Strategic Network Design

Production and logistics network optimization for sustainable value creation
Driven by the ever changing market conditions in today’s volatile world, companies face a continuous need to review their existing supply chain configuration while aligning it with the overall business strategy. As strategic supply chain network design represents a key lever of how companies can derive significant value from their supply chain, it is often found on the Top Management agenda requiring a holistic view and alignment between different functional lines such as Controlling, Marketing, Sales, Purchasing and Production.

1. Value of network design

If applied successfully, strategic network design can improve company’s financial performance (EBIT) in three basic areas:

**Increased revenue**
Higher customer service and lower time-to-market for products can be achieved by reduced lead times throughout the supply chain. In particular, supply chains of innovative products with high product margins may profit from having the right products at the right location and time.

**Reduced cost**
Supply chain costs are reduced as network design sets the conditions for ensuring operational efficiency of virtually all supply chain-related functions and processes – sourcing, production, distribution and inventory as well as duty and taxes. It helps companies achieve a higher return on assets by optimizing capital-intensive investments that are typically of a highly irreversible nature or defers major investments by providing feasible options of how additional demand can be met with existing resources.

**Improved flexibility**
A successful network design reduces the supply chain’s exposure to supply and demand risks and sets the precondition for responding to changes in the business environment to enable future growth. Supply chains can be re-engineered to be both more economically robust and more environmentally efficient.
These are just a few examples that came up in the press recently showing that strategic production and logistics network decisions are not predefined in terms of geographical direction, product scope and timing – depending on their particular motives, companies may move to East or West transforming an entire business or just changing the production location of a single component and moving to a certain region for the first time or re-discovers it.

Companies should consider reviewing their existing production and distribution networks whenever major changes in the environment occur. This may be caused by overlapping networks resulting from M&A activities, a customer shift determined by new markets or change in the customer expectations in terms of price, service quality and response time. Strategic restructuring and downsizing targets may also raise the question from where exactly could cost reductions most reasonably come. A major change in key planning parameters such as product margins, raw material prices, duties and taxes as well as local content regulations shall trigger companies to bring their current networks under the microscope to find out whether they still make sense under the new market conditions.

A green-field optimization approach shall be undertaken whenever a company starts a new business, enters a major new market or launches completely new product lines. In these cases, a new supply chain will be designed in accordance with the strategic business goals.

Figure 1: Drivers for Strategic Network Design

<table>
<thead>
<tr>
<th>Business drivers</th>
<th>Type of network design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mergers and acquisitions</td>
<td>Redesign of existing supply chain</td>
</tr>
<tr>
<td>Customers shift</td>
<td></td>
</tr>
<tr>
<td>Restructuring and downsizing</td>
<td>Design of new supply chain</td>
</tr>
<tr>
<td>Major change of key parameters</td>
<td></td>
</tr>
<tr>
<td>(margins, raw material prices, duties, etc.)</td>
<td></td>
</tr>
<tr>
<td>Readiness for eCommerce</td>
<td></td>
</tr>
<tr>
<td>New market entry</td>
<td></td>
</tr>
<tr>
<td>Launch of new product lines</td>
<td></td>
</tr>
</tbody>
</table>

1 Financial Times, October 7, 2013
2 Reuters, October 14, 2013
3 Handelsblatt, July 24, 2013
4 Bloomberg News, October 1, 2013
Capgemini Consulting applies a five-step approach to optimize a production and distribution network. The project duration strongly depends on the existing network complexity. Following figure summarizes how we approach the network design problems.

**Baselining:** In order to set the foundation of the network analysis, the business environment is examined and the scope of optimization is defined in the first step. Business decision makers are faced the challenge to balance different trade-offs against conflicting goals and constraints. What type of supply chain do we need – cost efficient or rather flexible and responsive? Is outsourcing of specific operations an option? What value adding services are required? Understanding the objectives, constraints and the scope of optimization is an essential step in approaching supply chain network design because getting the basics right is crucial for calculating business case.

**Network optimization:** After defining the overall business goals and constraints, the correct level of input data for the optimization is defined and the current network consisting of all relevant demand and supply flows is modeled. Besides quantitative factors that influence the long-term network design, qualitative aspects such as political attractiveness, infrastructure, workforce availability and skills shall be considered as well. The production and distribution network is then optimized according to the defined objectives and considering all relevant constraints while disregarding options already classified as infeasible.

**Application of optimization technology:** Often relying on the simplified spreadsheet analysis, instinct and intuition, business decision makers hope to come up with the right set of trade-offs. But in today’s volatile world, is it safe? Is it enough? Today’s business analytical and optimization capabilities allow us to combine intuition and business sense with sound, quantitatively proven results. Depending on network complexity we apply state-of-the-art optimization tools (e.g. ILOG, LogicNet Plus, VBA Programming) to develop an optimization model to resolve our clients’ network design problems.

