## 1.1

1. Define supply chain management.

*The definition according to Thaler: "The establishment of a basic procedural structure, incorporating the transport routes as well as supply and disposal strategies, together with a uniform system of controlling for all participants in the process chain."*

1. Define controlling.

*"Controlling is a management subsystem that shapes, interlinks and coordinates planning, control and the supply of information to help coordinate and adapt the overall system." This 1990 quote by Horváth is an established definition of controlling.*

1. What is the broader definition of supply chain controlling?

*Supply chain controlling covers all organizational, personnel and technical aspects relating to supply chain management. Conventional controlling elements may still be used internally, but make only a minor contribution to optimizing the company-wide supply chain. Conventional controlling must therefore be expanded beyond monetary variables to include a broader focus on customers, innovations and processes.*

## 1.2

1. Outline the importance of supply chain controlling.

*Supply chain controlling (SCC) is a sub-function of corporate governance and is therefore ascribed directly to the supply chain management. It ensures a continuous, comprehensive and up-to-date flow of information to the supply chain management about procedures and company results.*

1. What are the core tasks of SCC?

*Supply chain controlling is tasked with mapping all planning, control and monitoring processes and activities within the supply chain and keeping all stakeholders updated. Supply chain management should be viewed as a control loop.*

1. What is meant by a control loop?

*A control loop is a system in which certain events prompt certain types of feedback, whether positive or negative. A specific control variable is defined within the control loop (in this case, the supply chain).*

## 1.3

1. What is meant by cost tracking?

*Cost tracking is part of the reporting system. As a systematic control tool within supply chain controlling, it gages the proportion of certain activities in the supply chain and their contribution to corporate success.*

*Within supply chain controlling, cost tracking is typically applied to the areas of inventories, material costs and freight costs.*

1. In which area is cost tracking useful?

*Cost tracking is useful for budgeting within the strategic framework and supports the operational management team with its duties.*

## 1.4

1. Name the different types of supply chain controlling.

*Relationship (or partnership) controlling is one form of SCC, while trust controlling measures the soft factors.*

1. What is CPFR?

*CPFR stands for the collaborative planning, forecasting and replenishment of all supply chain participants.*

## 2.1

1. What are KPIs and how are they used in controlling?

*Controlling and KPIs are inextricably linked. KPIs are quantitative variables (expressed as figures) describing certain information within or between companies. KPIs can assist with forthcoming decisions and identify any deviations or weaknesses within the company or supply chain. They can shed light on cause-effect chains and enable realistic comparisons between your own company or supply chain and similar organizations. KPIs facilitate success monitoring as well as internal and external comparisons, and they set standards by which an organization is measured, for example in relation to its aspired targets.*

1. Explain the classic system of indices according to DuPont.

*This is a KPI system developed in 1919 by American company E.I. du Pont de Nemours and Company. As one of the world’s oldest and best-known KPI systems, the DuPont pyramid is founded on the theory that a company's success is determined by maximizing ROI rather than by maximizing profits. The system draws on a small selection of particularly meaningful global variables.*

## 2.2

1. Explain the difference between strategic and operational KPIs.

*Within a supply chain, a fundamental distinction is made between operational and strategic KPIs. Strategic KPIs are used to analyze the entire supply chain and create transparency about collaborative partnerships, while operational KPIs are internal valuations offering an overview of in-house divisions or highlighting individual business units.*

1. Name the four different types of KPIs according to Werner.

*1. Statistical differentiation (absolute and relative KPIs)*

*2. Target-oriented KPIs (performance and liquidity indicators)*

*3. Performance KPIs (strategic and operational indicators)*

*4. Object-related KPIs (performance and cost indicators)*

## 2.3

1. What are conventional three-dimensional business diagrams?

*Conventional, three-dimensional business diagrams are used to visualize relationships between different KPIs and serve as a decision-making aid. The three dimensions might be: (1.) Sales in a (2.) specific region over (3.) a given period. In practice, the use of multidimensional diagrams may be limited due to the high level of complexity and the required input. The third variant (the structure diagram) is more commonly used. Maps are used to illustrate topological conditions, such as the regional distribution of retail branches, while networks may be used to map logistical networks and tree diagrams to illustrate organizational structures (e.g. organizational charts and decision trees).*

