

➤ Supply Chain Innovation

An International Business Approach

MAUK WILBERS



Supply Chain Innovation

Second Edition

Mauk Wilbers



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Preface and acknowledgements

Written in down-to-earth language and from a business perspective, this book starts with an apt quotation from the Roman philosopher Seneca: ‘Our plans fail, because they don’t have a purpose. If you don’t know which harbor to sail to, *no* wind is the right one.’ The message for businesses, governments, schools and universities is that they cannot do without a vision that is reflected in values, a core purpose and the right strategy.

However, the book does not want to be an academic treatise on theories and science, nor an encyclopedia of storage systems and warehouse racks. Instead, it deals with real-life scenarios and best practices to illustrate how businesses can live up to their corporate and social responsibility of serving people, planet and profit by optimizing and innovating their supply chains.

The chapters follow the main processes of the SCOR model: plan, source, make, deliver and return. The final chapter looks at the future and more specifically, at innovation in the supply chain. Although written from a global perspective, the author tries to do justice in the examples and case studies to the fact that Germany and the Netherlands are leading countries, taking the first two positions in the Logistics Performance Index (LPI) ranking of the World Bank in 2014.

This second edition has been completely revised to include the latest developments. Each chapter starts with learning objectives, to help students focus on the key concepts which are also illustrated in the text by a large number of examples and cases. At the end of each chapter, study questions allow students to test their knowledge, whereas a comprehensive case study helps them tackle real-life supply chain challenges of companies such as Zalando, Coffeelovers and VDL Nedcar. Readers can download PowerPoint presentations to each chapter, as well as the answers to the study questions and case studies via the AcademicX portal.

I would like to thank my colleagues Adriana van Cruysen, Gaby Gijsberts, Eefje Willems-Cuijpers, Karel Thomas and Ger Schuivens for their comments on the book’s first edition. Special thanks go to my colleague Victor Verboeket and to Paul Gijsberts for their substantive advice, to Job Bos for the graphic design and to Kees Wielemaker and Paul Post for their publishing expertise and advice.

Readers are warmly invited to send feedback and suggestions to mauk.wilbers@zuyd.nl.

Mauk Wilbers
February 2015

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Chapter 1 Supply chain strategy

Learning objectives

- What is the importance of a mission statement as a compass for the strategy and operations and how can businesses develop their strategy pyramid?
- How can organization models contribute to understanding management issues?
- What is supply chain management?
- What is supply chain strategy?
- In what way does supply chain structure follow supply chain strategy?
- What are the drivers behind outcome-driven and blended supply chains?
- How can the rise of e-fulfillment and outsourcing to fulfillment service providers be explained?
- What is the key to optimization of the e-fulfillment supply chain?

1.1 The helicopter view: from mission to results

The necessity of having a mission and a goal is of all times. The Ancient Greeks used the word **telos** for goal and teleology for being focused on achieving a goal.

The Roman writer and philosopher Seneca spoke the famous words: 'Our plans fail because they don't have a purpose. If you don't know which harbor to sail to, no wind is the right one.'

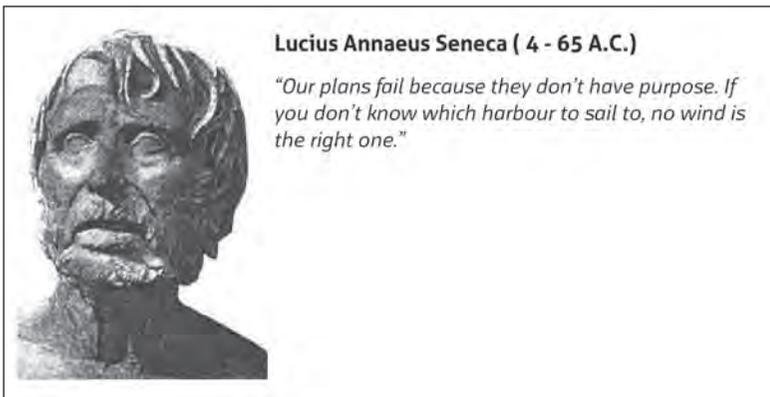


Figure 1.1 *Lucius Annaeus Seneca (c. 4 BC – AD 65)*

Unlike the Dutch language, where only the word 'doelstellingen' in combination with the adjectives short, medium and long-term can be used to indicate different types of goals, the Anglo-American language has a richer vocabulary. The words aim, purpose, goal and objective each have a specific and unique meaning.

If one distinguishes the planning levels in an organization, the mission level could be seen as the superordinate level. Planning on this level begins with formulating the core values and beliefs of the company. It covers a very long time span of maybe 5 to 10 or even 20 or more years.

The *telos* in this case is called **aim** or **purpose**. The aim or purpose of an organization or company reflects the core activities and **raison d' être** or reason for being of it.

When it comes to less distant goals, companies – until about 20 years ago – used to have three levels of planning and goals: strategic, tactical and operational. As Peter Drucker then wrote, there were two developments that caused a change in this:

- Emancipation and democratization
- Digitalization and the internet

Organizations became flatter because of a smaller power and knowledge distance, which led to less hierarchy. At the same time, digitalization and the widespread use of computers put pressure on the tactical middle-management level. Direct communication through the use of computers between the strategic and the operational levels made the tactical level redundant in many companies and organizations.

As a result of this, many organizations have reorganized and removed their tactical middle-management levels. Thus the hierarchy of planning changed from the traditional three levels of strategic, tactical and operational into the planning hierarchy as shown in table 1.

Table 1.1 *Hierarchy of planning*

Level	Type of Goal	Time Horizon
Mission or superordinate goals	Aim or purpose	5 to 20 years
Strategic	Goal	2 to 5 years
Operational	Objective	< 1 year

Applied to the area of logistics, for a transportation or parcel delivery company, the hierarchy of planning could be formulated as follows:

Table 1.2

<p>Mission level: Aim, purpose</p> <ul style="list-style-type: none"> ■ Providing customers with innovative and customized transportation solutions
<p>Strategic level: Goals</p> <ul style="list-style-type: none"> ■ Being the largest logistics provider in Europe in 2 to 3 years
<p>Operational level: Objectives</p> <ul style="list-style-type: none"> ■ 2,000,000 deliveries by air transportation in Europe by the 31 December ■ Guaranteed delivery all over Europe within 24 hours by 1 July

Supply chain strategies and logistics are integrated parts of the corporate planning systems. Starting at the superordinate mission level with the determination of values and beliefs and a core purpose. Subsequently, deduced from the vision and mission, the planning gets to the strategic level, where the mission is translated into strategic goals. Next, operational plans or strategies are made for all functions or departments within the company: marketing and sales, purchasing, manufacturing, human resources and supply chain management.

For example, the Supply Chain Operations Reference or SCOR model defines the ‘plan’ phase as the start of the operations ‘source’, ‘make’, ‘deliver’, ‘return’.

Besides the SCOR model, lots of other existing models contribute to the ability to steer and lead companies effectively. They can help entrepreneurs and managers get a clear vision or helicopter view of their business and provide a structured approach to the planning process and the planning and control cycle.

This way, companies can be led in a responsible way in compliance with the demands of customers, stakeholders and the society at large.

Case 1.1 Nespresso

A recent example of a successful supply chain is Nespresso. The company won the 2012 logistic award for best Web Shop of the Year. The jury praised Nespresso for having the ‘customer at the wheel’, for the sustainable return logistics and for having a supply chain that’s even sexier than George Clooney.

The success started with vision and a mission statement ‘People first, policies later’, that reflects the core values of Nespresso: ‘people first’, ‘quality’ and ‘sustainability’.

It was this mission statement, that generated the energy and motivation and gave the sense of direction and necessary strategies to accomplish the great results that eventually led to the award.

Nespresso’s supply chain success can be summarized by their AAA Sustainable Quality program, the picking of a few important strategic partners, one of which being an NGO, Rainforest Alliance and last but not least, collaboration and communication by phone, video conference, email and even face-to-face meetings in coffee producers’ countries. This way a collaborative supplier ‘network’ was built, that outperforms a buyer-centric ‘mission control’ supply chain.

Nespresso and other firms who start a web shop and change from ‘brick and mortar’ to ‘bricks and clicks’ make it obvious that a radical change in the corporate strategy will have serious implications for the supply chain strategy. Most likely, these companies will eventually have a completely new e-fulfillment supply chain next to the existing one. The decision on the mission level of Nespresso, reflected in the values ‘people first’ and ‘sustainability’, also strongly influences the desired outcome of the corporate and supply chain strategy.

Another new development that has substantially changed supply chain policies is collaboration. Whereas in the past, the business area of logistics and operations management was viewed as the moving of boxes and transportation, it is now clear to the business and academic worlds that there is a need to adopt a more integrated view of the different logistics-related operations in order to take into account how they interrelate and interact with each other. The logic of logistics has to be extended upstream to suppliers and downstream to final customers. This is the change that by Harrison and Van Hoek is strikingly called ‘From boxes to brains’. Partnership and collaboration have led to the modern concept of supply chain management.

Traditional models of business organization were based upon the notion that the interests of individual companies were best served by maximizing their revenues and minimizing their costs. If these goals were achieved by disadvantaging another entity in the chain, then that was inevitable. Getting the biggest piece of the pie was the objective.

Now, companies in excellent and truly global supply chains, through coordinating the supply chain and in close collaboration with suppliers and customers, are trying to bake a bigger pie. The goal is no longer to maximize own profits at the expense of other stakeholders, but to get a fair share of the pie. Which will be a bigger piece than the biggest piece of the smaller pie, baked in the self-centered traditional supply chain.

Time, cost and quality remain the critical success factors, but now inventory is minimized, time frames are compressed and bottlenecks and quality problems are eliminated in a joint effort of collaboration and cooperation throughout the supply chain.

It goes without saying that supply chain management lays a big claim on the abilities and skills within the focal firm and its partners in the supply chain. Having a helicopter view on the supply chain and the position of the company and its partners in it is an essential prerequisite for being successful.