**What-if-Analysis:** After coming up with the first optimized solution, we compare the results with the baseline structure to establish relative attractiveness. Define and evaluate feasible scenarios to test the robustness of solution.

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**Figure 2: Our generic approach**

- **Baseline**
  - Agree on exact project scope
  - Confirm level of modelling detail required
  - Define constraints and business goals
  - Collect and validate data
  - Conduct focus interviews

- **Network optimization**
  - Model baseline network structure
  - Perform network optimization using latest professional tools

- **What-if-Analysis**
  - Compare optimization results with the baseline to establish relative attractiveness
  - Define and evaluate feasible scenarios to test the robustness of solution

- **Business Case**
  - Develop business case for recommendation
  - Support and guide through decision making process
  - Agree on final implementation

- **Implementation**
  - Implementation and budget plan
  - Local negotiations
  - Project management
  - Ready for investment implementation

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Holistic business case: According to the significance to our client, the optimization scenarios are evaluated based on profits, costs and practical feasibility. We do not neglect cultural aspects at all times as they often play a bigger role than expected. Considering this sensitive topic however may be crucial for the success of the project. Together with the client we come up with the final recommendation which is considered to be both financially attractive and practically feasible. Depending on the specific client request, this may be a change in the distribution strategy, a new product-plant allocation, the establishment or rationalization of production and distribution locations or outsourcing of specific operations.

Implementation: We know very well that even the best strategy is obsolete without really applying it in the real life. Therefore, we not only define the future status but also show clients the way how to get there by elaborating a feasible implementation and budget plan. Leading negotiations with suppliers, service providers or public authorities and managing the transformation project in time and budget ensures that the results of the design phase are rigorously accomplished.
An international leading supplier of automotive engine parts in Central Europe wanted to optimize the outbound logistics network taking into account all countries in Europe, Middle East, North Africa and Russia. Besides some local distribution centers in Germany, Italy and Spain, the major network hub was located in Netherlands and already run close to its maximum capacity. Thus, our customer needed to build up additional capacity to maintain service levels. Optimization targeted material flows of 450kt or around EUR 5200m in sales annually.

A strong demand shift towards Eastern Europe and Russia was expected for the years to come. The client was further concerned that service level requirements for the emerging markets are about to increase sharply and the current network model will not be able to deliver accordingly. The sales and sourcing footprint analysis supported this hypothesis and together with cost structure information on transportation, inventory, warehousing and assembly for the countries in scope provided the first indications for possibly favorable future network models. Based on the initial analyses, we developed 12 scenarios of future network models and discussed these with the management team. Supported by our scenario assessment methodology, covering logistics costs and performance criteria as well as local economic indicators such as labor availability, political stability etc., we identified 3 most favorable scenarios for the deep-dive analysis.

![Figure 4: Geographical scope, main network KPIs and process scope](image)

- **Geographical scope**
- **Content scope**
  - The network design for the European, Russian, Middle East and North Africa distribution for aftermarket will be analysed and optimised
  - The following supply chain processes and related costs will be considered
    - Inbound transportation to distribution centre
    - Warehouse operations
    - Outbound transportation from distribution centre to customers

> All European deliveries including Russia and MENA are in focus and future business in Middle East

![Figure 5: Focus interview results](image)

<table>
<thead>
<tr>
<th>Perceived as-is logistics network performance</th>
<th>Disagree</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material flows are structured efficiently</td>
<td>31</td>
<td>38</td>
</tr>
<tr>
<td>Locations &amp; dimensioning of warehouses ensure optimal fulfilment of customer demand</td>
<td>33</td>
<td>10</td>
</tr>
<tr>
<td>Our inventories are transparent across our logistics network</td>
<td>59</td>
<td>0</td>
</tr>
<tr>
<td>We are often able to confirm customer’s desired delivery dates</td>
<td>33</td>
<td>7</td>
</tr>
<tr>
<td>For important product groups, a reliable forecast is available that allows a further planning</td>
<td>31</td>
<td>17</td>
</tr>
</tbody>
</table>

**Perceived to-be market requirements**

- **Trend 1: Service Levels**
  - "...In future we will see a demand for more sophisticated service levels also in EE..."
  - "...get back on service levels we used to have..."
- **Trend 2: Competition**
  - "...we are not able to serve that (EE) market as competitors are used to..."
  - "...we need state of the art service as business gets more competitive..."
- **Trend 3: Differentiation**
  - "...EE needs different products as the fleets are different..."