## 3.1

1. What are conventional controlling tools?

*The tools used to calculate KPIs in supply chain controlling must satisfy a variety of requirements. A conservative approach to value chain controlling uses traditional controlling tools such as activity-based costing, contribution margin accounting and target/actual comparisons.*

1. Why are SCOR models used in Supply Chain Management?

*Supply chain controlling also uses overarching activity-based costing to identify process cost drivers and minimize cost allocation inaccuracies. The SCOR model is globally recognized as an efficient tool for planning and controlling supply chains by creating a common basis with uniform definitions and demarcations. The Supply Chain Operations Reference Model (SCOR Model) was designed in the United States by the Supply Chain Council to describe all business processes within and between companies. The five essential supply chain management processes (plan, source, make, deliver and return), coupled with business process reengineering, benchmarking, and best practice analyses, provide the basis for the first level of detail found solely in strategic corporate planning.*

## 3.2

1. Name three innovative supply chain controlling tools and briefly define one of them.

*Name three tools which represent processes / combinations of processes and so-called soft factors: The supply chain map, the stress and resilience portfolio, and supply chain valuation. The supply chain map creates transparency by determining and assessing a supply chain partner’s position within the value chain in relation to other partners, such as upstream or downstream value-creation levels. The stress and resilience portfolio is used to assess and categorize these relationships. Supply chain valuation is recommended for downstream evaluation of the resultant management recommendations.*

1. What does it mean if a member of the supply chain or section of the overall unit is described as "critical"?

*The stress and resilience portfolio analyzes the strengths and weaknesses of each supply chain participant. It can be useful to prioritize all members of the value chain and identify the critical sections. This transparency means that cooperation with supply chain stakeholders who fall short of the defined criteria can be monitored and improved. If necessary, an emergency plan can be drawn up or a particular section of the organization replaced as appropriate.*

## 4.1

1. What are ERP systems?

*ERP systems are business software systems used to map a company’s internal processes. ERP software covers all internal processes relating to production planning & control and materials management from procurement through to warehousing, as well as all logistical aspects. ERP systems also cover human resources management as well as cost calculation and accounting. ERP systems integrate all the aforementioned areas into one central system, to allow the concerted operation of internal processes and create consistently recognizable and traceable process lines.*

1. Are ERP systems appropriate for supply chain management?

*ERP systems are ideal for mapping internal processes, but when it comes to integrating external factors, as is the case in supply chain management, they reach their limitations.*

## 4.2

1. Explain the distinction between ERP systems and CRM / SCM systems.

*In supply chain management and value chain controlling, the focus is on incorporating all supply chain participants. ERP systems are essentially designed for individual companies. Supply chain management focuses on processes that control the entire logistics chain from supplier to end-user alongside the management of customer relationships. CRM or SCM tools should therefore be used for a more holistic view. CRM systems focus on processes that are directly or indirectly related to customer management, while SCM systems align internal and external logistics and supply chains with an increasingly globalized economy.*

1. How would you go about designing an SCM system?

*When designing an SCM system, assume that all requirements are evenly distributed and consider all eventualities, then select the supposed cheapest alternatives. Next, narrow down your selection to those best-placed to accommodate anticipated changes and fluctuations in incoming orders, then re-evaluate the remaining shortlist from a cost perspective. Having repeatedly scrutinized every detail of the entire supply chain system in this way, you will arrive at the most financially attractive solution for the supply chain. Perform one final assessment to gage performance in the event of simulated fluctuations and, if necessary, modify again. The basic data obtained in this way and incorporated into the SCM system is the target state which guides all supply chain activities. The SCM system itself compares the target KPIs with the actual values obtained and supplies controlling with this information so it can intervene in the supply chain in case of deviations. The next step is to define the individual segments of the value chain and integrate these theoretically derived values into the supply chain as target KPIs. The subsequent requirements placed on the IT systems are derived from these defined processes.*

