



Einkauf, Logistik und
Supply Chain Management

Hrsg.: Christopher Jahns

Julia Wolf

The Nature of Supply Chain Management Research

GABLER EDITION WISSENSCHAFT

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**Einkauf, Logistik und
Supply Chain Management**

Herausgegeben von
Professor Dr. Christopher Jahns

Die Schriftenreihe stellt den State-of-the-art betriebswirtschaftlicher Forschung am Supply Management Institute SMI™ im Bereich Einkauf, Logistik und Supply Chain Management dar. Die Verbindung von Theorie und Praxis steht dabei ebenso im Vordergrund wie die internationale Ausrichtung und die unmittelbare Verknüpfung der Themen Einkauf, Logistik und Supply Chain Management.

Julia Wolf

The Nature of Supply Chain Management Research

Insights from a Content Analysis
of International Supply Chain Management
Literature from 1990 to 2006

With a foreword by Prof. Dr. Christopher Jahns

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Foreword

Among researchers in the business and management disciplines, there is some kind of a common understanding that research should provide models, concepts and solutions for practical problems. In other words: research is practice-oriented and, personally, I subscribe to this maxim. Still, sometimes, it is important to pause for a moment and reflect upon one's own activities.

The present thesis is one of those comparatively few pieces of research that do so by dealing with the scientific side of research and by asking a number of questions that target at the identification of the nature of a very recent subfield within business and management, namely Supply Chain Management. In particular, the author seeks to understand the processes that characterize the evolution of Supply Chain Management research throughout the past sixteen years and reflects upon avenues for future research - feeling that SCM research seems to have come to a crossroads.

The systematic reprocessing of Supply Chain Management literature and the methodologically sound approach are impressive and enable Julia Wolf to contribute a valuable component to scientific practice and debate in this area. Her work also illustrates that, in terms of philosophical underpinnings, research in Supply Chain Management is still at the very beginning and I hope that this thesis gives rise to more work of similar kind.

Today, I can look back with proud upon three years of inspiring work and discussions with Julia Wolf. I hope that she will demonstrate the same ambition and dedication in the future as she did throughout the time and in the scope of various different projects at the Supply Management Institute in order to further pursue and realize her personal objectives.

Prof. Dr. Christopher Jahns

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- Prof. Dr. Wolfgang Winter who many years ago sowed the seeds for my aspirations. His perspective on reality and belief into the ideas of Heinz von Foerster laid the foundation for many of my later actions: “*Act always so as to increase the number of choices.*”
- Michael who was convinced that everything would turn out all right. I hope you will make your way while maintaining you’re extraordinary spirit. I still believe in you. Thanks for all.

Finally, I am indebted to thanks to my family. My mother who had to suffer most from bad temper and shortages of time and still never ceded to back me up in my doings - wherever and whenever. My father who never gets tired of philosophical or political discussions without losing his sense for practice. My brother and sister who both made their own way. I am proud of the two of you. My grand-parents for always being so supportive. You’re the greatest.

Julia Wolf

Table of Contents

List of Figures.....	XI
List of Tables.....	XIII
List of Abbreviations.....	XV
1 Introduction	1
1.1 Background to the Research.....	1
1.2 Research Problem and Main Research Question.....	2
1.3 Thesis Structure.....	5
2 Theoretical Foundation.....	9
2.1 Definitions	9
2.2 Fundamentals of Supply Chain Management	13
2.2.1 Origins of Supply Chain Management.....	13
2.2.2 The Science of Supply Chain Management	15
2.3 Perspectives on the Analysis of Scientific Disciplines	18
2.3.1 Thomas Kuhn's Characterization of Science.....	19
2.3.2 Van Gigch's Levels of Inquiring Systems	21
2.3.3 Frame of Reference	22
2.4 Deduction of Research Questions	27
2.4.1 Philosophy of Science	27
2.4.2 Scientific Practice.....	29
2.4.3 Operational Practice	33
2.4.4 Anomalies and Unresolved Research Questions.....	35
2.5 Interim Summary.....	35
3 Research Methodology.....	38
3.1 Origins and Principles of Core Methodologies	39
3.1.1 Systematic Literature Review	39
3.1.2 Content Analysis	41
3.1.3 Expert Study	44
3.2 Steps in the Research Methodology	45
3.2.1 Step 1: Expert Study.....	45
3.2.2 Step 2: Identification of Relevant Research Outlets	47
3.2.3 Step 3: Selection of Articles.....	48
3.2.4 Step 4: Specification of Unit of Analysis.....	49
3.2.5 Step 5: Specification of Categories	50
3.2.6 Step 6: Generation of Coding Scheme	73
3.2.7 Step 7: Pilot Classification Process.....	75
3.2.8 Step 8: Data Collection	75
3.2.9 Step 9: Quality Assessment.....	75
3.3 Interim Summary.....	82