**Legend:** Fully disagree = -3 Fully agree = +3 Category average = Average of all 24 categories = 13 IQ interview participants, May 2011

* Cumulated figures; one figure contains all answers related to the stated category

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The deep-dive analysis encompassed the development of a detailed business case showing the implications to the client’s P&L lines, its logistics performance as well as sensitivity analyses to test the robustness of each scenario. A full scale distribution center (covering the full product portfolio) in Hungary out to be the most favorable solution. However, as the projected demand shift bears some uncertainty, our final proposal was to subsequently ramp up operations in Hungary with selected product groups and to potentially manage risks together with a third party logistics provider as well as gain experience in the market context. After all, the proposed network optimization delivered cost reductions of around 8% p.a., reduced the lead time to emerging Eastern European markets from 1 week to 1-3 days (depending on the country), reduced the transport costs paid by our client’s customers by around 20% and most importantly enabled our client to establish its position in the fast growing Eastern European market.

**Figure 6: Final recommendation**

<table>
<thead>
<tr>
<th>Timeline</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario H – All Products from both locations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Two DCs/PCs (EE + Western Europe)
- DC/PC in Netherlands, esp. to serve Western Europe and NA with all non ISP
- DC/PC in Hungary, esp. to serve Eastern Europe and ME

- ISP served from Hungary: 100%
- Assembly in Hungary: 100%

| Scenario M – All Engine Parts from Hungary |

- Two DCs/PCs (EE + Western Europe)
- DC/PC in Netherlands to serve WE and NA with all non ISP
- DC/PC in Hungary, esp. to serve EE and ME with engine and sealing

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5. Our offering

Capgemini Consulting’s offering in strategic network design goes beyond just determining the lowest-cost location to open a new plant or logistics location. We help companies in a variety of strategic questions associated with their supply chain networks and provide valuable insights in the following areas:

**Manufacturing Network Design**
Determine the best number, location, and capacity of plants and production lines and technology to maximize asset utilization, minimize total cost, and align capacity with business growth projections.

**Sourcing Strategy**
Determine which products should be processed at which plants and which products should be sourced externally (make-or-buy decisions) in a multi-plant environment.

**Distribution Network Design**
Determine the optimum number, location, and size of distribution facilities to meet customer service requirements at a minimum cost.

**Target Costing**
Determine the target costs for third party logistics service providers or external suppliers in an integrated network.

**Distribution Service Territory**
Determine the best service territory for each Distribution Center (DC) to improve service levels and reduce costs (centralization vs. decentralization).

**Tax Efficient Supply Chains**
Identify the right network configuration in a geographically distributed value creation processes with different tax and customs regulations considering all these aspects.

**Scenario Based Planning**
Understand how unexpected events could affect costs, service levels, and potential revenues by conducting different what-if-analyses and develop plans to mitigate these risks.

Apart from giving answers to each of these specific problems, we help companies solve their entire supply puzzle by giving them an end-to-end view and creating a holistic understanding. As each of the identified improvement areas may have different time horizons, we create a self funded improvement program based on sound quantitative facts and adjusted with cultural, political and practical aspects.
Capgemini Consulting has proven its capabilities in many projects across all relevant industries. Our collaborative approach ensures a tailored solution by considering our clients’ individual needs and wishes. Not only being proficient in latest modeling and optimization techniques, but also adding qualitative and cultural aspects to our work, we develop solutions that prove easier for clients to follow, accept and implement. Our core capabilities also include profound expertise in neighboring areas like building shared-service centers and global supply chain control towers to achieve end-to-end visibility. With Business Transformation as part of our DNA, we always look for a sustainable concept leading to sustainable results.

Figure 7: Capgemini Consulting’s unique selling proposition

- Experienced team
- Global presence
- Satisfied clients
- Business & modeling skills
- Client involvement
- CC’s USPs
- Comprehensive database
- Proven toolbox
- We are able to offer local experts for all target regions around the globe (esp. Eastern Europe)
- Our consultants combine business knowledge, strategic analyses skills as well as manufacturing and logistics know-how with the ability to leverage latest optimization technologies
- Scenario development tailored to our client’s needs, location assessments down to final investment decision, awareness of critical decision criteria; these are only some elements of our proven toolbox
- We don’t pull out standard solutions but create tailored results together with our clients

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Capgemini Consulting is the global strategy and transformation consulting organization of the Capgemini Group, specializing in advising and supporting enterprises in significant transformation, from innovative strategy to execution and with an unstinting focus on results. With the new digital economy creating significant disruptions and opportunities, the global team of over 3,000 talented individuals work with leading companies and governments to master Digital Transformation, drawing on their understanding of the digital economy and leadership in business transformation and organizational change.

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About Capgemini

With more than 190,000 people, Capgemini is present in over 40 countries and celebrates its 50th Anniversary year in 2017. A global leader in consulting, technology and outsourcing services, the Group reported 2016 global revenues of EUR 12.5 billion. Together with its clients, Capgemini creates and delivers business, technology and digital solutions that fit their needs, enabling them to achieve innovation and competitiveness. A deeply multicultural organization, Capgemini has developed its own way of working, the Collaborative Business Experience™, and draws on Rightshore®, its worldwide delivery model.

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