1.2 Organization models

In most organization or management models one can find the same areas that require attention and are of interest everywhere and under every condition. These are: strategy, structure, culture, people, resources and results. These areas are also referred to as the management or design variables of an organization.

The focus of the models can be quite different. In this chapter the 7S model and the Knowledge Management model will be discussed, because these models contribute to the mission and strategy level of corporate decision making. The SCOR model will be dealt with in chapter 3, because its importance lies in operations and process management.

In the 7S model of Peters and Waterman, the organization is described from the perspective of abstract organizational variables: shared value, strategy, structure, systems, staff, style and skills. The same goes for the Knowledge Management model, which describes 6 abilities each organization must develop. The Balanced Scorecard concentrates on 4 result areas: customer satisfaction, financial results, business processes and learning and innovation. People, Planet, Profit brings a new perspective by putting emphasis on social responsibility and the environment.

The second category of organization models focuses on quality. This category will be discussed in chapter 3. The purpose of the ISO 9000 standard is to improve process control and the assurance of the quality level. ISO 9000 uses the planning and control cycle Plan-Do-Check-Act (PDCA), based on the problem-solving circle of Deming. In table 1.3, an overview of the most important reference models for organizations and their building blocks is shown. Quality assurance and continuous improvement are the foundation for the EFQM and INK model.

The European EFQM (European Foundation for Quality Management) excellence model defines enablers and results. In The Netherlands, the EFQM model is known as the INK model where INK stands for Instituut Nederlandse Kwaliteit. The United States (Baldrige Award) and Japan (Deming Prize) have similar models to determine which company deserves to get the annual award for being the best company in terms of quality and performance excellence.

Table 1.3 Organization models and building blocks for a blend

7S	Shared value, Strategy, Structure, Systems, Staff, Style, Skills
EFQM	Policy and strategy, Processes, People, Leadership, Resources, Performance results, Customer satisfaction, Society and Environment
ISO 9000, 14000, 26000	Plan, Do, Check, Act, Processes, Environment, Corporate social responsibility
Balanced scorecard	Business process, Customer, Finance, Innovation and learning, Planning and control
Knowledge management	Anticipate, Respond, Produce, Learn, Create, Last
People, planet, profit	People, Planet, Profit, Sustainability, Corporate social responsibility, Full cost accounting
SCOR	Plan, Source, Make, Deliver, Return

Finally, the SCOR model is specifically applicable to processes in logistics and supply chain management. It describes the main 5 processes in this area: plan, source, make, deliver and return.

1.2.1 Building blocks

The building blocks of the basic management models can be described as follows:

Strategy deals with the objectives of the organization (mission and vision) and with the method used by the organization to attain these (strategy and policy). Basically, finding the balance between the desired external results and the existing internal possibilities is what is important. A good strategy therefore, makes provisions for both the outside of an organization (what do we want to achieve) and the inside of an organization (which structure, culture, people and resources do we need to achieve the required results).

Structure is related to the organization and the process structure. Basically, it deals with the issue of how business activities are organized and which tasks, competences and responsibilities employees have. This area requires special attention to the so-called processes. The INK/EFQM model highlights the importance of.

Culture how people interact. Essentially, culture is about the basic values of the organization. The leadership INK/EFQM area is related to the behavior side of leaders. This also applies to management style and shared values, as used in the 7S model of Peters and Waterman.

People relates to managing competencies (knowledge and skills). Two approaches are practiced: developing and safeguarding knowledge and skills of an organization, and the personal career development of the employee himself or herself.

Resources involve the broad range of 'other' resources. That is: financial management (money), information management (ICT), facility management (accommodation, materials, secretarial services, security and catering) and communication management.

The **results** part is not present in all reference models, but it is in Balanced Scorecard, EFQM, Baldrige Award etc. The rating is determined in relation to the four most important groups of stakeholders and the supply chain as a whole: employees, customers and suppliers, the focal

firm in the context of society, environment (CSR, people, planet) and end results (financial and operational results, profit).

1.2.2 The Knowledge management model (Abilities Model)

Without knowledge, no business can survive. Companies, or even departments or business units can create value for their customers and for themselves by gaining and retaining knowledge that is unique.

Following the footsteps of Nonaka and Taguchi, who are considered to be the founding fathers of modern Knowledge Management, Tissen, Andriessen and Lekanne Deprez developed a model to identify and describe the abilities necessary to create value-added knowledge management in companies and organizations. This model states that an organization should possess six basic capabilities: ability to anticipate, respond, produce, learn, create and last. The relaunch of VDL Nedcar is enabled by knowledge and the ability to produce, as will become obvious in the end-of-chapter case study of chapter 5.

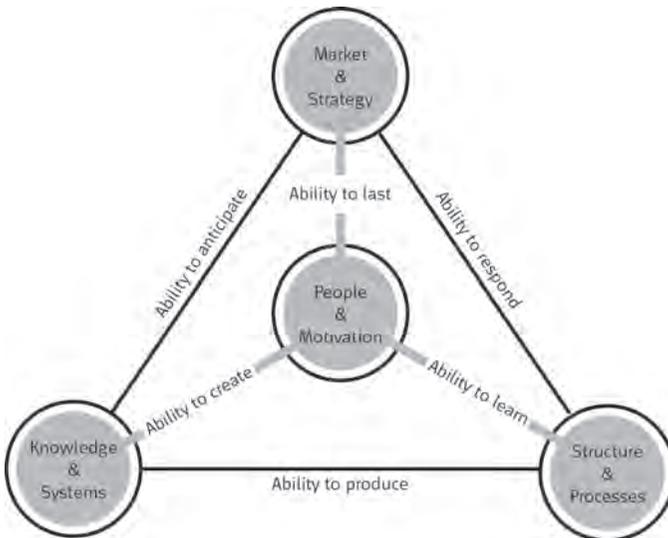


Figure 1.2 The value-added knowledge management model (Tissen, Andriessen, Lekanne Deprez)

1. **The ability to anticipate.** The ability to anticipate between 'Market & Strategy' and 'Knowledge & Systems' presumes that information and knowledge systems must be kept up-to-date to enable the company to spot market trends, and what is more, to really anticipate and stay ahead of the global change curve.
2. **The ability to produce.** Producing goods and services requires proper structures, systems and processes.' (Tissen 1998:36) A company should strive to deliver a product to a customer in the most efficient and effective way possible. This implies (re)engineering of business processes and the use of state-of-the-art information technology.
3. **The ability to learn.** Employees should learn from their own experiences, their customers, competitors and colleagues through sharing ideas, experiences and 'tacit knowledge'.

4. **The ability to create.** Developing new knowledge – innovation – is vital for every organization. Creating new knowledge will help every company to pursue continuity. Whereas in the past, the Research & Development departments would take care of this, nowadays it is everyone's responsibility. This ability is vital when it comes to applying an innovative strategy, such as *Blue Ocean Strategy*.
5. **The ability to respond.** The organization must respond quickly to market changes and business opportunities and adapt its design to a changing environment.
6. **The ability to last.** This ability deals with the importance of human resources management and motivated knowledge workers.

1.2.3 The 7S Model

In the 7S model of Peters and Waterman, the organization is described from the perspective of abstract organizational variables: shared value, strategy, structure, systems, staff, style and skills. The 7S model was developed by Richard Pascale, Tom Peters and Robert Waterman and first described in their 1982 worldwide best seller 'In Search of Excellence'. The 7S model can help organizations to improve performance, examine effects of future changes, align departments and processes and determine how to implement a strategy. As the most popular management book it sold 3 million copies in its first four years. While most models of organizational effectiveness go in and out of fashion, the 7S framework has persisted.

Peters and Waterman examined 43 successful companies on the criteria of asset growth, equity growth, return on total capital, return on equity, return on sales and market value and found eight themes to be responsible for their success:

1. A bias for action. 'Do it, try it, fix it'.
2. Close to the customer. Successful companies learn from the people they serve.
3. Autonomy and entrepreneurship. Fostering leader and innovators.
4. Productivity through people. Treating people as the root source of quality and productivity. Respect for the individual.
5. Hands-on, value-driven. Management-by-walking-around, showing commitment.
6. Stick to the knitting. Never manage a business you don't know.
7. Simple form, lean staff. Keep structures as simple as possible with lean top-level staff.
8. Simultaneous loose-tight properties. Combination of autonomy in shop-floor activities and centralized values.

The success of the 7S framework can be explained by the use of research on the functions of the right and left hemispheres of the human brain.

Where the holistic, imaginative right half helps us to visualize things, the logical and rational left half enables us to verbalize it. The alignment of the 7 elements of the model requires both right and left half abilities of the human brain, leading to a balanced analysis of the effectiveness of companies.

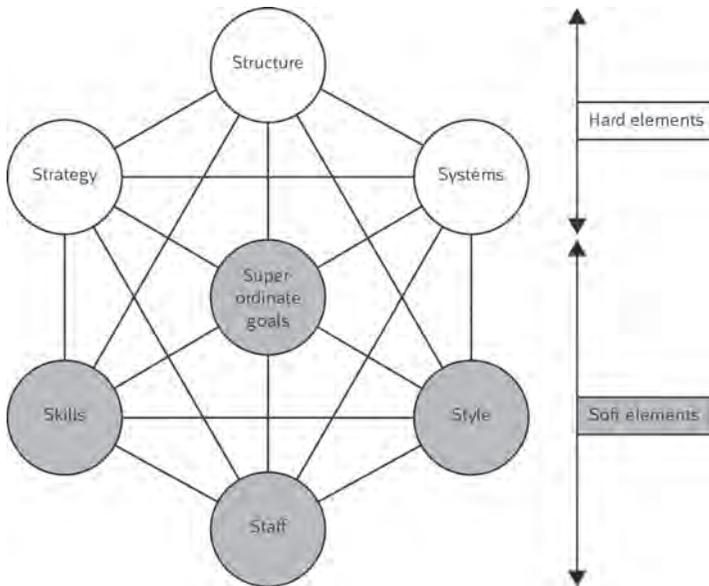


Figure 1.3 7S model (Peters and Waterman)

The 7S model involves seven interdependent factors that are categorized as either ‘hard’ or ‘soft’ elements. Hard elements are easier to define or identify and management can directly influence them. These are: strategy statements; organization charts and reporting lines; and formal processes and IT systems.

