

---

## 2 SUPPLY CHAINS AND TRADE RELATIONSHIPS

The previous chapter provides an overview of the thesis, lists the objective, issues, and significance of the research topic and also the approach for achieving the main goal.

This chapter reviews the relevant literature and comprises four sections. The review starts with fundamental definitions and features of the concepts of “Supply Chain” (SC) and “Supply Chain Management” (SCM). This is followed by the discussion on approaches to understanding the supply chain in-depth, in particular their classification, actors, flows and networks. Next, the key issue related to the Supply Chain Relationships (SCR) and factors influenced these is discussed. After this, focus is shifted to e-commerce as an enabler to SCM, what kind of opportunities there are, their benefits and whether barriers to the adoption exist (see Figure 2-1).

**Figure 2-1: Overview of Chapter 2 “Supply Chains and Trade Relationships”**

<b>CHAPTER 2: SUPPLY CHAINS and TRADE RELATIONSHIPS</b>	<b>2.1 The Supply Chain (SC)</b>
	Definitions and objectives
	Classification of Supply Chain
	Actors in Supply Chain
	Supply Chain Flows
	Supply Chain Networks
	International Supply Chain
	<b>2.2 Supply Chain Management (SCM)</b>
	Historical view of SCM
	Definitions and objectives
	SCM in agri-food business
	<b>2.3 Trade Relationships (TR) in the SC</b>
	Definitions and objectives
	Levels of Supply Chain Relationships (SCR)
	Governance structures
	Contractual Relationships
<i>Short-term vs. Long-term contracts</i>	
<i>Quality signs of agri-food products</i>	
Factors affecting SCR	
<b>2.4 E-commerce enabled SCM</b>	
ICT and e-Business background	
B2B e-commerce	
<i>Electronic data interchange (EDI)</i>	
<i>E-marketplaces</i>	
<i>E-platforms in the agri-food sector</i>	
Benefits of e-commerce	
Barriers to adoption of e-commerce	

Source: Own elaboration

### 2.1 The Supply Chain (SC)

#### 2.1.1 Definitions and objectives

There are numerous definitions for a Supply Chain (SC) and Supply Chain Management (SCM). The definition often reflects the field from which the question is approached. For example, a manufacturing-oriented view will emphasise different points from a marketing-oriented view. A reasonable neutral definition for a Supply Chain has been presented by ELLRAM (1991):

*“A network of firms interacting to deliver a product or service to the end customer, linking flows from raw material supply to final delivery”.*

LEE AND BILLINGTON (1995) have a similar definition:

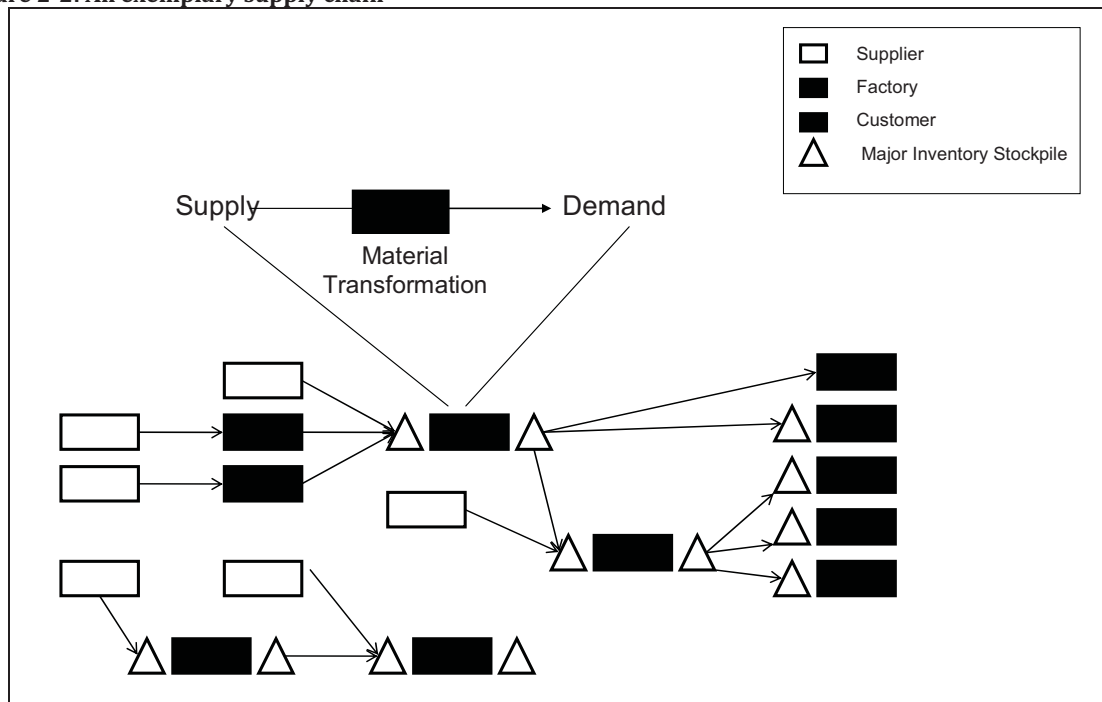
“A supply chain is a network of facilities that procure raw materials, transform them into intermediate goods and then final products, and deliver the products to customers through a distribution system”.