4 Data Analysis and Evaluation	83
4.1 Evolution of Supply Chain Management Research Activity	83
4.1.1 Description of Publication Activity.....	83
4.1.2 Characterization of Major Research Periods.....	87
4.1.2 Interim Summary.....	91
4.2 Philosophy of Science in Supply Chain Management	91
4.2.1 Ontology and Epistemology in Supply Chain Management.....	91
4.2.2 Interim Summary.....	95
4.3 The Supply Chain Management Object of Study.....	95
4.3.1 Definitions.....	96
4.3.2 Constructs.....	103
4.3.3 Level of Analysis	107
4.3.4 Objectives.....	110
4.3.5 Interim Summary.....	112
4.4 Scientific Practice - Schools of Thought in Supply Chain Management	113
4.4.1 Cluster Analysis	115
4.4.2 Characterization of Schools of Thought.....	122
4.4.3 Interim Summary.....	130
4.5 Scientific Practice - Methodologies in Supply Chain Management.....	132
4.5.1 Research Strategy.....	132
4.5.1 Research Analysis	134
4.5.3 Interim Summary.....	137
4.6 Operational Practice in Supply Chain Management Research.....	138
4.6.1 Industrial Focus.....	138
4.6.2 Regional Span	141
4.6.3 Interim Summary.....	143
4.7 Anomalies and Unresolved Research Questions in Supply Chain Management	143
4.7.1 Unresolved Research Questions - Insights from the Content Analysis	144
4.7.2 Unresolved Research Questions - Insights from the Expert Study	145
4.7.3 Anomalies - Insights from the Expert Study	148
4.7.4 Interim Summary.....	150
4.8 Conclusions on Data Analysis and Evaluation.....	151
5 Summary and Implications	154
5.1 Answers to Research Questions	154
5.2 Contributions to Supply Chain Management Research	160
5.3 Limitations and Directions for Future Research	162
References	165
Appendices	199
Appendix 1 - List of Experts	199
Appendix 2 - Expert Study Questionnaire	199
Appendix 3 - Sample Articles	200
Appendix 4 - Codebook	218
Appendix 5 - Krippendorff's Alpha Results for Test - Retest	229

List of Figures

Figure 1.1: Structure of the Thesis	8
Figure 2.1: Systematization of Terms from Theory of Cognition.....	10
Figure 2.2: Evolution of Science According to Thomas Kuhn	20
Figure 2.3: Van Gigch's Three Levels of Inquiring Systems	22
Figure 2.4: Frame of Reference.....	23
Figure 3.1: Steps of the Research Methodology	45
Figure 3.2: Four Levels of Analysis in Supply Chain Management Research	61
Figure 3.3: Hierarchy in Research Methodologies.....	66
Figure 3.4: Example of a Decision Scheme	74
Figure 4.1: Absolute Distribution of SCM Articles over Years.....	85
Figure 4.2: Relative Distributions of SCM Articles over Years	87
Figure 4.3: The Use of Supply Chain Management Definitions.....	96
Figure 4.4: Evolution of SCM Levels of Analysis.....	108
Figure 4.5: Occurrence of Schools of Thought in Supply Chain Management over Time....	131
Figure 4.6: Breakdown of SCM Research Approaches across Periods	133
Figure 5.1: Evolution of Supply Chain Management Research.....	160

List of Tables

Table 2.1: Definitions of Supply Chain Management.....	12
Table 2.2: Reviews on Scientific Paradigms in Supply Chain Management Research	28
Table 2.3: Reviews on Scientific Practice in Supply Chain Management Research	30
Table 2.4: Overview of Research Questions.....	36
Table 3.1: Final Target Journal List.....	48
Table 3.2: Supply Chain Management Constructs.....	56
Table 3.3: Objectives of Supply Chain Management	62
Table 3.4: Classification Scheme for Industrial Sectors	71
Table 3.5: Classification Scheme for Geographic Focus	71
Table 3.6: Overview of Content Categories.....	73
Table 3.7: Measures to Ensure Reliability	76
Table 3.8: Measures to Ensure Validity.....	81
Table 3.9: Overview of Methodology	82
Table 4.1: Total Distribution of Articles in Journals and Years	84
Table 4.2: Relative Distribution of Articles in Journals and Years	86
Table 4.3: Distribution of Articles across Periods	90
Table 4.4: Evolution of Scientific Paradigms across Periods	92
Table 4.5: Distribution of Paradigms in Journals.....	95
Table 4.6: Evolution of the Use of Definitions	97
Table 4.7: References to Existing SCM Definitions in the Emergence Phase.....	98
Table 4.8: References to Existing SCM Definitions in the Acceptance Phase	99
Table 4.9: References to Existing SCM Definitions in the Growth Phase	100
Table 4.10: References to Existing SCM Definitions in the Normal Science Phase	103
Table 4.11: Breakdown of SCM Constructs across Periods	104
Table 4.12: Breakdown of Major SCM Constructs across Periods.....	105
Table 4.13: Breakdown of SCM Levels of Analysis across Periods	107
Table 4.14: Cross Tabulation of Journal Type and Level of Analysis.....	109
Table 4.15: Breakdown of Major Levels of Analysis across Periods	109
Table 4.16: Breakdown of Objectives across Periods.....	110
Table 4.17: Breakdown of Major SCM Objectives across Periods.....	111
Table 4.18: Summary of Findings on the SCM Object of Study	113

