

TURUN KAUPPAKORKEAKOULUN JULKAISUJA

PUBLICATIONS OF THE TURKU SCHOOL OF ECONOMICS



Dimitrios Vafidis

***APPROACHES FOR KNOWLEDGE
AND APPLICATION CREATION
IN LOGISTICS***

***An Empirical Analysis Based on
Finnish and Swedish Doctoral
Dissertations Published
Between 1994 and 2003***

Copyright © Dimitrios Vafidis & Turku School of Economics

ISBN	978-951-564-411-4 (nid.) 978-951-564-412-1 (PDF)
ISSN	0357-4652 (nid.) 1459-4870 (PDF)
UDK	001 001.8 303.02 658.286 658.5 658.7

Esa Print Tampere, Tampere 2007

ACKNOWLEDMENTS

This research project was started in 1999, when my intention was to spend a few weeks investigating methodological choices in logistics research. Surprisingly, I was deeply fascinated about this rich topic and the interest lasted for much longer than anticipated, and resulted in a licentiate thesis in 2002. After the publication of the licentiate thesis I concentrated on practitioner work for several years. Fortunately, my many academic friends were a constant reminder over these years, that much research work remained to be done and many interesting discussions awaited participation. Finally, I realised in 2005 that it was time to continue with the research, and made arrangements with my daily job to facilitate the needed time.

There are tens of people who have contributed and supported the completion of this research. Some contribution has been substance and ideas for the research, some has helped with the practical challenges in daily life such as arranging for time and funding. Yet, the most important support from the people around me has been inspirational and encouragement to carry on.

There are numerous individuals that have created a interesting, caring and, above all, a supporting research atmosphere. First of all, my supervisor Lauri Ojala's insightful comments and dependable support was invaluable. Lauri introduced me to the world of research, and his practical help with organising time and funding in the initial stages of the research ensured a good start in the first place. The thinking and fresh points of view of Britta Gammelgaard from Copenhagen Business has greatly influenced this thesis. It was Britta's idea to look that the social dimensions in the research process, which turned out to be a major part of this research. Jan Stentoft Arlbjörn and Olav Solem were the pre-examiners of this thesis and greatly helped stretch myself on the final stages of the research by giving insightful and supportive comments, questions and hints. Nordic fellow researchers have been very supporting in various discussions and seminars. In particular I want to thank those 43 doctorates that found the time to respond to the survey, and many also took the time to have interesting telephone and face-to-face conversations, giving further insights and ideas. The people that I met at Turku School of Economics over the years have generously offered their expertise over countless informal discussion. In particular Tero Seppälä, Lotta Häkkinen and Satu-Päivi Kantola have been great colleagues in both casual discussions, as well as in sharing their

expertise in specific areas of the research. Many thanks also to Tim Glogan and Alex Frost for checking the language of the final version.

This research aims to serve the academic community and there were no particular goals to serve the industry and practitioners. Although this research could be considered as a very disciplinary oriented exercise, I consider myself primarily a practitioner. I have been fortunate to work for Kone Corporation, which is an employer that encourages personal development and has been very supportive to my request to take some months off for research during the last one and a half years. Without this possibility, it would have been a much bigger struggle to complete this research. In particular, I want to thank Esa Reilio and Riku Kemppe for supporting me in this endeavour.

This research has been primarily self funded, but additional support has been gained through various projects and grants over the years, and I am most grateful to the organisations and people who have enabled the funding of this research. In the licentiate stage of the research, projects with Wärtsilä Ltd. and MacGregor Ltd. helped to fund the research, as did the grant from Marcus Wallenberg foundation. In the doctoral research phase, the grants from Liikesivistysrahasto and Akseli Hietakari research funding made it financially possible to take time off from work and made it possible to concentrate on research.

Last and most importantly I want to thank friends and family for giving joy and motivation and for keeping things in perspective. Most important of all, my wife Anne helps me continuously see the bright sides of the world and has keeps me involved with the truly important aspects of life.

Dimitrios Vafidis

Heinoo 1.2.2007

CONTENTS

1	INTRODUCTION	13
1.1	Background, motivation and purpose of the research	13
1.2	Diversity of approaches in logistics research	16
1.3	Research related to this study.....	18
1.4	Outline of the thesis	20
2	SCIENTIFIC APPROACHES TO KNOWLEDGE CREATION	23
2.1	Development of paradigms	25
2.2	Positivism	28
2.2.1	Classical positivism	29
2.2.2	Logical positivism.....	30
2.3	Hermeneutics	32
2.3.1	Objective vs. subjective observations	34
2.3.2	Intentions and free will	35
2.3.3	Culture's role in the hermeneutic tradition	36
2.4	Pragmatism	37
2.5	Methods in logistics research – qualitative vs. quantitative	40
2.6	Definitions of theory	44
3	SOCIAL AND PERSONAL PERSPECTIVES IN KNOWLEDGE AND APPLICATION CREATION	49
3.1	Research work in a social context	49
3.1.1	Reputational systems	49
3.1.2	Communities of practice.....	53
3.1.3	Social systems in logistics research.....	54
3.2	Research from a personal perspective.....	57
3.2.1	Role and concepts of motivation	57
3.2.2	Application of the motivation frameworks in this research.....	61
3.3	Summary of the analysis frameworks in this research	63
4	METHODS IN THIS STUDY.....	67
4.1	Methods for analysing the methodological level.....	67
4.1.1	Research subject area categorisation.....	69
4.1.2	Neilimo and Näsi categorisation model	70
4.1.3	Arbnor and Bjerke model	77