A supply chain has been defined as: “A set of three or more entities (organization or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from source to a customer” (MENTZER ET AL. 2001).

STEVENS classifies a supply chain as “... a connected series of activities which is concerned with planning, coordinating and controlling materials, parts, and finished goods from supplier to customer. It is concerned with two distinct flows (material and information) through the organization” (STEVENS 1989).

GANESHAN ET AL. have yet another analogous definition: “A supply chain is a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers” (GANESHAN ET AL. 1995). The Figure 2-2 depicts an exemplary supply chain with all its components.

Figure 2-2: An exemplary supply chain



Source: Stadler 2005

The classification of supply chain, its actors and what it consists of, will be further analysed later in this chapter.

The first step in managing the supply chain, as well as studying the relationships within, is to map the supply chain structure (LAMBERT 2006). The outline of this subsection is as follows: Supply chain classification – here the attributes of the supply chain are listed. After this, the basic building blocks of the supply chain are defined. In the definitions below, these blocks are termed entities, organisations, networks, and individuals. The connections between the blocks

## 2.1 The Supply Chain (SC)

are termed linkages or relationships. Then the direction and its meaning of the supply chain flows is shown, followed by an explanation of the supply chain network.

### 2.1.2 Classification of Supply Chain

A supply chain can be classified on the basis of typological features and their characteristics. The following features and characteristics given by BUSH AND DANGELMAIER (2002) present an overview of the broad potential of a supply chain classification (see Table 2-1):

**Table 2-1: Classification of supply chain**

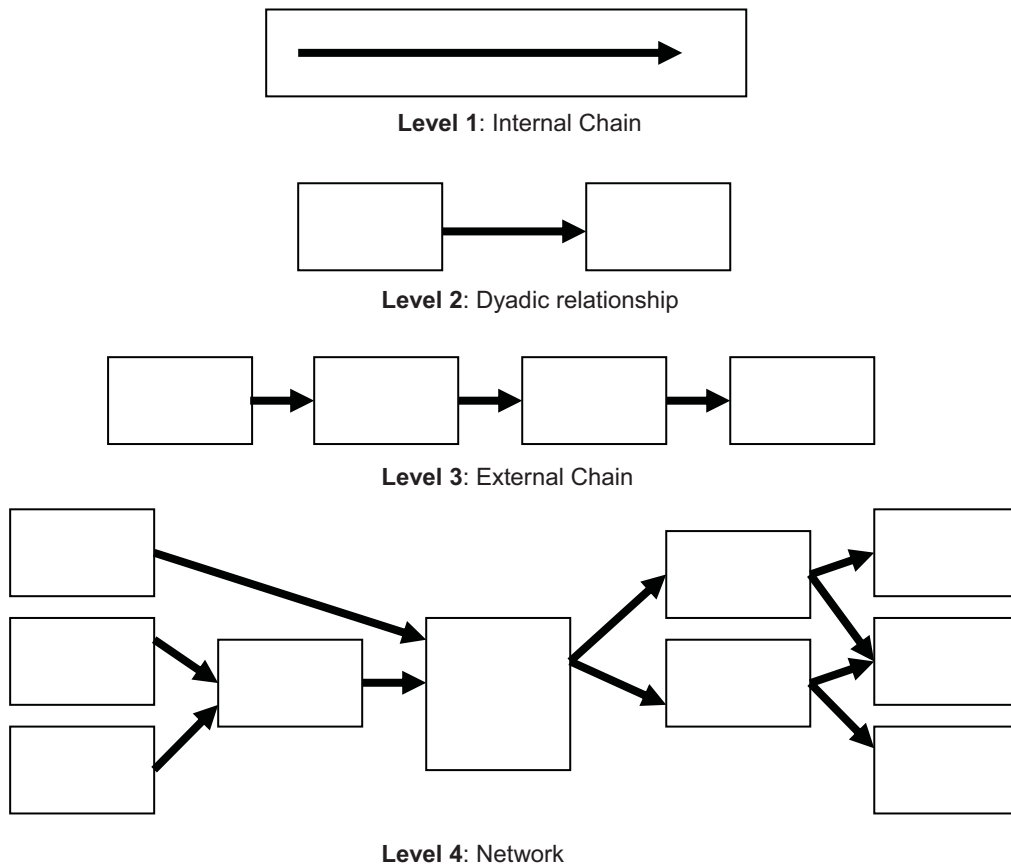
Attribute	Attribute's characteristic
Cooperation's item	procurement
	production
	sales
	research and development
Cooperation's direction	horizontal
	vertical
Partner's size	homogeneous
	inhomogeneous
Coordination's direction	hierarchical
	heterarchical
Origin	local
	regional
	national
	global
Nature of state of competition	single
	double
	multiple sourcing
Time perspective	short
	medium
	long term
Relationships	informal
	contracted
Trust	low
	medium
	high