Table 4.19: Outliers from Nearest Neighbour Analysis.....	118
Table 4.20: Articles Changing-Over Clusters by Jaccard and Dice Calculations.....	121
Table 4.21: Characterizing Variables for Six Schools of Thought in SCM.....	123
Table 4.22: Articles from the Operations Research School of Thought	125
Table 4.23: Articles from the Customer Orientation School of Thought.....	126
Table 4.24: Articles from the Process Optimization School of Thought	127
Table 4.25: Articles from the Strategic Chain Integration School of Thought	128
Table 4.26: Articles from the Supplier Integration School	129
Table 4.27: Articles from the Internal Organization School.....	130
Table 4.28: Breakdown of Research Strategies across Periods	132
Table 4.29: Breakdown of Major Research Strategies across Periods.....	134
Table 4.30: Breakdown of Research Analysis Techniques across Periods.....	135
Table 4.31: Breakdown of Major Research Analysis Techniques across Periods	136
Table 4.32: Breakdown of Industries across Periods	139
Table 4.33: Overview of Cross-Industry Studies	140
Table 4.34: Breakdown of Major Industries across Periods	141
Table 4.35: Breakdown of Continents across Periods.....	141
Table 4.36: Breakdown of Major Industries across Periods	142
Table 4.37: Breakdown of Regional Span across Periods	142
Table 4.38: Expert Propositions of Unresolved Research Questions.....	148
Table 4.39: Summary of Findings.....	152

List of Abbreviations

CSCMP	Council of Supply Chain Management Professionals
EJPSM	The European Journal of Purchasing and Supply Management
IJLM	The International Journal of Logistics Management
IJOPM	International Journal of Operations & Production Management;
IJPDLM	International Journal of Physical Distribution and Logistics Management
IJPM	The International Journal of Purchasing and Materials Management
IJPR	International Journal of Production Research
JBL	Journal of Business Logistics
JOM	Journal of Operations Management;
MS	Management Science
SCM	Supply Chain Management
SCMIJ	Supply Chain Management: An International Journal
SIC	Standard Industrial Classification

1 Introduction

This first chapter serves to introduce the problem area which is Supply Chain Management research and to specify the main research question. In addition, this chapter provides a brief validation for the investigation to be undertaken and an overview of the overall structure of the thesis. Finally, definitions of key terms are provided to acquaint the reader with the problem area.

1.1 Background to the Research

Economy in the second half of the 21st century has been characterized by a number of fundamental transformations that challenged organizations to frequently find new forms of management in order to remain competitive. Globalization has been one of the most important forces (Christopher & Ryals, 1999, p. 12; Lancioni, Forman & Smith, 2001b, p. 734). It has been facilitated by the reduction and elimination of barriers within Europe and the introduction of a joint currency, the dissolution of the command economies in the Eastern Block, the establishment of the North American Free Trade Agreement among others (La Londe & Masters, 1994, p. 35). A second force has been increased concentration on core competencies by firms and an associated trend towards outsourcing of non-core activities (Lummus & Vokurka, 1999, p. 12). Third, these two forces aggravated international competition and environmental complexity and led to a high level of uncertainty (e.g. Bandinelli, Rapaccini, Tucci & Visintin, 2006, p. 162; Peck & Jüttner, 2000a, p. 33). This effect has been aggravated by the economic rise of countries from Asia, mainly China and Japan. Fourth, the rise of new information technologies facilitated business operations and the coordination across organizations and regions (e.g. Meredith, 2001, p. 399; Narasimhan & Kim, 2001, p. 51) and has probably enabled the fifth driver: spatial, organizational and functional fragmentation of production, delivery and associated services (Rodrigue, 2006, p. 510). Finally, the polarisation of markets and the necessity for many organizations to cope with the challenges of polarised high-end/low-end market profiles constitute a last major characteristic of today's international business environment (Storey, Emberson, Godsell & Harrison, 2006, p. 769).

