2. Introduction

The steel industry exerted a very strong influence during the 19th and 20th centuries, yet developments of furnace prototypes were already in progress much earlier. In the 14th century, it was possible for the first time to heat iron in such a way that it remained in liquid form. At the onset of the 19th century, Friedrich Krupp founded a cast steel factory in Essen (Germany). His son Alfred Krupp took over the business in 1826, which back then had only seven employees. At the time of Alfred Krupp's death in 1887, the number of employees in the factory had increased to 20,000. Up until 1973, the steel industry was a very strong economic sector throughout the world, yet it marked a fateful year for the German steel industry. The world economic crisis strongly altered growth prospects in the steel industry, from which it still has not recovered even today.¹

2.1. Problem Statement

The steel industry is regarded as traditional and conservative from a historical perspective, and as such the industry moves very slowly in terms of embracing changes. This perception is also reflected in a study in which one of the questions pertained to sufficient strategic orientation in the ASEAN regions (Brunei, Cambodia, Indonesia, Laos PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and

¹ Cf. http://www.planet-wissen.de/alltag_gesundheit/werkstoffe/stahl/ [surveyed on 29.03.2015]

Vietnam).² Individuals who were surveyed comprised the metalproducing and metal-processing industry, the engineering sector, the automotive as well as the electrical industry in Germany. 57% of those surveyed asserted there was no orientation in the ASEAN regions. Only 27% positively answered this question.³The attributes cited run contrary to trends in today's market, and the steelproducing industry is at a crossroads as a result. It is also characterised by massive capacity surpluses in Europe and Asia. To confound matters, there are additional obstacles in the form of state subsidies, which compensate for the surpluses. Additionally, the steel industry faces more challenges due to high energy costs in Europe as well as the CO_2 certificate issue. This paper seeks out new ideas that can make distinctive improvements to the profit situation for the European steel industry.

2.2. Objectives and Expectations

The objective of this paper is to illustrate possible means with which to resolve the steel industry's dilemma. Its scientific foundation is created on the basis of supply chain management. Supply chains from various industries will be subsequently analysed and special characteristics of the supply chain in the steel industry shall also be compiled. Supply chain scrap metal, alloys, electrodes and refractory material will be explicitly examined from the source up to the OEM (Original Equipment Manufacturer) stage, insofar as possible. The

²Cf. ASEAN, Association of Southeast Asian Nations, <u>http://www.asean.org/asean/asean-member-states</u> [surveyed on 07.04.2015]

³Cf. Langenscheidt und Venohr, 2014, p. 42

focus of this paper lies in the increase of competitiveness and profitability by means of supply chain management. Since this is a urgency, matter of Erwin Bronk (partner with PWC (PricewaterhouseCoopers)) also clearly expressed his concerns during his lecture at the "Stahlmarkt 2013" presentation. He acts on the assumption of imminent cutthroat competition on a global level if the steel industry does not downsize within the next few years. This paper shall point out that there is still earning potential that can be developed. However, this only stands to succeed if findings from this paper are combined with practical implementation by means of the change management process.

2.3. Research Questions

In this paper, answers to questions shall be established that facilitate improvement potential for the steel industry. The questions are as follows:

- What supply chains exist in the present-day steel industry?
- What supply chains are decisive competitive factors?
- To what extent are existing supply chain concepts used in the steel industry?
- Is it possible to generate a competitive advantage in the steel industry by implementing supply chain management?
- What can supply chain management offer in terms of competitive advantage for the steel industry?

- What is the current status of supply chain finance in the steel industry and how can it serve to close any contingent gap?
- What indicator systems exist in the steel industry?

2.4. Structure of the Paper

This paper is divided into 11 chapters. The first chapter includes the management summary. The second chapter outlines the problem statement, objectives and expectations, hypotheses, structure of the paper as well as the methodical procedure. In the third chapter the definition of supply chain is elaborated upon and reference is made to branch-specific characteristics and distinctive features within the steel industry. The fourth chapter concerns supply chain and management and discusses developments trends. Comprehension of the supply chain management concept will be explored in depth based on the motives for implementation, objectives and benefits, frame of reference, potentials, followed by a critical appraisal of supply chain management. In this chapter, great emphasis on the supply chain finance will be conceded and the topic of working capital management will be highlighted. Furthermore, supply chain performance management will be outlined, including its definition, target values, instruments and balanced scorecard. An additional range of subjects addressed in chapter 3 includes profitability, competitive advantage as well as change management. In the fifth chapter, the current steel industry situation will be described and encompass the competitive position, the global market positioning as well as the advantages and disadvantages of the European steel industry in the context of global competition. Chapter 6 explains the methodology for the written expert survey and reports its results. Chapter 7 focuses on decisions regarding supply chain concept allocation, that is, which supply chain type best suits the respective supply chain. Improvements with respect to raising profitability and competitive advantage, acceleration of processes as well as risk minimisation serve as a foundation for the decisions made. Chapter 8 contemplates the forecast of the steel industry in Europe. With the aid of various literary sources, a potential scenario for the future will be projected and adapted to the steel industry, which will provide the basis for developing a prospective and potential supply chain concept. In chapters 9, 10, and 11 conclusions will be drawn, an ensuing discussion regarding the results will be generated, and a summary will be compiled correspondingly.

2.5. Methodical Approach

The methodology for the written survey supports transparency with regard to various perspectives. It subsequently is conducive to its implementation by which the theoretical approach is applied in order to extrapolate suitable trade recommendations. The survey is conducted in written form to counteract any risk of compromised results, since the author of this paper is employed in a steelproducing industry. The survey is divided into two categories. The first category involves companies that can be directly polled on the basis of relationships. This procedure ensures the suitability of the chosen questionnaire and allows for further enquires that could raise the quality of the responses. In the second category, approximately 10-20 steel factories around the world are questioned via a survey tool, which ensures the anonymity of the question and answer protocol. The objective is to achieve a high response rate. Target subjects for the survey comprise managers from the purchasing, acquisition, logistics and supply chain management sectors. Survey questions are intended to provide conclusions regarding the current implementation status of supply chain concepts within the steel industry as well as cover concepts as defined in the work involving other sectors. The following sectors are included:

- Supply chain management
- Supply chain finance (working capital)
- Supply chain performance (operating numbers, balanced scorecard)
- Innovations
- Change management process