Source: Own elaboration, based on Busch and Dangelmaier 2002

This is however not the only available supply chain classification. Even though most supply chain classifications originate from the management of supply chains, the same system levels are relevant when determining the scope of supply chain interaction in accordance with CHRISTOPHER (2005). This is consistent with the definition by MENTZER ET AL. (2001), stating that supply chains are simply something that exists, while supply chain management requires clear management efforts by the organisations within the supply chain.

When taking the research approach to supply chains, HARLAND (1996) has suggested the division of Supply Chain research into four levels of complication as illustrated in Figure 2-3.

Figure 2-3: Four levels of research in Supply Chain Management



Source: Harland 1996

The levels are according to HARLAND (1996):

- Level 1: The internal chain;  
The *internal supply chain* that integrates business functions involved in the flow of materials and information from the inbound to outbound ends of the business is regarded as the first level. The inter-organisational relations can then be divided into three different levels:
- Level 2: The dyadic or two party relations;
- Level 3: The external chain where the supplier, the supplier's suppliers, the customer, and the customer's customers are included, i.e. a set of dyadic relations;
- Level 4: The network of interconnected chains.

The levels describe Supply Chain integration and Supply Chain Management as the management of supply relationships. This means that Supply Chain Management is not restricted to the management of the material flows. The management of information flows becomes more important as the complexity of the structure increases.

### 2.1.3 Actors in a Supply Chain

According to LAMBERT ET AL. (1998), a supply chain consists of the network of members, and the links between members of the supply chain. HARLAND (1996) on the other hand defines a supply

chain network as comprised of a set of persons, objects or events, called actors or nodes. Within the industrial network approach actors, activities, and resources are identified (HAKANSSON AND SNEHOTA 1989, HAKANSSON AND JOHANSSON 1992). Most authors agree that the basic building blocks of a supply chain are the nodes and the arcs between the nodes; the problem however is to agree on what these nodes and arcs represent. There is hence a need for defining these components of the supply chain further.

The nodes have previously been defined as different companies (LAMBERT ET AL. 1998), different organisations (HAKANSSON AND SNEHOTA 1989, CHRISTOPHER 2005), different geographical locations (FERDOWS 1997) or different entities (organisations or individuals) (MENTZER ET AL. 2001). The term ‘actor’ could hence be used if the content of an actor is defined. Each actor is thus here defined as a specific set of resources, regardless of ownership, location etc.

The arcs in the supply chain structure have previously been defined as process links (LAMBERT ET AL. 1998), as relationships (HAKANSSON AND SNEHOTA 1989, CHRISTOPHER 2005), as linkages with processes and activities (CHRISTOPHER 1992), or as flows of products, services, finances, and information (MENTZER ET AL. 2001).

The arcs in the supply chain are defined in this thesis as the relations between the actors.

An in-depth approach of the relationships between the actors in the supply chain will be presented in section 2.3.