These developments led to an increased number of management concepts such as business process re-engineering or Keiretsu that promised to provide solutions to the challenges. Among these business concepts, Supply Chain Management (SCM) has probably been one of the most important (Gripsrud, Jahre & Persson, 2006, p. 644; La Londe & Masters, 1994, p. 35) and the expectations towards SCM have been enormous. The central idea behind SCM is the generation of sustainable competitive advantage by means of integration (Cooper &

Ellram, 1993a, p. 13; Cooper, Ellram, Gardner & Hanks, 1997, p. 67; Ellram & Cooper, 1990, p. 1) of business functions either within an organization or across organizations (Mentzer et al., 2001, p. 18). Therefore, individual members of a supply chain are supposed to assist each other in order to improve competitiveness of the overall chain (Min & Mentzer, 2004, p. 63).

Evidently, SCM seems to be an appealing and promising concept for practitioners and it is a natural consequence that there has been an increasing body of literature from the scientific world that seeks to provide appropriate tools and guidelines for supply chain managers to enable them to optimally realize their tasks (e.g. Payne & Peters, 2004). The strong recognition SCM experienced within science led to the suggestion that SCM has developed into an independent business discipline (e.g. New, 1997, p. 15; New & Payne, 1995, pp. 60-68; Cousins, Lawson & Squire, 2006) whose *raison d'être* is the provision of valuable tools, concepts and theories to support the implementation of SCM into practice. However, despite an increasing number of research into SCM, Fawcett and Mangan found that only few companies are actually engaged in supply chain integration (Fawcett & Magnan, 2002, p. 340). This situation leads to the suggestion that there is a gap between scientific knowledge creation and the transfer of this knowledge into practice.

The reasons for this suspension can be manifold. For example, SCM research might generate theoretical models that are not or only partly applicable in practice or SCM research might pose the wrong questions. In addition, it could be that scientists in SCM have a different understanding of what SCM is than practice (e.g. Dubois, Hulthen & Pedersen, 2004, p. 4; Dubois et al., 2004; Storey et al., 2006, p. 755). Although these are only hypotheses and speculations, it seems that the legitimacy of SCM as a scientific discipline is challenged as long as the research field is not capable of providing practical solutions to managerial problems. If the discipline seeks to meet this challenge a profound understanding of the theoretical substantiation of the field, its evolution over time, the contributions that have been made by scientists from various fields and the tensions underlying SCM is a necessary precondition. As of today, this understanding has not been investigated to its full potential yet as will be described in the following chapter.

1.2 Research Problem and Main Research Question

The term Supply Chain Management was originally proposed by Oliver and Webber to designate a new form of strategic logistics management (Oliver & Webber, 1982). However, the antecedents of SCM are much older and appear to start with physical distribution and transport, based on the theory of Industrial Dynamics (Forrester, 1961). Total cost approaches to logistics and distribution have been identified as another origin of SCM (Chen & Paulraj, 2004b, p. 131). The underlying assumption in both cases is that the optimization of a single

element in a supply chain does not necessarily ensure efficiency and effectiveness of the supply chain as a whole (Croom, Romano & Giannakis, 2000, pp. 67-68).

Since then, researchers from numerous disciplines have incorporated supply chain thinking into their research programmes making it a multi-disciplinary field (e.g. Lancioni, Forman & Smith, 2001a, p. 53) as for example Strategic Management (Bechtel & Jayaram, 1997; Christopher & Ryals, 1999; Ketchen & Giunipero, 2004; Rodrigues, Stank & Lynch, 2004; Tan, Lyman & Wisner, 2002), Purchasing and Supply Management (Cavinato & Kauffmann, 1999; Jahns, 2005; Kaufmann, 2001; Leenders, Nollet & Ellram, 1994; Stuart, 1997), Marketing (Christopher, 2005; Min & Mentzer, 2004; Svensson, 2002a, 2003), Interorganizational Relationship Research (e.g. Golicic & Mentzer, 2005; Skjoett-Larsen, Thernoe & Andersen, 2003; Walter, Lechner & Kellermanns, 2007), Organization Theory (e.g. Kim, 2007) and Operations Management (Khouja, 2003b) - to name a few only.

Yet, the amount of research done to develop and map the theoretical base of SCM has been limited (Burgess, Singh & Koroglu, 2006, p. 703), leading to disintegration and fragmentation of core findings (Croom et al., 2000, p. 68; Cousins et al., 2006, p. 701; Zsidisin, Smith, McNally & Kull, 2007, p. 169). In addition, there is still no common understanding and definition of the term Supply Chain Management, although several corresponding attempts have been made (Burgess et al., 2006, pp. 708-709). Finally, each of the aforementioned disciplines emphasize a certain aspect of the overall SCM concept, leading to a diversity of problems subsumed under the SCM label and to blurred boundaries of the concept (New, 1997, p. 15; Hakansson & Persson, 2004, p. 11; Bretzke, 2005, p. 11).