## 4.3

1. Use a practical example to illustrate the key steps when devising SCM software.

*The key points to consider within the value chain are as follows:*

*1. The South American wine has long production times and transport routes, so the stock cannot always easily be reordered. As a result, the wine merchant starts stockpiling more and more stock to meet customer demands and avoid jeopardizing sales, fearful that customers could migrate to its competitors instead.*

*2. Because of the lengthy procurement times and transport routes, demand cannot be promptly met if stock levels are too low.*

*3. The logistics costs are immense, especially with high-end wines aimed at a very exclusive clientèle, as they are only purchased in small quantities with higher transport costs.*

## 4.4

1. Why is SCM software used?

*Despite the high cost and effort associated with the use of SCM software, its use is justified, because it builds on a proven, process-oriented approach. It is important to ensure appropriate project and risk management measures to preclude budget and schedule overruns as far as possible. Involving central units like procurement, capacity planning and sales planning early in the process to identify and optimally coordinate mutually influencing interfaces is another key success factor. This also includes the early information and involvement of future SCM software users so that valuable employee experience can be incorporated when implementing the new system. This helps boost the project’s chances of success by comprehensively communicating the anticipated improvements for employees and companies.*

1. Why should employees be involved in SCM projects at an early stage?

*Because it helps to improve communication, operational use and knowledge-sharing between individual departments, either by involving employees directly in the project, or by communicating the current project status to non-participating employees via training and communication plans.*

## 5.1

1. Explain the difference between operational and strategic goals within the context of operational and strategic controlling.

*Strategic goals are long-term, while operational goals are for short-term implementation. A strategic goal is to safeguard the company's existence, while success and liquidity goals are operational. Strategic controlling supports management with a forward-looking mindset and promotes a particular corporate culture throughout all functional areas of the company. Strategic controlling also performs vital coordination tasks to support the strategy planning and implementation process. Operational controlling is responsible for establishing a performance-based planning and control system. It coordinates target achievement measures and assists management with decision-making. Operational and strategic controlling are mutually dependent and complement one another. Strategic controlling can only be effective if operational controlling fulfils its tasks.*

1. List the possible tools for both controlling types and explain activity-based costing.

*Just as there are two types of controlling, the tools used are also divided into two groups. Contribution margin accounting, KPI (systems), ABC analysis, budgeting, break-even analysis, activity-based costing and many other tools (which vary depending on the specific controlling task) are classed as operational controlling tools, while benchmarking, various analysis techniques and the balanced scorecard are classed as strategic controlling tools.*

*Activity-based costing, an established cost accounting system, draws on some of the tried-and-trusted methods used in full cost accounting systems. Activity-based costing improves cost allocation by distributing overhead costs proportionally for easier planning and control of individual departments. Costs must be allocated proportionally in order to identify and implement cost-cutting potential in individual departments, by breaking them down transparently among individual products and services rather than general business units. Activity-based costing requires a detailed analysis of each task within a cost center so that unproductive tasks become transparent and readily identifiable. This approach is always applied to the entire value creation process.*

## 5.2

1. What is benchmarking and where is it used?

*Benchmarking was originally used to compare operations. Benchmarking is a continuous comparison process, preferably with a company’s stronger or the strongest competitors (best in class), with a view to learning from and adapting their success formulae and incorporating them into the company’s own strategy. There are various types of benchmarking, including functional, internal and competitive benchmarking. Benchmarking is a useful controlling tool, as it not only provides information about an operational unit’s success or failure but also acts as a motivator by comparing competitors to identify potential process improvements and strategic realignments. However, the disadvantage of benchmarking is that it does not always compare like with like, such as subsectors with similar but completely unrelated processes. For example, although different products may use similar production processes, they are not comparable because the products are marketed in completely different environments.*