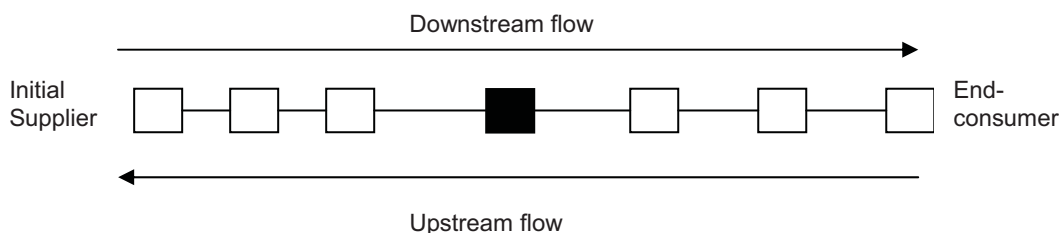
#### 2.1.4 Supply Chain Flows

The actors in a supply chain exchange materials, products, services, money, and information to create value for the end-customer. The direction of this flow is called the upstream or the downstream flow and usually refers to the direction of flow from the focal company’s point-of-view (CHRISTOPHER 1998).

The **upstream** flow mainly consists of information and finances but also products or material in the form of returns. The **downstream** chain, or the distribution channel, consists of the focal firm’s customers and their customer’s customer. The main content of the downstream flow is the flow of products or material, even though the flow of information is also important.

A typical supply chain and its relationship between upstream and downstream actors are shown in Figure 2-4. As the figure shows, consumers demand products, and in order to satisfy these demands, multinationals source products through a vendor or middleman or purchase directly from contracted suppliers (CHRISTOPHER 1998).

Figure 2-4: The up/downstream flow of a supply chain



Source: Christopher 1998

### 2.1.5 Supply Chain Networks

**Networking** is a cooperation between business partners in horizontal and vertical chains. The networking concept is used when there are more than two cooperative partners.

**A supply chain network** is defined as a network of connected and interdependent organisations mutually and co-operatively working together to control, manage and improve the flow of materials and information from suppliers to end users (CHRISTOPHER 1998.).

In the literature the term supply network is often used in place of supply chain (KUHN AND HELLINGRATH 2002, SYDOW 2006).

This change of the object's view from supply chain to supply network can be justified according to BUSCHER (2003) because individual enterprises usually not only have a single supplier and a single purchaser, but maintain various relationships with several members of the chain. Thus it seems that the term supply chain may be replaced by the term supply network.

Research often focuses on supply chains as connections between exactly one seller and exactly one buyer due to the simplicity of the concept and analytical tractability. This restriction often suffices for achieving the research goals.

However, real business interactions often occur in network structures rather than in a chain of buyers and sellers for several reasons:

- Multiple links may enable the pooling of risks;
- Buyers may share sellers to ensure that sellers have sufficiently high demand to cover investment costs;
- More links may enable access to a variety of goods;
- Sellers may have economies of scope or scales, if they have multiple buyers;
- Possible advantages of diversity and potential future benefits, e.g. buyers could take advantage of sellers investigating different technologies;
- Overcoming threshold values in a certain field that is impossible to overcome with one link (e.g. in many environments, a firm's gain of adopting a technology may depend on others adopting this technology).

Subordinately, the term network in practice is more applicable to nonlinear relationship points, while the terminology supply chain implies linearity between the individual enterprises, because enterprises in SCs cannot be regarded in an isolated manner. The enterprises are affected by other enterprises and vice versa (CHAIB-DRAA 2006). Co-operations in the supply chain allow these interactions for all enterprises to be arranged optimally, i.e. the interests of all cooperation partners in the SC are well-known and considered.

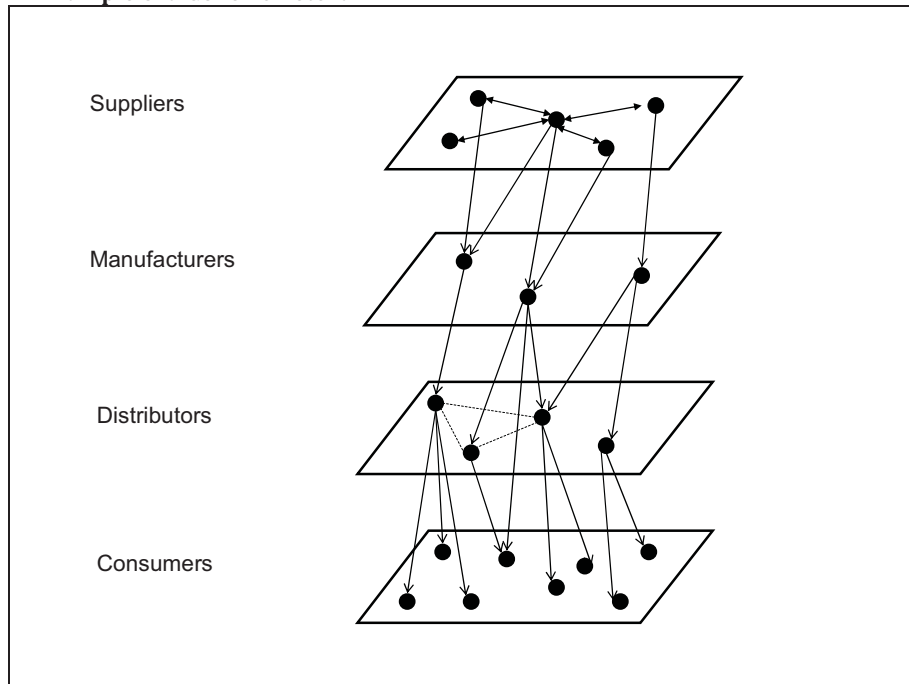
*"A supply network is a group of buyers, sellers, and the pattern of the links that connect them, where a 'link' is anything that makes possible or adds value to a particular bilateral exchange"* (KRANTON AND MINEHART 2001).