The objective of this thesis is to address the problem of the insufficient theoretical base of SCM by providing insights into the theoretical substantiation of SCM as a field of research. More precisely, the following main question will be addressed:

“How can the processes of knowledge creation in Supply Chain Management be characterized and how did they evolve over time?”

In other words, the main research question is about the nature of Supply Chain Management research. A number of different factors will have to be considered in order to provide a comprehensive description and characterization of research activity in SCM. For example, insights into the philosophical and theoretical underpinnings of the SCM discipline, the link between science and practice and the evolutionary processes the research field has undergone throughout a specific time period will be required. In addition, an exploration into the tensions that split different groups of researchers will be conducted. Finally, fundamental SCM research questions that have not yet been fully explored will be identified. These descriptions of the major activities in SCM knowledge creation will make it possible to generate maps of SCM research that characterize the theoretical substantiation of the field across different periods of time and as of today.

Within business disciplines, practical relevance is one of the major determinants of scientific success (Freimann, 1994, p. 12). However, an important characteristic of any discipline is its capability to reflect upon the knowledge creation processes shaping its domain (e.g. Harland et al., 2006, pp. 735-736). The objective of this research is not to produce any directly managerially relevant knowledge. Rather, the objective is to contribute to the reflections on the disciplinary status of Supply Chain Management research. As a consequence, the thesis primarily contributes substantial value for scientists in the field of SCM but, in an indirect way, it also assists practitioners involved in SCM. The following benefits can specifically be expected:

1. Mapping the paradigmatic status and its development of a research field provides an overview of the constellation of beliefs, values, and core techniques of a scientific community and is therefore capable of guiding future research in this field (Kuhn, 1996, pp. 1-26; van Gigch & le Moigne, 1989, p. 129).
2. Mapping the theoretical status and the development of Supply Chain Management research will provide an understanding of SCM that diminishes confusion and is capable of highlighting directions for research activities (Giannakis & Croom, 2004, p. 28).
3. From the perspective of the SCM scientific community, a clear understanding of what SCM actually is, contributes to its recognition as an important, substantiated discipline. This can contribute to academic professionalization and identity (Harland et al., 2006, p. 731) and lead to a power increase in scientific policy making and university funding (Baron, 2005, p. 269).
4. A profound understanding of the SCM discipline will make it easier to detect major unresolved research questions that determine future research activity (Näslund, 2002, p. 321) and, in doing so, increases its value contribution to practitioners.
5. From a practitioner view, understanding the different perspectives of SCM can assist in the identification of those concepts that are most suitable for solving their specific problems and requirements.
6. A scientific discipline is not only involved in knowledge generation processes but also in making the knowledge accessible to others by means of teaching and education. Thus, comprehensive maps of science can assist in the development of comprehensive curricula and thus to increase a common understanding of the SCM research contents and processes among SCM professionals which will further support the effective realization of SCM in practice.

In sum, although this thesis is primarily science driven, it implicitly makes an important contribution to practice and education in SCM as well. In the next chapter, the design of the thesis in terms of its structure and chapters will be outlined. In addition, a brief overview of the contents in each of the following chapters will be given.

1.3 Thesis Structure

This chapter serves to introduce the design of thesis and to briefly summarize the contents of each of its chapter. Chapter 1 lays the foundation for the thesis. It identifies the research problem, poses the central research question and describes the core objective of the thesis. Several reasons for the justification of the thesis are proposed.

Chapter 2 is dedicated to the development of a comprehensive understanding of all aspects that need to be considered for the analysis of a discipline and the characterization of its knowledge creation activities. The chapter starts with the definition of several key terms required for the understanding of thesis (chapter 2.1). A brief discussion of the central roots and origins of supply chain thinking is provided which led to the emergence of the term *Supply Chain Management* at the beginning of the 1980s (chapter 2.2.1). Furthermore, previous literature will be discussed in which similar objectives were pursued as in the present thesis. A critical discussion of the contributions that have been made in this area until today will make it easier to precise the main research question posed for this thesis and to clearly differentiate the contribution of this thesis in comparison to existing research (chapter 2.2.2). Providing a structured analysis of the evolution and status of a scientific discipline is a difficult and complex task which is aggravated by the fact that there has only been very limited research into the central components and activities that need to be considered for comprehensive discipline analyses. Thus, chapter 2.3 reviews some of the major works in theory of science and will select one of these that seems to be the most appropriate for the objective of this research. Although there are several works seeking to explore the nature of science, only few of them seek to explain the notion of science over time. Unlike most other authors, Thomas Kuhn seeks to understand the factors and processes that lead to the emergence and disappearance of scientific disciplines. Therefore, his evolutionary perspective on the structure of scientific revolutions was chosen as major frame of reference for the purposes of this thesis (chapter 2.3.1). In addition, this research draws upon the work of van Gigch who used Kuhn's notion of scientific disciplines and poured it into a more structured, hierarchical framework (chapter 2.3.2). In chapter 2.3.3, the perceptions of the two authors Kuhn and Van Gigch are integrated into a comprehensive and systematic framework for the analysis of scientific disciplines. Both the profound understanding of SCM and the specification of the frame of reference make it possible to further decompose and precise the main research question of the thesis. Therefore, chapter 2.4 provides discussions of existing

literature on SCM on the different components and elements of the frame of reference to understand whether there has already been sufficient research performed in one or more of the different sections of the framework and to decompose the major research question into a set of sub-questions.