Soft elements, on the other hand, can be more difficult to describe, and are less tangible and more influenced by culture. However, these soft elements are as important as the hard elements if the organization is going to be successful. Whatever the type of change – restructuring, new processes, organizational merger, new systems, change of leadership, and so on – the model can be used to understand how the organizational elements are interrelated.

The alignment check starts with **Shared values**, also called superordinate goals, which reflect the vision and mission of the company. They represent the core purpose or ‘raison d’être’ and the values of the company that are evidenced in the corporate culture and the general work ethics. Their position in the middle of the model emphasizes that these values are central to the development of all the other critical elements. As the values change, so do all the other elements. A company with values that are strong and consistent with the structure, strategy, and systems, will have a head start compared to companies with weak or no values at all. In the next section of this chapter, a very useful 4-step tool of Collins and Porras for articulating the vision of a company into a mission statement will be described. Alfred Chandlers’ adagium ‘Structure follows strategy’ makes **strategy** the first hard element to inspect before looking at the structure. Thirdly there will be a need for an appropriate **structure** to achieve the strategic goals, in other words organizational resources have to be brought into place. Is it going to be a hierarchical, tall structure with many management layers and regulations to determine who reports to whom and centralized decision making? Or will there be a need for a flat, more democratized structure with decentralized decision making? How is work divided over the company, team and individual employees? How do the various departments coordinate activities? What assets does

the company need, such as buildings, cars and trucks? Or will it be a virtual organization with hardly any physical belongings, apart from computers, internet and a network?

Systems, the third hard 's', are required to support the daily activities and procedures that staff members engage in to get their job done. Quality systems, information systems, financial and human resources systems as well as physical systems, such as production, logistics, distribution and (e-) fulfillment systems.

Do the soft elements style, staff and skills support the desired hard elements? **Style** means style of leadership and has a tremendous impact on all aspects of a business. Leading from the front and putting your money where your mouth is, being involved and practicing management-by-walking-around and a participative hands-on leadership style will enhance motivation of employees.

Staff deals with the employees and their general capabilities. Which competencies, positions and specializations need to be represented within the team?
Are there gaps in required competencies?

Skills encompass the actual skills and competencies of the employees working for the company. Current employees need to have the ability to do the job. Are there any skills gaps? Are skills monitored and assessed?

In adjusting and aligning the soft elements with the hard elements, an iterative process of making adjustments, is needed.

1.3 Turning vision into a mission statement in 4 steps

Jim Collins and Jerry Porras wrote their best seller 'Built to Last: Successful Habits of Visionary Companies' in 1994. The book is an investigation into the development of some of the most successful corporations. Collins and Porras focus their research towards 18 'visionary' companies. Collins and Porras, like Peters and Waterman, also wanted to know what makes exceptional companies different from the other companies. They put the emphasis on timeless management principles instead of trends and innovations such as employee empowerment and shared values.

During a six-year research process, they 'unlearned' much of what they had learned with large corporations' successes. Their research questioned assumptions that previously were believed to hold truth:

- A great idea is needed to start companies
- Visionary organizations need charismatic leaders
- Maximizing profits is the dominant goal with visionary companies
- Visionary companies focus on beating competitors
- Hiring outsiders as CEOs is the best way to spark an organization

Some of the core beliefs Porras and Collins discuss include preserving a core ideology, the Big Hairy Audacious Goals (BHAG) concept, owning a cult-like culture, trying new things, rejecting the idea of a ‘great idea’ to start a company, and consistent innovation. Preserving a core ideology with core values and a core purpose allows companies to stay in tune with competition through the constant evolution of products and services.

The BHAG philosophy encourages leaders to conduct paradigm shifts with their products by constantly launching missions and reinventing the company by creating new products.

Philosophies described include constant innovation and embracing evolution. Innovation allows companies to keep products and services updated to be ahead of the competition. Collins and Porras take the yin/yang symbol from Chinese philosophy in order to explain the visionary mentality – which is bad news for those that cannot live with two contradictory ideas at the same time. The yin and yang approach of Collins and Porras is their version of Peters and Waterman’s brain hemispheres.

Nespresso, by formulating a clear mission statement ‘People first, policies later’, laid the foundation for its successful operations. In doing so, Nespresso has proven itself to be a visionary company in the sense of Collins and Porras. These authors define a visionary company in terms of reputation, contribution to society and more. In order to meet the demands of a changing world, a company ‘must be prepared to change everything about itself except its basic beliefs as it moves through corporate life.’ According to the authors, a company must preserve its core ideology while allowing the non-core ideologies to change. Product lines, profit strategies, cultural tactics, and organization structure can change – but a core ideology should not. Companies should not be limited to a narrow-minded frame of reference, where there is only one choice, but not both.

Table 1.4 *Articulating a vision in a mission statement*

<p>Step 1 Core Values</p> <ul style="list-style-type: none"> ■ <i>Sony:</i> Elevation of the Japanese culture and national status; encouraging individual ability and creativity; being a pioneer; doing the impossible. ■ <i>Walt Disney:</i> No cynicism; nurturing wholesome American values; creativity, dreams and imagination; preservation and control of the Disney magic.
<p>Step 2 Core purpose</p> <ul style="list-style-type: none"> ■ <i>Nike:</i> To experience the emotion of competition, winning and crushing competitors ■ <i>Sony:</i> To experience the joy of advancing and applying technology for the benefit of the public ■ <i>Walt Disney:</i> To make people happy

Step 3 Big, Hairy, Audacious Goals (BHAG)

Target BHAGs

- *Boeing*: Become the dominant player in commercial aircraft and bring the world into the jet age' (1950s)

Common enemy BHAGs:

- *Nike*: Crush Adidas (1960s)
- *Honda*: We will destroy Yamaha (1970s)

Role-model BHAGs:

- *Stanford University*: 'Become the Harvard of the West' (AOs)

Internal-transformation BHAGs:

- *Rockwell*: Transform the company from a defense contractor into the best diversified high-technology Company in the world (1995)

Step 4 Envisioned future in a vivid description:

- *Sony*

We will create products that become pervasive around the world... We will be the first Japanese company to go into the US market and distribute directly... We will succeed with innovations that US companies have failed at – such as the transistor radio... Fifty years from now, our brand name will be: as well known as any in the world... and will signify innovation and quality that rival the most innovative companies anywhere... 'Made in Japan' will mean something fine, not something shoddy

Richard Branson provides a good example of this in his segmentation strategy for Virgin Atlantic Airlines. Instead of choosing either a low-cost or a high-quality strategy, the option of acquiring both to the max is practiced.

Segmenting the market into business class and tourist class, Virgin offers high quality service to the business travelers at an average market price. It then spends part of the revenues of this high segment for reducing the fares for tourist travelers, while at the same time keeping service at the highest possible level. Summarizing, one could say that visionary companies don't look for a choice or a balance but explore opportunities to acquire both to the max. They find ways to do well in the short-term and long-term, rather than sacrificing one for the other. The purpose of the yin/yang symbol is to illustrate this concept. In doing business, companies should be able to adapt and change over time in response to market conditions. Competencies, strategies and goals change over time but the core ideology must remain intact. Another visionary company that preserves its core ideology is Boeing. In the 1950s, Boeing ventured into new territory and took a gamble on building commercial airliners instead of sticking to military aircraft, which earned most of its profit. As a result, its rival Douglas Aircrafts was left in the dust.

Big, Hairy, Audacious Goals (BHAG)

Visionary companies must have the confidence to set 'big hairy audacious goals'. Collins and Porras introduce the BHAG concept as a way for companies to generate energy and a sense of direction. They describe BHAGs as nearly impossible, but still possible with confidence and a bit of arrogance on behalf of the company. It stresses high commitment and working outside the comfort zone. The Kennedy moon mission is a very good example of a BHAG.

Perhaps not by accident, in 1994 Hamel and Prahalad brought a message to the business world which was quite similar to that of Collins and Porras. In their book 'Strategy as stretch, Competing for the future' they use the metaphor of strategy and a challenging goal as a rubber

band. Companies should formulate a challenging mission with a 10-to-20-year impact. Strategy as a rubber band means stretching for the impossible. By stretching the rubber band and letting it go on one side it will automatically and without extra efforts pop to the other side! The challenging goal and strategy, comparable to the BHAG of Collins and Porras, is leveraging the organization's capacity of resources. Competitive power of the company increases through innovation and quality improvement and will lead to new and better products and services. Visionary organizations need to strive for self-improvement every single day. Apart from the short term, an eye should always be kept on the long term.

Collins and Porras describe the 4-step process of articulating a vision into a mission statement:

1. Core values
2. Core purpose
3. 10-to-30-year BHAG
4. Vivid description

Within the 3rd step of this process four types of BHAGs are to be distinguished:

1. Target BHAG (qualitative or quantitative)
2. Common enemy BHAG
3. Role model BHAG
4. Internal transformation BHAG

In the example of Boeing, a target BHAG was formulated: 'Become the dominant player in commercial aircraft and bring the world into the jet age' (1950s). Indeed, in the decades behind us Boeing proved to be the dominant player worldwide, leaving Douglas and other competitors behind.

The ambition statement of the Gulpener Bierbrouwerij BV

A regional, medium-sized company, Gulpener Bierbrouwerij BV, illustrates that not only big, multinational corporations pay attention to vision and values. In 2014 Gulpener received the Dutch national CSR and sustainability award 2014 for collaboration with local suppliers and making their supply chain more sustainable.

The brewery is based in Gulpen, a village in the heart of the South Limburg, the Netherlands, and has won numerous awards over the last decade, mainly in the area of quality, social responsibility and sustainability.