Instead of the linear and unidirectional model describing supply chains, the supply chain network concept includes and describes lateral links, reverse loops, two-way exchanges etc. This corresponds to Harland's system level four (see also section 2.2.1).

In a similar manner, LAZZARINI ET AL. (2001) describe that supply chains are not really linear chains but most often expansive networks (LAZZARINI ET AL. 2001) and introduce the concept of

*netchain* – a set of networks comprised of horizontal ties between firms within a particular industry or group, such that these networks (or *layers*) are sequentially arranged based on the vertical ties between firms in different layers (Figure 2-5). Netchain analysis explicitly differentiates between horizontal (transactions in the same layer) and vertical ties (transactions between layers), mapping how agents in each layer are related to each other and to agents in other layers.

Figure 2-5: An Example of a Generic Netchain



Source: Lazzarini et al. 2001

### 2.1.6 International Supply Chain

International trade is determined by natural and cost-related reasons. The natural reason for international trade is the absence of one or more factors of production (nature, labour, knowledge and capital) for the production of a particular good in one country. At this point it is important to mention that not only the lack of production factors, but also the over-supply of raw materials, semifinished and finished products is a natural reason (KAMINSKI ET AL. 2006).

Cost and price advantages are another reason for international trade. Some products can be produced cheaper abroad than in one's own country, and vice versa cost advantages in one's own country make other products more attractive to foreign demand. Cost differences arise in terms of quantity and quality of factors of production (KAMINSKI ET AL. 2006). According to the theory of absolute cost advantage, based on Adam Smith, goods will be exported if they are cheaper inland than abroad. On the other hand, goods are imported if they are cheaper abroad than inland (ANDEREGG 1999).

The international supply chain equates to the national or regional supply chain. The only difference is that the international supply chain goes beyond national borders and acts in a larger geographical area. The regional supply chain with some foreign partners can contribute to

an international supply chain that will be extended to an integrated global supply chain (SIMCHI-LEVI 2003).

The international supply chain is in contrast to the national supply chain associated with a greater number of activities that are brought about by many people of different nationalities. Within the international supply chain activities are in particular dependent on international trading conditions, the nature of the product and cultural characteristics of the trade relationship in the related countries (CARL 2003). The trade partners of the international supply chain work in a dynamic environment with often varying requirements (SCHARY AND SKJOTT-LARSEN 2001).

## **2.2 Supply Chain Management (SCM)**

The following section introduces different current perceptions and definitions of SCM, as a variety of ideas and understandings about SCM exists. The SCM in the agri-food sector and on the international level are further examined.

The term "Supply Chain Management" (SCM) was originally introduced by OLIVER AND WEBBER in the early 1980s (OLIVER AND WEBBER 1992) and has since gained currency and constantly increasing importance (WERNER 2000). The changes from seller's to buyer's markets and rising complexity and dynamics of the basic conditions are assumed to be the main causes for this approach (KUHN AND HELLINGRATH 2002, BERENTZEN 2000).

Before analysing the concept of SCM and its application, it is of importance to present the objectives of the SCM function. The following subsection provides the objectives of SCM.

### *2.2.1 Definitions and objectives*

The definitions of Supply Chain Management often overlap with those of modern definitions of logistics (LAMBERT 2006). The key difference is perhaps that definitions of SCM that do not come from a logistics background take a more holistic approach and the emphasis is on a network rather than on a single company. This single company approach can be seen, for example, in the definition of Logistics by CHRISTOPHER (1998).

Based upon definitions of different authors, Table 2-2 should impart a sense of the impact of the large spectrum of SCM.