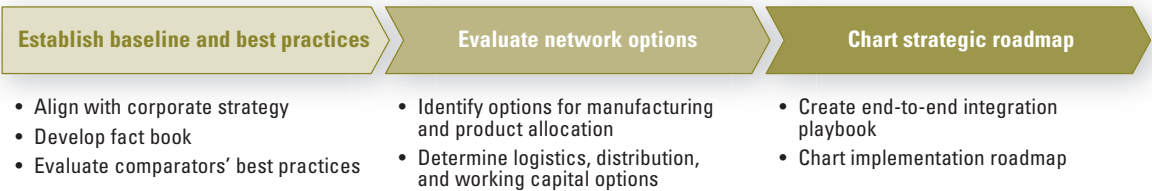
The company was struggling to understand real end-to-end value-chain costs, so that it could design a network that could efficiently support its strategic objectives. Market outlooks and product strategies suggested growth patterns in the near future would vary, which created excess capacity at some sites and shortages at others. Eastern European markets were growing twice as fast as Western ones, for example, but with a substantially different product mix requiring various transportation and distribution needs. To ensure the new supply-chain configuration was "future-proofed" and aligned with the business strategy, we helped the company define its future manufacturing and distribution network, and create a plan to implement it.

Approach

We developed a tailored, three-step approach (*see figure 3*):

1. In a series of workshops, we helped company executives identify key strategic inputs, baseline costs, and volumes. A fact book was created to collect baseline information and a review of external best practices helped stimulate ideas for developing future scenarios.
2. We jointly prepared and reviewed in detail a number of future network options, focusing separately on manufacturing, logistics, and working capital:
 - Identified manufacturing scenarios by defining the future role of each plant based on

Figure 3
 Path to a “future-proofed” manufacturing and distribution network



Source: A.T. Kearney analysis

- product-allocation decisions, project pipelines, and outsourcing options
 - Divided logistics opportunities by geographical clusters (such as Iberia, the United Kingdom, Balkans, and Central Europe) and focused on reducing the distance traveled by products in each cluster
 - Determined inventory reduction potential by evaluating the consolidation of slow-moving products into fewer distribution centers to reduce demand variability and, therefore, stock
3. Using quantitative and qualitative metrics and considering key interdependencies with other initiatives—such as implementing an enterprise resource planning (ERP) system—we jointly integrated the manufacturing and logistics options, identifying likely end-to-end scenarios and the resulting implementation roadmap

Results

Ultimately, our client identified an optimal network design and a structured, three-year implementation roadmap that would deliver substantial cash and working-capital benefits resulting from:

- The rationalization and consolidation of three manufacturing facilities, including the re-insourcing of volumes from a third party and the re-allocation of products to more appropriate sites

- A smaller warehousing footprint and optimized cross-border material flow within central Europe
- A velocity-differentiated supply chain yielding 20 percent reduction of finished-products inventory

Case Study 3: The Fragmented Conglomerate

A global manufacturer of precision instruments—recently formed in a carve-out transaction—was highly fragmented, with 50 sites in 40 countries and several partially completed merger integrations. Its strong market position was under threat from two competitors, both more efficient and centralized than this manufacturer.

The company called on A.T. Kearney for help in developing a more integrated organization, changing the corporate culture, and in the process improving efficiency. Our main focus was on revamping the company’s manufacturing and sourcing processes and establishing a global program management office (PMO) to coordinate the work and projects of all other consulting firms on the scene.

Challenge

Fragmentation was a major issue for this manufacturer. Having failed to properly integrate several acquisitions, processes across manufacturing operations were inconsistent and misaligned. The

company was suffering from poor performance and rapidly losing its hard-won scale advantages.

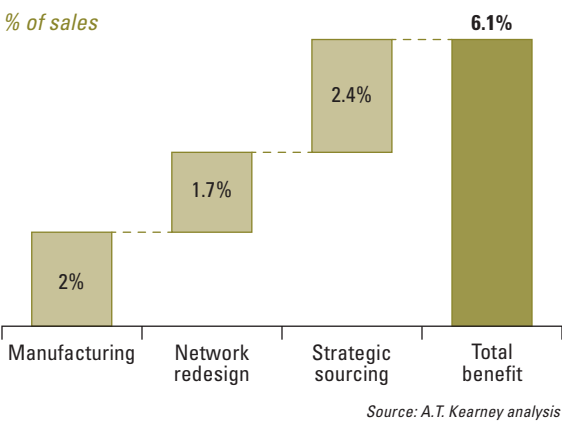
Approach

First on our agenda was to complete the merger integrations, which would be essential to delivering efficiency improvements. Company managers were asked to sponsor and lead the project teams; in this way, we obtained senior management commitment to more than 90 percent of the expected financial gains.

To address the costly fragmentation, operational excellence initiatives were launched in the seven largest sites in Europe and the United States, identifying savings, defining action plans, and helping local teams implement changes.

Our analysis of the company’s structure concluded that a redesign of its manufacturing footprint would deliver cost savings—from bundling redundant activities into core sites, and closing sites below critical size, to sending some manufacturing activities to lower-cost countries. Strategic sourcing was used to protect product quality and reduce costs, and to increase transparency into spending and purchase prices across the global company. Figure 4 represents savings in three areas as a percentage of sales.

Figure 4
Savings achieved in three areas



Results

This business transformation not only allowed the company to double its profits, but also permitted the board to execute an initial public offering (IPO). The results of the various initiatives included:

- Reduced costs by 20 percent through operational excellence programs
- Delivered 10 percent in annual cost savings by redesigning the manufacturing footprint
- Reduced cost of materials by 10 percent via more sophisticated negotiating techniques

A.T. Kearney is a global team of forward-thinking, collaborative partners that delivers immediate, meaningful results and long-term transformative advantage to clients. Since 1926, we have been trusted advisors on CEO-agenda issues to the world's leading organizations across all major industries and sectors. A.T. Kearney's offices are located in major business centers in 38 countries.

AMERICAS	Atlanta Calgary Chicago Dallas Detroit Houston Mexico City New York San Francisco São Paulo Toronto Washington, D.C.
ASIA PACIFIC	Bangkok Beijing Hong Kong Jakarta Kuala Lumpur Melbourne Mumbai New Delhi Seoul Shanghai Singapore Sydney Tokyo
EUROPE	Amsterdam Berlin Brussels Bucharest Copenhagen Düsseldorf Frankfurt Helsinki Istanbul Kiev Lisbon Ljubljana London Madrid Milan Moscow Munich Oslo Paris Prague Rome Stockholm Stuttgart Vienna Warsaw Zurich
MIDDLE EAST & AFRICA	Abu Dhabi Dubai Johannesburg Manama Riyadh

For information on obtaining additional copies, permission to reprint or translate this work, and all other correspondence, please email: insight@atkearney.com.



www.atkearney.com