1. List the seven phases of the benchmarking process.

*The benchmarking process itself can be divided into seven phases: Analyze the company’s strengths and weaknesses; identify where changes are urgently needed in the company/where the best market opportunities are; analyze the "best in class"; understand why this organization is so successful; identify potential adaptations within your own company; formulate and implement (new) strategic goals; success analysis/target-actual comparison; if the desired result is not achieved, repeat steps one to four.*

## 6.1

1. Define risk in the supply chain.

*A supply chain risk is assessed according to the likelihood of damage occurring, affecting more than one company in a value chain and originating from a supply chain participant or in the immediate vicinity of the supply chain. If a risk occurs among one supply chain participant, one or more of the other participants will experience it as a demand or supply risk. For risk assessment purposes, it is irrelevant whether the risk is triggered directly by a supply chain partner or an environmental factor.*

1. What is meant by supply chain "vulnerability"?

*Risks occurring within value chains trigger consequential losses among one or more supply chain partners. This effect is known as the supply chain’s "vulnerability".*

## 6.2

1. Distinguish between the different risks in the supply chain and identify their characteristics.

*Supply chain risks can be categorized depending on where they arise (the risk source). Supplier-side risks are disruptions caused by a supplier failure, for whatever reason, and also include quality problems with supplied parts and price fluctuations on the procurement markets.*

*Customer-side risks are disruptions affecting customers of a supply chain product. One example is the bullwhip effect, a phenomenon whereby the entire supply chain is imbalanced by limited local information and resultant local decisions, because even a small fluctuation in customer demand can impact demand at every subsequent stage in the supply chain and become increasingly dispersed. Bureaucratic risks are another category which should not be underestimated, ranging from laws and regulations to administrative restrictions.*

*Infrastructure risks may include various disruptions, such as an IT failure or production capacity failure due to machine damage. Risks associated with employees include illness, strike or even fraud. Other key aspects include supply disruptions such as power outages and disaster risks.*

## 6.3

1. Where must risk management be anchored and how can risk assessments be addressed in advance?

*The more complex the supply chain, the greater the risk of vulnerabilities. Risk management must therefore be incorporated into both strategic planning and supply chain controlling.*

*Complex simulations can be used to scrutinize the issue from every perspective and gage how risks affect the supply chain and which impacts may be triggered by which events.*

1. How are risk assessments and company success interdependent?

*A company’s success is determined by risks: A risk event arises from the various identified risk sources, i.e. an event occurs which triggers a risk. The timing and location of this event are identifiable. At this point, risk management implements risk mitigation measures to limit the supply chain’s vulnerability and minimize the risk. The less the supply chain is influenced by risks, the greater the chance of success for the supply chain, and consequently, for the company.*

## 7.1

1. What is meant by risk and what is risk potential based on?

*Risks are events with adverse impacts. Risk management means identifying risks and employing measures to evade, mitigate or counteract them. Risk management is used whenever there is a certain risk potential. Risk potential is based on three factors: A specific, well-founded threat; a weak link in the supply chain; and potential damage to a significant asset. If the likelihood and impacts of a negative event are unknown, it is classed as a hazard. The planned success of a supply chain is influenced by the likelihood of a risk scenario and resultant potential losses.*

2. What are the three key elements of risk management?

*Risk management itself comprises three key elements: Risk identification and analysis, the implementation of measures (i.e. control of emerging risks) and risk monitoring.*

## 7.2

1. List the three phases of risk analysis.

*Risk management uses a range of analytical techniques with differing costs and inputs. Essentially, a risk analysis comprises three phases from which a specific risk catalog is generated: Risk identification, risk classification, and risk documentation.*

1. How do you make risks visible and how are risks assigned to products or services?

*Risk checklists are a tried-and-tested risk analysis technique prepared by a company based on its past experiences. They usually draw on historical records supplemented by more recent experiences. These empirical values are made tangible by documenting processes and deviations, ideally with detailed consideration of the triggers of any adverse influences or events. Every product and service within a supply chain has specific risks depending on market environment, however marginal the differences may be. For each of these individual risks, the checklists should be supplemented by a specific risk analysis. Product-specific risks or damage events may be triggered by error, intent or coincidence. From a commercial perspective, analysis will include issues such as currency stability (when importing supplier parts from abroad) or the effects of possible market price increases for raw materials. Other key factors are linked to the corporate environment, such as regulations, laws and standards.*