Table 1.5 *Honours and Awards Gulpener Bierbrouwerij BV*

Winner Award Sustainable Entrepreneurship Limburg 2003
Winner National Award for Corporate Social Responsible Entrepreneurship 2003 (jury-and-public award)
Korenwolf : Lekkerste witbier 2003 and 2006
MilieuKeur 2004 (Environment charter)
BNB Oorkonde Biergilde 2005 (Charter Beer Guild)
Euregio Umweltprijs 2005 (Environment)
PINT stimuleringsprijs 2005

EKO 2006 (Sustainability)
ISO 14001 2007 (Sustainability)
Award for Acknowledged Regional Product 2009 Gouden PINT 2009
Dutch national CSR and sustainability award 2014

The region is known for its hills and parkland created by the local farmers. The Gulpener Beer brewery plays a central role in the local community and feels responsible for its employees and for the social infrastructure in the region. The explicit formulation of the mission statement at the beginning of the millennium caused a turnaround in the corporate strategy and the supply chain strategy and operations.

Table 1.6 *Gulpener's mission statement in 4 steps (Collins and Porras)*

<p>Step 1 Core values</p> <ul style="list-style-type: none"> ■ Roots in the region of the company ■ Commitment to sustainability ■ Cooperation with agriculture and environmental organizations ■ Close collaboration with regional suppliers ■ Involvement in society of villages of Gulpen, Reijmerstok (annual hop festival) etc.
<p>Step 2 Core purpose</p> <ul style="list-style-type: none"> ■ Allowing people to enjoy quality beers produced with passion and pleasure
<p>Step 3 Big, Hairy, Audacious Goal</p> <ul style="list-style-type: none"> ■ Being the biggest of the small breweries by brewing the best tasting beer in a sustainable way, using the best quality ingredients from the best regional suppliers.
<p>Step 4 Envisioned future in a vivid description</p> <ul style="list-style-type: none"> ■ We create value and live up to our ambitions, together with regional farmers who grow summer barley, wheat, rye and hop in a way that is friendly to the environment... using mountain spring water from the Ardennes... we translate our connection with the region into close relationships with suppliers in nearby villages and the region as a whole... We support nature preservation and environmental organizations and societies in Limburg... We provide our energy needs through 'green' power and the use of solar panels... We don't pasteurize our beers to achieve a better taste, a better smell and a better digestion... We regard the higher cost for the longer period of 'lagering' as an investment in quality, sustainability and the environment... We actively communicate our ambition.

The achieved successes brought the company awards and great recognition from consumers and all other stakeholders. The Gulpener Beer brewery is also the first of all breweries to have an alliance with nature. At the beginning of the new millennium, a conscious decision for corporate social responsibility and sustainability was made. The ambition statement was signed by all the employees and has been the starting point for Gulpener's strategy and operations ever since.

The different types of beer are produced in a sustainable way, brewed with regional and ecological ingredients from regional suppliers and with the smallest possible environmental impact. Gulpener has adopted the triple-bottom-line People, Planet, Profit and has added the fourth P of Pleasure to indicate the passion and pleasure that accompany the processes of brewing beer. Their slogan 'Op de Toekomst' or 'To the Future' reflects the vision and values of the company. In table 1.6 the four steps of the mission statement of Gulpener Bierbrouwerij are listed.

1.4 Supply chain management

The effectiveness of supply chains can be measured as the degree to which it has delivered desired outcomes. Cross-functional measures are required to support the same vision, values and strategies. Whereas in the past, every link in a chain made its own decisions in logistics, nowadays supply chain and logistics decisions can no longer be made in isolation.

Supply chain management goes further and includes the flows of information, goods and money of several organizations in a chain decision. This requires attempts to achieve cross-functional integration of different departments, units and management levels within and between organizations. Traditionally, the flow of goods was the main focus in logistics, now two other equally important flows are distinguished: the flow of funds or the financial flow and the flow of information.

UPS definition describes the essentials of supply chain management in a very short and concise way and helps understanding what a supply chain is: 'Supply chain management is the synchronization of the movement or flow of goods, funds and information'. The three flows involved in the supply chain can be outlined as follows:

- *The physical flow of goods* – from the purchase of raw materials and components, through their manufacture and assembly into products and their distribution to end-users. They are the most visible piece of the supply chain.
- *Management control and the flow of money* – this can take various forms, depending on the particular market situation.
- *The flow of information* – any part of the supply chain, which is not linked by an acceptable flow of information results in the supply chain not being operational. Information flows allow the various supply chain partners to coordinate their long-term plans and to control the day-to-day flow of goods and material up and down the supply chain.

The concept of Supply Chain Management implies that practically every product that reaches an end user represents the cumulative effort of multiple organizations. These organizations are referred to collectively as the supply chain. All the activities from design or purchasing to delivering the product to the customer are part of it, as figure 1.4 shows. Supply chain activities traditionally cover everything from product development, sourcing, production and logistics, as well as the information systems needed to coordinate these activities.

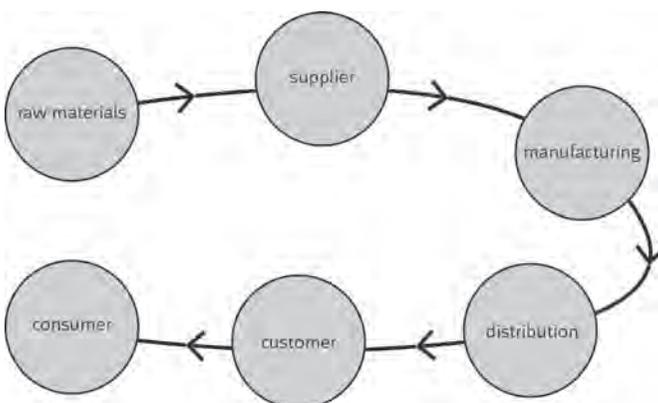


Figure 1.4 The traditional supply chain

Traditionally most organizations in the supply chain only paid attention to what was happening within the company. Few businesses understood – let alone managed – the entire chain of activities that ultimately delivered products to the final customer. The result was incoherent and often ineffective supply chains.

Supply chain management now, is the active management of supply chain activities to maximize customer value and achieve sustainable competitive advantage. It is the tuning of the logistics activities to each other in order to integrate and control logistics processes to optimize performance. By collaboration, supply chain costs are lowered by reducing complexity and improving customer service levels. Logistics costs incurred by manufacturer, wholesaler and retailer – inventory, warehouse and transport costs estimated to be about 20% of sales value – are added together. In an effort to make the pie grow rather than to fight for a bigger part of the pie, the combined effort to lower logistics costs will make the profits higher.

In the modern supply chain, companies pay more attention to sustainable design and reverse logistics. ISO 14000 contains guidelines for the preservation of nature and the environment. McDonough and Braungart came up with Cradle to Cradle (C2C), a movement that promotes giving products a new life at what used to be the end of their life cycle. Reverse logistics, reuse and recycling became a fixed final part of the supply chain. The SCOR model distinguishes the processes plan, source, make, deliver and return, thus creating a link between the strategic phase of planning and the four operational processes, including the environmentally important return process.

In order to improve performance in time, cost and quality, supply chain management has to cut across functional areas. This often requires significant changes in the firm's organizational



Supply Chain Management Processes

Customer relationship management
Supplier relationship management
Customer service management
Demand management
Order fulfillment
Manufacturing flow management
Product development and commercialization
Returns management

Figure 1.5 Integrating and managing business processes across the supply chain

structure. Therefore, the responsibility and authority for implementing SCM must be placed at the highest levels of an organization. Firms that attempt to embed SCM within a functional unit such as purchasing, operations, or logistics usually have limited success.

Supply chain management urges companies to set up information systems and metrics that focus on performance across the entire supply chain. Sub-optimization in individual departments or units can cause problems. For example, a manufacturing unit's decision to minimize its inventory levels may reduce delivery performance to the end-user. Likewise, a distributor's decision to chase highly seasonal demand may 'bullwhip' its upstream partners, causing significant cost overruns. Putting in place the information systems and metrics needed to make intelligent decisions in the face of such trade-offs presents a significant challenge to supply chain partners.

Finally, supply chain management adds another layer of complexity to a firm's strategy development efforts. Years ago, firms could succeed by being particularly good in one functional area, such as marketing, finance or operations. Then firms recognized that they had to have sufficient capabilities across multiple functional areas in order to survive. In addition to their debates about functional and business-level strategies, managers must now address how they will *partner* with other firms in the supply chains.

Integrating business processes across the supply chain and collaboration with partners have become significant indicators for success. Customer (CRM) and supplier relationship management (SRM) are indispensable.

1.5 Supply chain strategy

Supply chain strategy is not to be confused with supply chain management. By formulating a business strategy, a company tries to make a competitive plan to answer the question what products and services to offer in what markets and segments. It involves leveraging the core competencies of the organization to achieve a defined high-level goal or objective. Supply chain strategy is not simply a linear derivative of the business strategy, but it can be the enabler of the business strategy. For example, if the business strategy is to be a low-cost company, the supply chain strategy should support this.

Plan

When developing a supply chain strategy, core competencies, focus and means of differentiation are equally important as building an overall business strategy.

A supply chain strategy defines a **plan** of how the supply chain should operate to be competitive or gain sustainable competitive advantage over other supply chains.

It evaluates the cost-benefit trade-offs of the actual operations to meet a specific supply chain objective.

Supply chain strategies can be focused on different outcomes, such as efficiency, responsiveness, resilience, sustainability or innovation. Whereas the *efficient supply chain* will try to decrease operational costs and maximize efficiencies, the *responsive supply chain* will try to maximize customer satisfaction by being flexible and reacting quickly to changes in demand.

Do

Companies have to look at their supply chain performance, the ‘do’ phase in the plan-do-check-act cycle. Executing supply chain strategy involves closely following the implementation plan and applying good project governance by managing performance throughout implementation and beyond. Tracking performance allows an organization to measure how successful it is in realizing the goals of a strategy.