Chapter 3 constitutes one of the two major chapters of this thesis. In this chapter, the origins and applications of the main methodologies used in the thesis are described (chapter 3.1). Due to the complex nature of the research objective, a multi-method, stepwise approach is used to answer it. This approach combines both qualitative and quantitative data collection and analysis techniques. In essence, three methodologies are applied in an intertwined way: an expert panel, a structured literature review (chapter 3.1.1) and a content analysis (chapter 3.1.2). Taken together, these three data collection techniques are realized in nine different steps that are described in detail in chapter 3.2. First, an expert study is realized to gain qualitative information on one central part of the frame of reference and to precise some sections necessary for the content analysis (chapter 3.2.1). The structured literature review comprises the two steps number two and three, the former yielding in the identification of major research outlets (chapter 3.2.2), the latter specifying the selection of articles (chapter 3.2.3) which are then submitted to content analysis. The content analysis itself comprises the steps 4 to 9. In step 4, the classification unit for the content analysis is specified (chapter 3.2.4). Step 5 serves to identify the classification categories for research activities in SCM (chapter 3.2.5). In step 6, the decision rules and coding schemes are determined (chapter 3.2.6). Step 7 describes the pilot study (chapter 3.2.7) and step 8 the actual data gathering and classification process (chapter 3.2.8). Finally, in step 9 the measures and activities are described that were implemented to ensure reliability and validity (chapter 3.2.9).

Chapter 4 constitutes the second major chapter of this thesis and is entirely dedicated to data analysis and evaluation. In chapter 4.1, the content analysis results are used to discern core periods of research activity in SCM by means of an analysis of the evolution of the overall publication activity in SCM (chapter 4.1.1). The periods are characterized in chapter 4.1.2. The data gained by means of the expert panel, the structured literature review and the content analysis then enable the portrayal the Supply Chain Management knowledge creation processes comprehensively in terms of different characteristics as differentiated by the frame of reference and across different periods of time. This characterization is realized in a stepwise process comprising chapters 4.2 to 4.6. In essence, the philosophical underpinnings of SCM are discussed in terms of ontology and epistemology (chapter 4.2.1), the object of study in Supply Chain Management is differentiated (chapter 4.3) regarding applied SCM definitions (chapter 4.3.1), major SCM constructs (chapter 4.3.2), the level of analysis (chapter 4.3.3) and the objectives pursued with SCM (chapter 4.3.4). Chapter 4.4 serves to differentiate major schools of thought in the SCM field of research. This achieved by means of a cluster analysis that is described in chapter 4.4.1. The description and characterization of

the schools of thought is provided in chapter 4.4.2. The main methodologies used in SCM to generate findings are described (chapter 4.5) in terms of research strategies pursued in the sample articles (chapter 4.5.1) and in terms of research analysis techniques (chapter 4.5.2). In addition, a discussion is provided as to the degree to which practical problems from the 'real world' are considered for theory development in SCM (chapter 4.6). This analysis focuses on two aspects, namely the industrial focus (chapter 4.6.1) and the regional scope (chapter 4.6.2) of empirical analyses. Whereas all these aspects characterize past knowledge generation processes, chapter 4.7 focuses on the identification of current major unresolved research questions (chapters 4.7.1 and 4.7.2) and anomalies (chapter 4.7.3) that provide directions for future research activity in SCM in order to ensure the long-term persistence of the discipline. Chapter 4.8 summarizes the findings in the form of maps of science for the distinct periods of SCM research activity. These maps enable the characterization and differentiation of research activity over time.

Chapter 5 constitutes the last chapter of the thesis. In this section, major findings of the thesis are summarized. Furthermore, major benefits and impacts of the thesis for both research and practice are described. In addition, this chapter provides a critical discussion of the thesis' limitations in terms of research approach, the data collection techniques and the data analysis procedures. The chapter finishes by pointing out potential other areas of future research activity by focusing on those aspects that have not been considered by the thesis. In order to facilitate the understanding of the thesis' structure, figure 1.1 summarizes the chapters and the different steps that need to be realized to answer the main research question guiding this thesis.