## 7.3

1. How is a risk assessment carried out?

*Once the risk analysis is complete, a risk assessment is undertaken using selected yardsticks supported by statistics. Risk assessment typically focuses on the dimensions of “extent of damage” and “likelihood of occurrence” and includes three different variants: In variant I. evaluation is based on cardinal scalable variables (a scale using real numbers). Variant II. uses ordinal scalable variables (also known as a ranking scale). Variant III. uses nominal scalable variables (an enumeration with no evaluation, ranking or sequencing, for example: yellow, blue and red cars).*

1. What about risks that cannot be assessed with a scale? Give an example.

*Risks that cannot be assessed on one of these scales are summarized in business terms. This type of assessment decides on measures without analyzing their potential impact. Risk assessment criteria may include brand awareness, company image or macroeconomic assessment criteria.*

## 7.4

1. What is meant by a TREE structure?

*Project risks are identified and analyzed using a so-called TREE structure. The identified risks are individually assessed according to the following structure:*

*Description of the risk; impacts of the risk; causes of the risk; risk mitigation measures.*

1. What about unplannable (so-called “acute”) events that require rapid damage limitation?

*However carefully risk management is planned, unforeseen acute events can occur which demand rapid damage limitation. These risks should then be carefully analyzed to prevent similar problems in the future or allow them to be rectified more easily. Risk management cannot anticipate every risk, because the market environment and internal supply chain development tend to be very dynamic. As a continuous process, however, risk management helps to contain individual risks and limit the overall risk level.*

## 8.1

1. What is meant by organization?

*The term organization encompasses three different approaches: institutional organization (such as an institution, authority, political party, church …), structural organization and functional/instrumental organization. Structural organization means that the company or supply chain already has a procedural and organizational structure in place. Core and secondary processes are anchored in process descriptions, manuals, and other guides. Organizational charts and hierarchies will have already been drawn up by supply chain management and summarized in role and job descriptions. The actual task of organizing falls into the third category: functional/instrumental organization, whereby organizational activities are assumed on behalf of a third party. For example, a call center might provide scheduling on behalf of an insurance company, or a forwarding company might manage shipments on behalf of an industrial customer.*

1. In which areas is organization changing in relation to the supply chain?

*Organizational design is continually evolving in all companies and in the supply chain. Its development is individual and may be triggered or caused by change, or may itself effect change, and/or may include measures to tackle change.*

## 8.2

1. What is meant by system dynamics in relation to supply chain management?

*One fundamental principle firmly anchored in supply chain management is the holistic view of strategic and operational approaches. System dynamics is a technique designed to assist companies, supply chains and managers with mapping complex correlations through systems thinking and system simulations.*

1. What is meant by simulation?

*Simulation denotes the interactions between individual application areas, computer science and applied mathematics. Simulation can be used across industries and disciplines and is used for guidance and to ensure the success of the company.*

## 8.3

1. What is a data warehouse?

*In supply chain controlling and its interface to risk management, all analyses, ideas, strategic and operational decisions are based on shared, up-to-date, holistic sources of data and information. Whereas in the past a simple reporting system for company data would suffice, today’s databases offer much more than just conventional master data and historical data, especially in the diverse supply chain environment. The latest databases serve as a platform for all data and information flows from enterprises or, more broadly, from supply chain architectures. An active data warehouse is capable of processing multiple different systems. Data and information flows from all operational, scheduling-related and strategic processes are mapped and KPIs are developed for supply chain controlling.*

1. How does a data warehouse simplify the monitoring and controlling of a supply chain?

*As a shared platform, the data warehouse maps the holistic approach to supply chain management and risk management for the value chain and related controlling. Despite the many benefits, harmonizing or re-creating the multiple different technologies used value chain participants may be a costly and time-consuming process.*