Check

One way of assessing the supply chain is by checking the organization’s assets and evaluating how well they support the strategy. Outdated machinery and systems may lead to high operational overhead and costly process inefficiencies and redundancies. A formal supply chain assessment may help in better understanding the operational strengths and weaknesses as well as opportunities for improvement. Many global supply chains will find that they are not equipped to cope with the world we are entering. Most were engineered – some brilliantly – to manage stable, high-volume production by capitalizing on labor-arbitrage opportunities available in China and other low-cost countries. But in a future when the relative attractiveness of manufacturing locations changes quickly – along with the ability to produce large volumes economically – such standard approaches can leave companies dangerously exposed. Once the assessment is complete, a team can review and prioritize recommendations, validate opportunities, define risks and requirements for implementation.

Act

As a result of the check, companies have to adapt their supply chain strategy and develop actions for improvement that include activities and tasks, roles, responsibilities, a timeline and performance metrics. Cooperating and collaborating with supply chain partners, seek out mutual goals for both organizations. Not only will this bring the company one step closer to realizing its supply chain strategy but by sharing information it will learn more about the companies that it collaborates with. For example, collaboration with customers in product design may draw attention to new product concepts. In sourcing, the make-or-buy decision may prove to be very important. If manufacturing can be made cheaper by off-shoring, it may be worthwhile not only to drive down costs, but also to focus more on the core competencies of the organization. Processes should be monitored carefully over time. Is outsourcing the complete manufacturing process to China still really appropriate? Recently, labor disputes in China contributed to overnight wage increases of 20 percent or more in some Chinese cities. This example shows that the relative attractiveness of manufacturing locations can change overnight. Standard approaches of outsourcing and off-shoring parts of the business can be dangerous to any company. Growing global uncertainty and business complexity, along with the worries of the recent crisis, are causing supply chains to pay more attention to risk readiness and resilience. Pioneering supply chain organizations are preparing themselves in two ways. First, they are ‘splintering’ their traditional supply chains into smaller ones better prepared to manage higher levels of complexity. Second, they are maximizing their ability to anticipate and respond by reconfiguring their supply chains to be more resistant and resilient in the light of an almost unpredictable range of potential outcomes. These companies are building diverse and more resilient portfolios of supply chain assets that will be better suited to thrive in a more uncertain world.

1.5.1 Supply chain strategy as an iterative process

On a periodic basis, e.g. once every year, supply chain strategies should be revised. The supply chain strategy should go round the Deming cycle Plan-Do-Check-Act again.

Were the goals of the business strategy met? Are the needs of the supply chain partners still the same? Porter's framework may give new insights into the threats of new entrants or substitute products. How has the industry changed e.g., new competitors, business practices, products and technology?

At this time, companies may even want to reassess their supply chain organization if the changes are significant enough to warrant it. Also, use this effort to look for new opportunities to further position the organization for success. Sharing information and collaborative planning with partners are crucial in executing a supply chain strategy effectively – just as it is crucial to align the supply chain strategy with the business strategy.

1.5.2 Strategy and innovation

Strategic planning can be looked upon as one of the most, if not the most difficult management issue of our turbulent era.

In his 1980 classic 'Competitive Strategy: Techniques for Analysing Industries and Competitors', Porter reduces the problem down to three generic strategies: cost leadership, differentiation and market segmentation (or focus). Market segmentation is narrow in scope while both cost leadership and differentiation are relatively broad in market scope. Porter regarded the external environment as the leading influential factor for strategic concepts and positioning of companies (externally based). From the three generic business strategies, Porter stresses the idea that only one strategy should be adopted by a firm and failure to do so will result in a 'stuck-in-the-middle' scenario. He argues that in practicing more than one strategy, the organization will lose the entire focus and thus a clear direction of the future trajectory cannot be established. The argument is based on the fundamental that differentiation will incur costs to the firm, which clearly contradicts the basis of low-cost strategy. Hence, cost leadership and differentiation strategy will be mutually exclusive.

Two focal objectives of low-cost leadership and differentiation clash with each other resulting in no proper direction for a firm.

Contrary to the rationalization of Porter, contemporary strategies have proven the power of a blend of strategies or hybrid strategies. Successful organizations like IKEA and Virgin adopt a mixture of low- cost and differentiation strategy.

Case 1.2 Expliciting strategy at Philips

From the 1990s, journalist Marcel Metzke has closely followed Dutch electronics multinational Philips to get an insight into the process and effectiveness of the strategy formulation of the company. In a number of articles, he describes the reorganizations and turnarounds Philips went through during the last few decades. The transformation from a technology-driven company into a market-driven company in the 1990s was a process which had a huge impact.

A combination of crisis management, selling technology to Rabobank and leasing it back, and thousands of lay-offs prevented bankruptcy only just in time. The turnaround was led by CEO and crisis manager Jan Timmer, who started by introducing a yearly Customer Day. On this day, Philips employees across the organization, were brought into contact with customers from all over the world through a video wall, to find out the customers' needs and expectations. This way, employees were made more customer and market-oriented.

Now Philips is a customer-driven company that carefully listens to its customers and tries to place itself in their shoes. The mission changed from the technology and production-driven 'Let's make things better' to the customer and market-driven 'Sense and simplicity'.

In an attempt to get a more explicit company strategy, Philips headhunted Compaq's strategist Roel Pieper and gave him the assignment to come up with a clear-cut new company strategy. However, after a few years of hard work, Pieper concluded that strategy formulation for a multinational in the turbulent and a highly competitive market of consumer electronics had become a mission impossible and gave back the assignment. Yet Philips has maintained a steady position in the market over the last few years and market share and profitability have been restored. This raises the question whether forces stronger than a clearly formulated strategy may be at work.

'In search of excellence' by Peters and Waterman puts a question mark behind Chandler's adagium 'Structure follows strategy'. In managing existing companies, strategy often is more a consequence than a cause, which turns the adagium of Chandler around: 'Strategy follows structure'. Capital-intensive companies sometimes have no choice but to adapt their strategy to the assets, factories and infrastructure they have previously invested in. An example of this is the fully robotized VDL Nedcar plant, where strategic choices for future car manufacturing activities heavily depend on the existing infrastructure of the plant.

Hamel and Prahalad in their bestselling book 'Competing for the future', 1994, also try to find the real drive behind changing strategies of companies. They conclude that strategy concepts are increasingly resource-based. Daily practices in companies seem to confirm this development. Strategic approaches are diverse and not easy to capture.

The 'external-based' approach of Porter and D'Aveni can be denoted as '**Strategy as fit**'. It is based on the presumption that strategies can be formulated and executed. In his book 'Strategy safari', Henry Mintzberg brings together ten schools to guide companies through the jungle of strategic management.

In their 'resource-based' approach Hamel and Prahalad introduce the phrase '**Strategy as Stretch**'. They describe the leveraging of the resources of a company through a challenging strategy that is supported by the right structure and culture. They confirm the Collins and Porras concept of the Big Hairy Audacious Goal (BHAG). The metaphor of a rubber band is used to express the leverage power of a challenging goal; 'stretch the rubber band and let go'. More recently, in their book on 'Blue Ocean Strategy', 2005, W. Chan Kim and R. Mauborgne stimulate and inspire entrepreneurs to create new uncontested market space and make the competition irrelevant.

Table 1.7 Strategic thinking in the last decades

Porter, D’Aveni	Mintzberg	Hamel and Prahalad, Collins and Porras	Chan Kim and Mauborgne
‘Strategy as fit’	‘Strategy safari’	‘Strategy as stretch’	‘Blue Ocean Strategy’
<i>Message:</i> Align company goals to the availability of resources and opportunities in the market	<i>Message:</i> Surviving in the complexity of the strategy jungle. The metaphor of the elephant: you cannot see the whole beast, but you can try to come to a synthesis of ideas and possibilities, that form a strategy	<i>Message:</i> Aspire to ambitious performance through leveraging resources by challenging goals The metaphors: ■ Strategy as a rubber-band ■ Big hairy audacious goals (BHAG)	<i>Message:</i> Create uncontested market space and make competition irrelevant
Strategic choices on basis of existing situation and SWOT-analysis	Strategic choices on basis of a contingency approach, and synthesis	Strategic choices on basis of vision and a challenging goal	Strategic choices on the basis of innovation and creating new market space
Cost leadership	Deliberate strategies	Challenging strategic goals	Differentiation and low cost
Differentiation strategies ■ Cost ■ Design ■ Quality ■ Non-differentiation	Emergent strategies Prescriptive and descriptive schools		Innovation Developing new products and markets
Market segmentation (or focus).			Creating new CSFs

If companies innovate and create new product market combinations or change the features of existing products and services in a way that they are unique and cannot be copied or imitated, they create the calm of a blue ocean. Competitors are left behind, competing with each other like sharks in their ocean that will color red with the blood of the fights. IKEA, Apple and Cirque du Soleil are good examples of companies who repeatedly manage to create their own blue ocean by creating new products, product environments and hard-to-imitate product features. Starbucks and Coffeelovers are companies that have clearly understood the characteristics of the experience economy we live in. They have created a unique atmosphere, allowing their customers to fully experience the pleasure of enjoying excellent taste both in the product, the product environment and the service.

Instead of fighting competitors to get the biggest piece of the pie, Blue Ocean Strategy promotes the baking of a bigger pie of which each partner – through collaboration in the supply chain – gets a fair part. Blue Ocean Strategy gives meaning to the term ‘Shared values’ of Peters and Waterman’s 7S model. To create uncontested market space, innovation not just inside companies but also between companies in the supply chain, is an essential prerequisite.

Blue Ocean Strategy aims at differentiation *and* low cost instead of differentiation *or* low cost. It brings new critical success factors in place at the cost of existing CSFs and increases buy-

ers value. Many innovations and changes to existing success factors have already taken place. Many industries have questioned their existing business models and have transformed them into new models. To give a few examples: in the banking industry, the proven model was based on an extensive, nationwide network of offices and personal service.

Nowadays, banks practice the new business model of 24-hour access, convenience and low price, in internet banking. Not so long ago in the computer industry, the critical success factors were speed, memory capacity and power. Today, computer users want design and user-friendliness and interconnectivity. In chapter 8, Innovation, a more extensive list comparing old and new business models can be found.