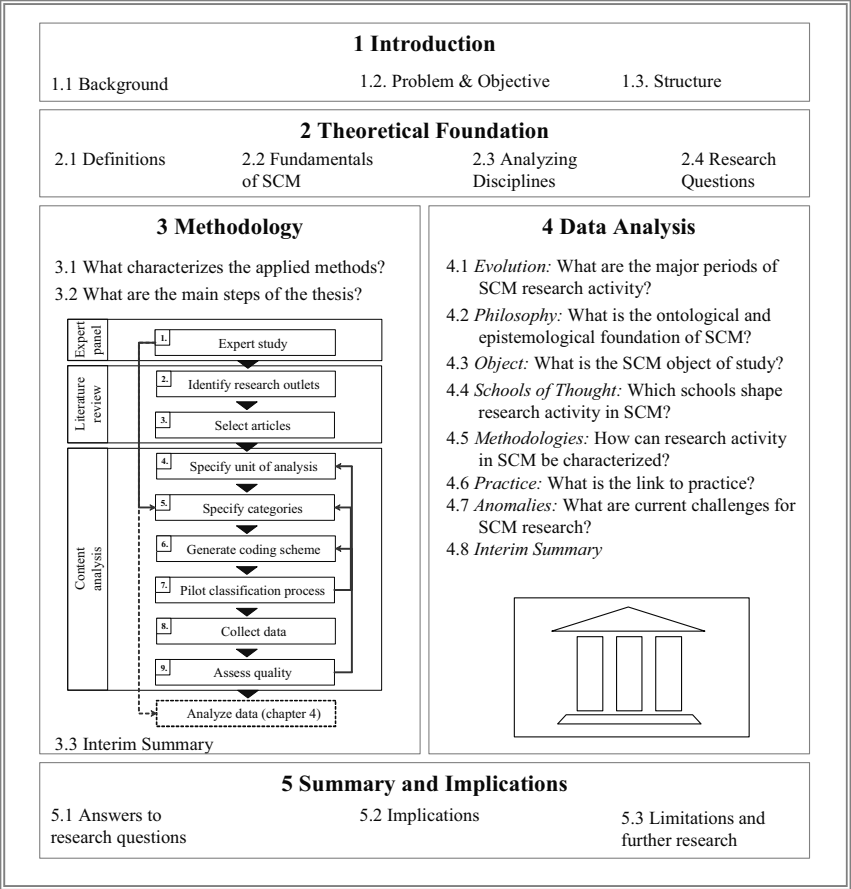


Figure 1.1: Structure of the Thesis
Source: own illustration

2 Theoretical Foundation

This chapter aims to build the theoretical foundation upon which this research is based. It includes the definition of key terms, a brief discussion of the evolution of Supply Chain Management research and an overview of the latest scientific debate in the field. In addition, the frame of reference for the subsequent analysis is developed. This is achieved by presenting, summarizing and systematizing the work of scholars who provide the necessary insights and instruments for the investigation of the knowledge creation processes in fields of science.

2.1 Definitions

In the present thesis, a bridge is built that links cognitive science to the Supply Chain Management discipline by providing insights into the theoretical foundations of SCM. As a consequence, two types of definitions need to be specified in this section. The first set of definitions is used to precise terms related to the theory of cognition. Second, the notion of Supply Chain Management used for this study needs to be defined.

1) Theory of cognition. The most important terms used in this research in relation to cognitive science are *paradigm*, *science*, *theory* and *discipline*. Each of these terms has been discussed controversially in the literature. For example, multiple meanings have been assigned to the term *paradigm* ranging from broad philosophical world views to mere metaphors (e.g. Prasad & Forray, 1993). As a consequence, this section will provide definitions of each of these terms as they will be used in the present thesis.

Regarding the term *paradigm* a major difficulty of this study needs to cope with is the fact that two types of definitions need to be used here. The frame of reference used for this study is primarily based on the work of Thomas Kuhn who concentrated huge parts of his research efforts on the exploration of scientific paradigms. Although Kuhn himself did not define the term unambiguously (e.g. Masterman, 1970), he has a very broad understanding of the term that rather corresponds to the understanding of an entire science as described in the following paragraphs. This understanding of the term *paradigm* according to Thomas Kuhn does not correspond to the understanding of the term that used in the main part of this thesis. As a consequence, a differentiation needs to be made for the use of the term in relation to Thomas Kuhn and for the remainder of the thesis. In chapter 2.2.1, *paradigm* will be defined as “*the constellation of beliefs, values and techniques, etc. shared by the members of a scientific community*” (Kuhn, 1996, p. 175). In contrast, in all other chapters the term *paradigm* will be used as a synonym to philosophy of science to designate a specific combination of ontological and epistemological beliefs shared by a group of scientists.