1.5.3 Time, cost and quality

Although new insights have been developed into how supply chains should be managed, a lot of what we have learned in the last hundred years is still valid. The analogy that a chain is only as strong as its weakest link is still as true as can be. Time, cost and quality are still the crucial objectives or critical success factors (CSFs) for supply chains. Organizations must be able to provide quality products or services in a timely, cost-effective manner. Therefore, programs such as Total Quality Management, Just-in-Time manufacturing and concurrent product development are just as relevant today as they were in the past. Lead time or cycle time is an important variable. It is easy to see that these critical success factors are still valid, whether it is in online shopping and e-fulfillment, or in modern developments such as 3D printing or robotizing. One of the most important equations in logistics is $\text{Lead time} = \text{Processing time} + \text{Waiting time}$.

Lead-time efficiency is calculated as follows: $\text{Processing Time} / \text{Lead time} \times 100\%$.

The lead or cycle-time efficiency ratio tells us something about the processing time and throughput. The processing time is the time actually spent working. The lead time is the time that elapses between the customer demand and delivery of the service or product. A high lead-time efficiency says something about the process. Within a process there is often waste of time in terms of waiting times and transport times. These have a direct impact on the throughput. The closer the processing time approaches the lead or cycle time, the more productive the work has been done. Waste is reduced. Reducing waste or in Japanese '**muda**' is a main feature of lean manufacturing which had its origin in Japan and the Toyota Production System (TPS).

In lean manufacturing 7 types of muda or waste are denominated in the TIMWOOD acronym:

T: Transportation

I: Inventory

M: Motion

W: Waiting

O: Over-processing

O: Over-production

D: Defects

Additional Japanese terms used in performance improvement systems are '**mura**' for unevenness, irregularity or inconsistency in physical matters or human spiritual condition and '**muri**' for overburden, unreasonableness or absurdity. Reducing the three types of waste '**muda**', '**mura**' and '**muri**' can be accomplished through standardizing work. The process must be

standardized by taking simple work elements and combining them, one-by-one, into standardized work sequences. This is an effective way to increase profitability. In Toyota's Production system this includes Work Flow, or logical directions to be taken, Repeatable Process Steps and Machine Processes, or rational methods to get there, and 'Takt' time, or reasonable lengths of time and endurance allowed for a process.

Figure 1.6 shows that logistics performance can be measured in lead time or cycle time, including processing time and waiting time, such as transportation, paper work and formalities.



Figure 1.6 Lead time or cycle time is processing time plus waiting time (paper work, transport)

Improving logistics operations, increasing productivity and gaining time can be achieved first and foremost by reducing waiting time. This goes for production logistics as well as for service and office logistics. A good example is the procedure a citizen has to go through in a building-permit application. The civil servants in the town hall need 6 weeks to make a decision, of which about 3 hours are really spent in processing the application. This means that the great majority of the lead time is waiting time. Two decades ago, before merging with Price Waterhouse, consultants Coopers and Lybrand, were motivated by this to introduce the Paper JIT program to reduce waste of time in paper work.

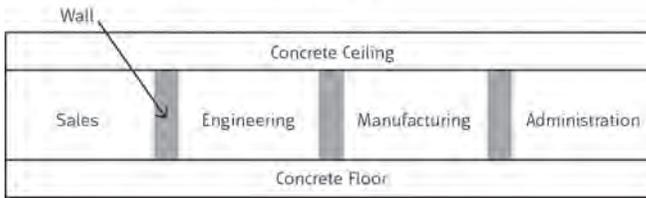
Time, cost and quality often serve the same objective. For example 'in-time delivery' to the customer will serve the objective 'time' but also increases the quality of the performance and will serve cost effectiveness. That's why synergy can be attained by continuous improvement methods such as Kaizen, lean production, waste reduction and Six Sigma.

Cycle or lead time has undergone changes over time. In the traditional functional organizational structure, tasks or workload were thrown 'over the wall' from one department to the other. New insights have resulted in the introduction of new organizational structures such as the matrix – or project organization.

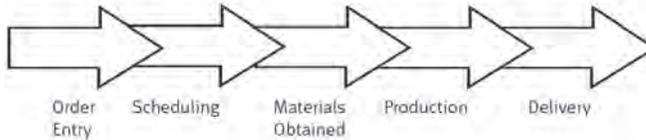
Companies have learned to break down the walls between the functions and departments and have started to improve collaboration and planning. This means cycle times have been lowered by interconnected seamless business processes. In some cases, where the market or individual customer demand insist on it, extremely fast cycle times have been realized.

The shift in focus from quick-response manufacturing to total-process management can be seen in the evolution of James Womack's writings. His 1990 best seller, 'The Machine That

The Traditional Method - Disjointed Functions



The New Method : Interconnected Seamless Business Processes



Fast Cycle Time Process

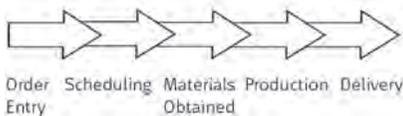


Figure 1.7 Cycle time: traditional and new method

Changed The World’, concentrated on the Toyota production system and continuous improvements in the manufacturing process known as Kaizen events.

1.6 Supply chain structure follows supply chain strategy

The choice for a logistics or supply chain structure doesn’t stand on its own. A supply chain strategy is not simply a linear derivative of the business strategy, but it can be the enabler of the business strategy. For example, if the business strategy is to be a low cost company, the supply chain strategy should support this by defining a plan as to how the supply chain should operate in order to be competitive or gain sustainable competitive advantage over other supply chains. It evaluates the cost-benefit trade-offs of the actual operations to meet a specific supply chain objective.

Supply chain strategies can be focused on different outcomes, such as efficiency, responsiveness, resilience, sustainability or innovation.

1.6.1 Efficient versus responsive supply chains

If, for example, demand is predictable and the competitive priority is delivering consistent quality on time and at low cost, the appropriate chain would be the **efficient supply chain**, which sees it as its main task to decrease operational costs and maximize efficiencies.

The **responsive supply chain** is considered to be the opposite of the efficient chain.

It tries to maximize customer satisfaction by being flexible and reacting quickly to changes in unpredictable demand. One could say that the efficient supply chain and the responsive supply

chain are the archetypes of supply chains. They have become the ‘mother figures’ or prototypes, upon which other supply chains are copied, patterned or emulated.

Table 1.8 *Supply chain environment for efficient and responsive supply chains*

Factor	Efficient Supply Chain	Responsive Supply Chain
Demand	Predictable, low forecast errors	Unpredictable, high forecast errors
Competitive priorities	Low cost, consistent quality, on-time delivery	Development speed, fast delivery times, customization, volume flexibility, variety, top quality
New service and product introduction	Infrequent	Frequent
Contribution margins	Low	High
Product variety	Low	High

In clarifying the cause-and-effect relationship between strategy and structure, it is assumed that ‘structure follows strategy’ (Chandler). And indeed, a company will first formulate a strategy, which essentially answers the question which products and services to offer to which markets. After determining the product market combinations (PMCs) and the strategies for each one of them, the next question is what structure is needed to serve the markets in the most effective way.

Designing the right organization structure, working towards the ideal supply chain, selecting the right suppliers to collaborate with, finding the ways to communicate with customers, are all consecutive business processes.

So far, we have focused on the efficient and responsive supply chain. Other entitlements, historically used to typecast supply chains, are the functional supply chain with predictable demand and the innovative supply chain with unpredictable demand (Fisher, 1997).

The terms lean supply chain and agile supply chain have been introduced more recently. There are similarities with the efficient and responsive archetypes, which will be discussed briefly later in this chapter.

Table 1.9 *Design features for efficient and responsive supply chains*

Factor	Efficient Supply Chain	Responsive Supply Chain
Operation strategy	Make-to-stock or standardized services; emphasize high volume, standardized services or products	Assemble-to-order, make-to-order, or customized services; emphasize service or product variety
Capacity cushion	Low	High
Inventory investment	Low, enable high inventory turns	As needed to enable fast delivery time
Lead time	Shorten, but do not increase costs	Shorten aggressively
Supplier selection	Emphasize low prices, consistent quality, on-time delivery	Emphasize fast delivery time, customization, variety, volume flexibility, top quality

Companies are struggling to improve not only their manufacturing operations but also their supply chain operations, recognizing the increasing importance of finding the best supply chain for their products. Consequently, the individual manufacturing company needs tools to match the supply chain to their product lines.

1.6.2 Fisher’s matrix

Fisher confirms that **‘structure follows strategy’**. He suggests that an effective supply chain has to be designed with respect to the product that is going to be supplied through the chain, supported by case studies of Campbell Soup and Sport Obermeyer.

The foundation for Fisher’s theory is that products can be either functional or innovative depending on their demand pattern and market expectations.

A supply chain, on the other hand, can emphasize the physical function in delivering the goods or the market mediating function for conveying information. A big advantage of Fisher’s work is its simplicity. He defines two basic products: **functional and innovative products** (figure 1.8).

The major differentiating factor is the uncertainty of demand:

Functional products show a rather predictable demand pattern and have long product cycles.

Innovative products, on the other hand, show an unpredictable demand, and the life cycle can be as short as a few months. Therefore, a functional product is assumed to require a physical efficient supply chain which can supply a specified amount of products at the lowest cost possible. The other type of product is the innovative product that requires a market-responsive supply chain, which focuses on quick adaptability towards changing market needs.

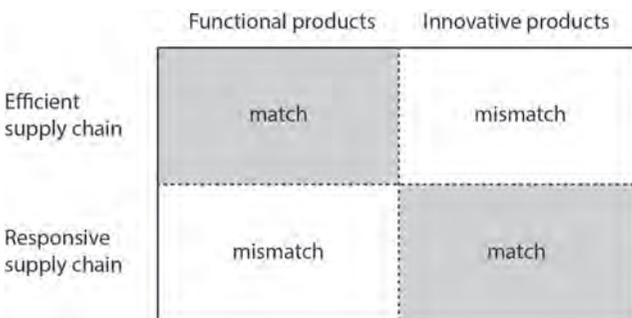


Figure 1.8 Matching supply chains with products (Fisher)

A move along the product life cycle from the introductory phase to the mature phase may imply a move from a basically innovative character of the product to a more functional type of product, while the company maintains a market-responsive supply chain and does not acknowledge the need to shift the focus to physical efficiency.