Still, processes of knowledge generation are not detached from specific forms and standards. Instead, researchers follow specific criteria that are generally accepted and recognized as being scientific (Seiffert, 1992, p. 391). This differentiates the processes of knowledge generation in science from other types of knowledge production. As a consequence, for the purposes of this thesis, *science* will be defined as the processes of knowledge generation by means of acknowledged criteria.

Researchers perform research in their disciplines from their individual ontological and epistemological perspectives and apply recognized criteria in order to generate theory. As a consequence, the last term from the theory of cognition field that needs to be specified in this thesis is *theory*. The label will be used to designate “*any coherent description or explanation of observed or experienced phenomena*” (Gioia & Pitre, 1990, p. 587).

In this research, “*discipline* refers to the common focus of a set of researchers” (Fabian, 2000, p. 351). Thus, what differentiates a discipline from others is the specific object of study that researchers focus their efforts on. Accordingly, scientists might perform research in a discipline from varied paradigms and philosophical assumptions and by using different sets of criteria for knowledge production. Thus, the perception of the notion discipline is broader than that of the other terms and the relations among the different terms are depicted in the subsequent figure 2.1. In sum, Supply Chain Management can be considered as a discipline as there are numerous researchers who focus on SCM as object of study from their specific perspectives and who use specific criteria for knowledge generation to develop theories about specific SCM phenomena.

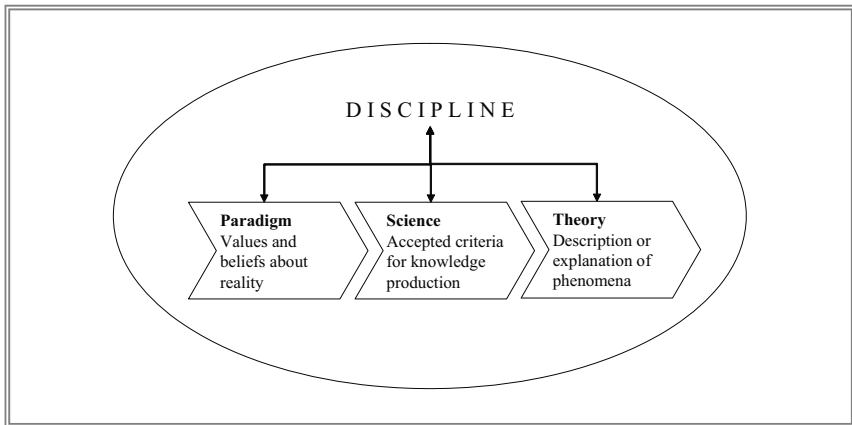


Figure 2.1: Systematization of Terms from Theory of Cognition

Source: own illustration

2) Supply Chain Management. In the following paragraphs, the focus will be on the definition of the term Supply Chain Management in order to differentiate the field of research from other disciplines. In essence, two terms need to be defined here: supply chain and Supply Chain Management.

Mentzer et al. propose that a *supply chain* comprises a set of at least three entities directly involved in the downstream and upstream flows of goods, services, information and finance from a source to the customer (Mentzer et al., 2001, p. 4). These entities can either be individuals, departments or organizations. Thus, it is not necessarily implied that a supply chain crosses organizational boundaries. What links the different elements of the chain are the flows of different objects associated with whole processes associated with the production and delivery of goods and services.

Whereas literature is comparatively clear about the notion of supply chain, the situation is different with regard to the term Supply Chain Management. Until today, there is no single, generally accepted definition of SCM. Rather, there is an ongoing discussion about the elements, activities and objectives that ought to be assigned to SCM. For example, there are definitions that focus on the strategic objective of generation of competitive advantage (e.g. Bowersox, Closs & Stank, 1999, p.6), in other definitions it is perceived as a philosophy (e.g. Ellram & Cooper, 1990, p. 2) and again in others the emphasis is laid on the number of organizations involved (e.g. Christopher, 2005, p. 19). Table 2.1 summarizes some of the most frequent definitions of SCM (see also Konrad, 2005, pp. 53-57).

Author	Definition	Focus
Ellram & Cooper, 1990, p. 2	Supply Chain Management... [is] defined more broadly as an integrated philosophy to manage the total flow of a distribution channel from supplier to the ultimate user.	Philosophy Flow perspective
Christopher, 1992, p. 18	Network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate consumer.	Network Flow perspective Value generation
Bowersox et al., 1999, p. 6	Supply Chain Management can be defined as a collaborative-based strategy to link interorganizational business operations to achieve a shared market opportunity. Supply Chain Management... is a... concept concerned with activities to plan, implement and control the efficient and effective sourcing, manufacturing and delivering process for products, services, and related information from the point of material origin to the point of ultimate consumption for the purpose of conforming to end-customer requirements.	Cooperation Strategy Activities