On the other hand, companies with functional products may implement new manufacturing concepts such as Quick Response (QR) and agile manufacturing, improving responsiveness and flexibility to levels that are higher than what the products and markets require and at the expense of efficiency.

The four combinations of product and supply chain types are analyzed with respect to the effect on performance. Performance is measured in terms of competitive priorities, i.e. quality, delivery speed, delivery dependability, cost (for price competition), volume flexibility, and product-mix flexibility as well as profitability. The significant differences between the companies in the four cells are concerned with cost, delivery speed and delivery dependability. In all these cases, companies with a match between product and supply chain outperform companies with mismatches. In market-responsive supply chains, companies with innovative products have significantly better cost-performance than those with functional products.

The combination of functional products and market-responsive supply chains is harmful to cost-performance, compared to innovative products.

The match combination of functional products in physically efficient supply chains gives the highest indication for success, but because of a high deviation, it is not significantly better than functional products in market-responsive supply chains.

Delivery speed is significantly better for functional products in physically efficient supply chains than in market-responsive supply chains. Functional products in physically efficient supply chains are most likely made to stock (MTS). Delivery speed is obtained through deliveries from a finished-goods inventory.

Both types of flexibility concerning product mix and volume are most important for innovative products in market-responsive supply chains.

However, the differences are not significant. A potential limitation to using Fisher's model in practice is that a manufacturing company may not always experience that they have the opportunity or the resources to create a perfect supply chain for their products; rather, they have to manage within existing supply chain structures.

Table 1.10 *Functional versus responsive supply chains (Fisher, 1997)*

Product aspects	Functional (predictable demand)	Innovative (unpredictable demand)
Product life cycle	More than two years	Three months to one year
Contribution margin	5-20 percent	20-60 percent
Product variety	Low (10-20 variants per category)	High (often millions of variants per category)
Average margin of error in the forecast at the time production is committed	10 percent	40-100 percent
Average stock-out rate	1-2 percent	10-40 percent
Average forced end-of-season markdown as percentage of full price	0 percent	10-25 percent
Lead time required for made-to-order products	Six months to one year	One day to two weeks
Supply chain design aspects	Physically efficient process	Market-responsive process

Product aspects	Functional (predictable demand)	Innovative (unpredictable demand)
Primary purpose	Supply predictable demand efficiently at the lowest possible cost	Respond quickly to unpredictable demand in order to minimize stock-outs, forced markdowns and obsolete inventory
Manufacturing focus	Maintain high average utilization rate	Deploy excess buffer capacity
Inventory strategy	Generate high turns and minimize inventory throughout the chain	Deploy significant buffer stocks of parts or finished goods
Lead-time focus	Shorten lead time as long as it does not increase cost	Invest aggressively in ways to reduce lead time
Approach to choosing suppliers	Select primarily for cost and quality	Select primarily for speed, flexibility and quality
Product-design strategy	Maximize performance and minimize cost	Use modular design in order to postpone product differentiation for as long as possible

Exactly for this reason, ‘structure follows strategy’ is not always true, as Peters and Waterman have already claimed. Especially in capital-intensive companies and supply chains, for example in automotive, chemical and energy industry, the expensive (infra)structure will narrow the strategic options. Strategists will have to start thinking about strategy from the structural feasibility, as there may be other actors along the supply chain, upstream or downstream from the focal company, that dominate the supply chain.

Consequently, not all companies may be capable of designing the supply chain of their choice. There are overlaps in the defining factors of the process and product categories. Besides that, it is really hard to define when demand is predictable and when it is not.

1.6.3 Lean and agile supply chains

Another perspective on alternative supply chain designs is the distinction between lean and agile supply chains, where a lean supply chain is physically efficient, using Fisher’s terminology, and an agile supply chain has similar characteristics as the market-responsive one in Fisher’s model. The terms lean supply chain and agile supply chain have been introduced more recently. There are similarities with the efficient and responsive archetypes.

However, there are substantial differences to earlier concepts, reflecting the changes in global management thinking and techniques. Lean techniques emphasize eliminating waste. Minimizing transport time and inventory and delivering just-in-time (JIT) are the focal points of Toyota’s production System (TPS). Using statistical quality controls (Six Sigma, Kaizen) and introducing quality management systems the ‘lean and mean’ approach became very popular and not only in the automotive industry. Japanese management was copied worldwide. Whereas lean supply chains build on efficiency and standardization, nowadays customization and personalization, combined with a necessity to reduce lead times, have led to the concept of the agile supply chain.

A good example of an agile supply chain in the apparel industry is **Zara**.

Fashion markets are synonymous with rapid change and, as a result, commercial success or failure is largely determined by the organization’s flexibility and responsiveness. Responsiveness is characterized by short time-to-market, the ability to scale up (or down) quickly and the rapid incorporation of consumer preferences into the design process.

For conventional organizational structures and forecast-driven supply chains, it is increasingly difficult to meet the challenges of volatile and turbulent demand, which typify fashion markets. Instead, the requirement is for the creation of an agile organization embedded within an agile supply chain.

Zara’s supply chain has an extremely short lead time of three to four weeks, made possible by nearby suppliers who can produce and deliver in small quantities. Besides a short lead time, Zara also has a short time-to-market which is the time from design to fulfillment. Zara puts its money where its mouth is and lives up to its slogan ‘You don’t want to wear yesterday’s fashion’. Agility is often associated with increased speed and flexibility and thus with responsiveness. Knowledge management and information technology are increasingly important in virtual enterprises and partnership formation.

An agile and knowledgeable workforce and enterprise resource planning systems (ERP) are required for virtual companies, which focus on their network of supply and demand partner companies. Besides that, the planning processes have to be intensively IT-supported. Meeting these requirements is a necessity to execute a competitive strategy in a networked economy in which customized products/services are produced with virtual organizations and exchanged using e-commerce.

1.6.4 Functional attributes and supply chain structure

When we consider different types of supply chains, it is important to be aware of the fact that multiple supply chains can be analyzed. Even within one larger company several different supply chains can exist as in the Lighting, Consumer Electronics and Medical Equipment divisions of a large electronics company.

To illustrate that, different companies with different PMCs make different choices since they have made a comparison between a consumer-goods and a computer-assembly supply chain for their functional attributes and supply chain structure.

Table 1.11 Functional and structural attributes of consumer goods and computer assembly supply chain (Adapted from Meyr, Stadler, 2008)

	Functional attributes	Consumer goods supply chain	Computer assembly supply chain
Procurement	<ul style="list-style-type: none"> ■ Number and type of products procured ■ Sourcing type ■ Supplier lead time and reliability ■ Material’s life cycle 	<ul style="list-style-type: none"> ■ Few, standard (raw materials) ■ Multiple ■ Short, reliable ■ Long 	<ul style="list-style-type: none"> ■ Many, standard and specific ■ Multiple ■ Short and long, unreliable ■ Short

	Functional attributes	Consumer goods supply chain	Computer assembly supply chain
Production	<ul style="list-style-type: none"> ■ Organization of the production process ■ Repetition of operations ■ Changeover characteristics ■ Bottlenecks in production ■ Working time flexibility ■ Customer Order Decoupling Point 	<ul style="list-style-type: none"> ■ Flow time ■ Batch production ■ High set-up times and costs ■ Known, stationary ■ Low ■ Make-to-stock (MTS), Deliver-to-order (DTO) 	<ul style="list-style-type: none"> ■ Flow shop and cellular ■ Larger/smaller batches ■ Irrelevant ■ Low importance ■ High ■ Assemble-to-order (ATO)
Distribution	<ul style="list-style-type: none"> ■ Distribution structure ■ Pattern of delivery ■ Deployment of transportation means 	<ul style="list-style-type: none"> ■ Three stages ■ Dynamic ■ Unlimited, routes (3rd stage) 	<ul style="list-style-type: none"> ■ Two stages ■ Dynamic ■ Individual links
Sales	<ul style="list-style-type: none"> ■ Availability of future demands ■ Demand curve ■ Product's life cycle ■ Number of product types ■ Degree of customization ■ Bill of materials (BOM) ■ Portion of service operations 	<ul style="list-style-type: none"> ■ Forecasted ■ Seasonal ■ Several years ■ Hundreds ■ Standard products ■ Divergent ■ Tangible goods 	<ul style="list-style-type: none"> ■ Forecasts and orders ■ Weakly seasonal ■ Few months ■ Few/many ■ Standard/customized ■ Convergent ■ Tangible goods

Stadtler and Kilger (2008) describe supply chain attributes which may be functional or structural in nature. The attributes fall into four categories: procurement type, production type, distribution type and sales type.

Starbucks, a company known to have one of the world's best-run supply chains changed the structure of its supply chain, paying attention to all the relevant attributes and considerations.

1.6.5 Outcome driven and blended supply chains

Companies (MNCs) can be in different supply chains for different market segments. Knowing that each market has its own dynamics and events makes it easy to understand that different market segments induce different supply chains and trade-offs between:

- Quality and price levels
- Inventory level and delivery time
- SLAs with suppliers
- Customer service levels
- Customer order-Decoupling Points (MTS, MTO, ATO)

In a world of growing uncertainty and complexity, attention has to be paid to the critical success factors mentioned above. Splitting one-size-fits-all supply chains into smaller ones, spreading risk and creating outcome-driven blended supply chains are the other ingredients of a successful recipe for the future. In modern supply chains, the main drivers are cost, responsiveness, resilience, innovation and sustainability.

Research at MIT Sloan has pointed out that 'one size fits all' no longer is the right recipe for modern supply chains.

A hundred per cent focus on low cost will cause the supply chain to become rigid and unable to anticipate or respond to changing circumstances and contingencies.

The same applies to a hundred per cent focus on resilience. Instead, supply chains are better off adopting a blend of drivers. Multinational corporations, and some small and medium-sized companies may have more than one supply chain for the different market segments they operate in. For companies within this category, drivers of one supply chain could be a blend of low cost and sustainability, whereas another supply chain could strive for innovation, combined with risk readiness and resilience. Outcomes that can ‘drive’ a supply chain are:

- Cost
- Responsiveness
- Security
- Sustainability
- Resilience
- Innovation

An important reason for having a supply chain strategy or multiple supply chain strategies is to establish collaboration with all supply chain partners, including suppliers, distributors and customers. As the market place becomes more competitive and demand more volatile, it is critical to reinforce existing relationships and work together. This way, well executed supply chain strategies in collaborative supply chains result in value creation in more than one way. Value is created for the customer, for the internal stakeholders and for society at large.

Truly innovative and sustainable supply chains create value for all stakeholders, the environment and future generations. One could imagine that an electronics corporation with three divisions of Lighting, Consumer electronics and Medical equipment has different supply chain strategies for each division with a different blend of desired outcomes, objectives and characteristics. The spider diagram shows graphs for the three outcome-driven supply chains, each with its own blend of drivers.

Because resilience reflects the elasticity or the ability of a company to bounce back after setbacks, in this diagram the outcome security is included in resilience.

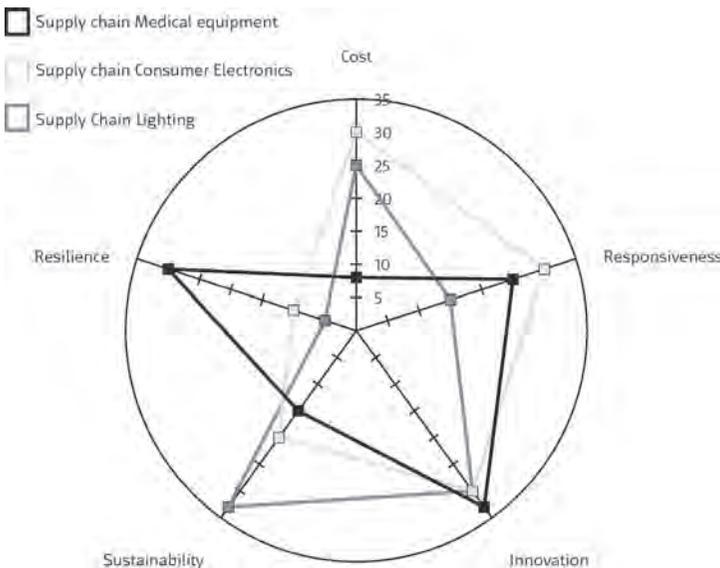


Figure 1.9 Spider diagram of different outcome-driven supply chains

The main drivers and important outcomes of the supply chain Medical equipment are a blend of responsiveness, innovation and resilience whereas in the supply chain Lighting sustainability and cost are more important.

Examples of archetypes of blended supply chains, their drivers, desired outcomes and critical success factors (CSFs) are summarized in the table below. Blending of outcomes within a supply chain is necessary to be successful. Aligning product market combinations (PMCs) for different customer segments with the strategy, systems and structure of the company leading to logical combinations of desired outcomes, strategies and critical success factors will pay off.

Table 1.12 Archetypes of blended supply chains

	Responsiveness-driven supply chain	Cost-driven supply chain	Innovation-driven supply chain	Sustainability-driven supply chain
Supply Chain Strategy	Responsiveness	Low cost	Innovation	High priority for being green
Outcome	Value for money Flexibility	Discount products	State-of-the-art products	Green products, little or no pollution and waste
Critical Success Factors (CSFs)	<ul style="list-style-type: none"> ■ Fast or just-in-time delivery ■ Higher price, quality ■ CRM ■ Lower inventory ■ More expensive manufacturing 	<ul style="list-style-type: none"> ■ Efficiency and low cost ■ Everyday low prices ■ Inventory of finished goods (Make to stock) ■ Not sensitive for extra values in SLAs, except service level 	<ul style="list-style-type: none"> ■ Knowledge, R&D ■ High price and quality ■ Responsiveness ■ Customization (Make or Purchase to Order) ■ New product introductions (high margins) ■ Slack in supply chain (incubators, 'skunk-works') ■ Break down problems at suppliers and machines 	<ul style="list-style-type: none"> ■ Carbon footprint part of the SLA ■ Reduce waste, (efficient) ■ Collaboration in supply chain ■ Supplier selection ■ Design and manufacture for the environment (C2C) ■ Lean and green (low cost)

Dutch supermarket chain Albert Heijn (AH) and Richard Branson’s Virgin Airlines provide two other examples of companies that operate with different PMCs in different supply chains with different drivers for different outcomes or blends of outcomes.

Table 1.13 *Different supply chains with different drivers for different outcomes or blends of outcomes*

Albert Heijn (AH) supermarket chain		Virgin Airlines	
Products/ segmentation	Blend of drivers supply chain	Products/ segmentation	Blend of drivers supply chain
Fresh & 'bio' products (top quality)	responsiveness/ sustainability/innovation	Business travelers	responsiveness/ innovation
A-products (high quality)	responsiveness/ innovation	Economy/Tourist travelers	low cost/ responsiveness
B-products (lower quality)	low cost	Space travelers (Virgin Galactic)	responsiveness/ innovation
Discount products (lowest quality)	low cost		

Splintering supply chains can be an effective complementary measure to blending supply chains. An example may illustrate this:

A company that faces forecasting and service-related problems because of increasingly volatile patterns and dissatisfied key customers after outsourcing its manufacturing to the Philippines, needs to rethink its supply chain configuration. A consequence of outsourcing production for this specific company is that all of its plants, relying on one common production-planning process, essentially manufactured the full range of its thousands of products and their many components. The company examined its portfolio of products and components along two dimensions: the volatility of demand for each SKU it sold and the overall volume of SKUs produced per week.

The company decided to split its one-size-fits-all supply chain into four distinct splinters. For high-volume products with relatively stable demand, the company kept the sourcing and production in the Philippines. Meanwhile, the facilities in the Netherlands became responsible for producing the rest of the company's SKUs, including high and low-volume ones with volatile demand and low-volume, low-demand-volatility SKUs.

Stepping up production in a higher-cost country such as the Netherlands made economic sense even for the low-volume products because the company could market them much faster, minimize lost sales, and keep inventories down for many low-volume SKUs.

However, the company didn't just reallocate production resources. At the same time, it changed its information and planning processes significantly. For the most volatile SKUs now produced in the United States, the company no longer tried to predict customer demand, choosing instead to manufacture directly to customer orders. For overseas operations, the company continued to have its plants in the Philippines produce finished goods on the basis of long-run forecasts.

The changes helped the company reduce its sourcing and manufacturing complexity and to lower its cost of goods sold by 12 percent. Meanwhile, it improved its service levels and shortened lead times to three days from an average of ten. Quality also improved across the company's full range of products.

1.7 Changing strategy: e-commerce and e-fulfillment

1.7.1 'Bricks and clicks': online shopping

Fulfillment can be defined as the process of taking an order and executing it by making it ready for delivery to the customer, including the ordering process, the payment, after-sales services and waste management. It may involve, among others, warehouse pickup, packaging, labeling. E-fulfillment is growing very fast and can be described as fulfillment activities that are carried out using the Internet.

'The number of e-commerce businesses, companies that sell their goods or services via the Internet is increasing significantly nowadays and is expected to keep growing further within the near future.'

E-commerce and e-fulfillment exist in a business-to-business (B2B) context, in which normally greater quantities are purchased for resale, and in a business-to-consumer (B2C) context, in which normally smaller quantities are purchased by the end-user, the consumer.

Consumer behavior is becoming more demanding and unpredictable. A customer-service explosion has taken place. Individualism, high quality and low pricing are the standards. This implies that companies have to move on to mass customization for commodity prices. Mass customization is the customization and personalization of products and services for individual customers at a mass production price. Also e-commerce businesses need to find the right order qualifiers *and* order winners to satisfy their customers and sell products over the internet. Consumers have continuously growing expectations and are waiting for a personalized and **seamless** customer experience.

Globalization, changes in lifestyle and social media have led to what is called **consumerism**, a social and economic order that encourages the purchase of goods and services in ever-greater amounts.

However, the term 'consumerism' is also used to refer to the consumerist movement for consumer protection or consumer activism, requiring honest packaging and advertising, product guarantees and improved safety standards.

E-fulfillment can be seen as the key to customer satisfaction.

E-commerce and online word-of-mouth go hand-in-hand and demand the end customer be taken more seriously than ever. Integral coordination in the supply chain is necessary to make the promises to consumers come true. Organizations that want to be really customer focused, should therefore focus on logistics optimization.

Within e-commerce, e-fulfillment is essential because it is fulfilling consumer expectations. This means a consumer wants to:

- determine where a parcel is delivered, e.g. at the home address, to a neighbor, a service point or another address
- decide when a parcel is delivered. Instead of a guaranteed delivery within 24 hours, the customer instead chooses an exact time window, so he can actually be home at the time of delivery
- know the status of his parcel real time and online through track and trace



Supply Chain Innovation is aimed at students in undergraduate and graduate courses in supply chain management. Collaborative planning, e-fulfillment, outsourcing, social media and cloud computing, technological developments and automation all have an impact on supply chain and operations management. Renewable energy and modal shifts in distribution will change the urban landscape. This poses challenges for supply chain partners and stakeholders, including educational institutes. This book contributes to finding innovative supply chain solutions.

The book is written from a business perspective and starts by explaining how organizations can live up to their corporate and social responsibility and develop a mission to serve people, planet and profit. The following chapters

deal with planning, quality and process management, and the individual processes in the supply chain. The final chapter looks at the future and, more specifically, at innovation in the supply chain.

This second edition has been completely revised to include the latest developments in business and sustainability. Each chapter starts with learning objectives, to help students focus on the key concepts, which are also illustrated in the text by a large number of examples and cases. At the end of each chapter, study questions allow students to test their knowledge and a comprehensive case study helps them to tackle real-world challenges.

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