4.1.4	Synthesis typology.....	79
4.2	Method for understanding the personal and social levels.....	84
4.2.1	Survey method for assessing personal and social levels	84
4.2.2	Literature reference analysis	87
4.3	Selection of empirical evidence	91
4.4	Research process.....	94
4.5	Validity and reliability	96
4.6	Assessment of the methodological approach of this study.....	101
5	ASSESSMENT OF METHODOLOGICAL APPROACHES IN KNOWLEDGE AND APPLICATION CREATION	105
5.1	Research subject areas	105
5.2	Application of the Neilimo & Näsi categorisation.....	111
5.3	Application of the Arbnor and Bjerke categorisation.....	116
5.4	Application of the synthesis typology.....	119
5.4.1	Level of research problems and empirical evidence	119
5.4.2	Usage of qualitative and quantitative methods.....	121
5.4.3	Openness of frameworks and contribution of research	126
5.4.4	Main theories and research order approach order.....	135
6	ASSESSMENT OF SOCIAL AND PERSONAL DIMENSIONS IN KNOWLEDGE AND APPLICATION CREATION	141
6.1	Personal dimensions in knowledge and application creation	141
6.1.1	Backgrounds of the respondents	141
6.1.2	Research funding	145
6.1.3	Researcher motives and interests described.....	147
6.1.4	Personal research consequences.....	152
6.1.4.1	<i>Career paths</i>	153
6.1.4.2	<i>Perceived significance of undertaking a doctoral research project</i>	158
6.1.4.3	<i>Post-doc research consequences</i>	162
6.1.5	Personal dimension and methodological approach	163
6.2	Social dimensions in knowledge and application creation.....	165
6.2.1	Social dependency and certainty in logistics research.....	165
6.2.2	Influential individuals and their effect on motives and methodological choices – academic dependency.....	168
6.2.3	Literature reference analysis	172
6.2.3.1	<i>General tendencies in using literature</i>	172
6.2.3.2	<i>Distinctive characteristics of academic and non-academic reference usage</i>	176
6.2.3.3	<i>Most cited authors</i>	179

7	CONCLUSIONS AND SUMMARY	185
7.1	Conclusions	185
7.2	Opportunities for further research	189
7.3	Summary.....	191
8	REFERENCES.....	193
Appendix 1	List of the dissertations reviewed.....	209
Appendix 2	Hall of fame in philosophy of science	213
Appendix 3	Summaries of the reviewed dissertations	216
Appendix 4	Summaries of the approaches in the reviewed Dissertations	271
Appendix 5	Categories of journals.....	276
Appendix 6	Web-based survey	283
Appendix 7	Survey responses.....	290
Appendix 8	Literature references by author	299
Appendix 9	Methodological approach and research interest correlations.....	301

LIST OF FIGURES

Figure 1.	Evolution of paradigms.....	26
Figure 2.	An open system	40
Figure 3.	Research methods framework.....	43
Figure 4.	Interrelationship of dependency and uncertainty	52
Figure 5.	Interaction between the individual researcher and the domains of a discipline and its practitioners	55
Figure 6.	Integrated control theory for work motivation.....	58
Figure 7.	Chronological framework of the personal level of the research process.....	62
Figure 8.	The process for generation of knowledge and applications	64
Figure 9.	The dimensions and analysis applications for investigating the levels of the research process.....	66
Figure 10.	The main characteristics identified in the dissertations analysed, the tools for analysis and the reflection to disciplinary status.....	68
Figure 11.	Business research methodologies Neilimo & Näsi framework ...	71
Figure 12.	A framework for evaluating research according to the main method combined with the approach of Arbnor and Bjerke.	78
Figure 13.	Main research project phases.....	95
Figure 14.	Subject areas of the dissertations analysed compared to Stock (1993)	106
Figure 15.	The theses of 1994-1998 categorised according to the Neilimo and Näsi framework.....	111
Figure 16.	The theses of 1994-1999 categorised according to the Neilimo and Näsi framework.....	112
Figure 17.	The dissertations categorised according to the Arbnor and Bjerke model	117
Figure 18.	Academic career consequences	156
Figure 19.	Logistics practitioner career consequences.....	157
Figure 20.	Non-logistics career consequences	158
Figure 21.	Number of literature references and standard deviation of the age of references in each dissertation	173
Figure 22.	The 41 authors appearing 20 or more times in the reference database and their frequency of appearance.....	180
Figure 23.	Hypothesis model for further research.....	190

LIST OF TABLES

Table 1.	Studies that investigate logistics research and the scope of investigation of each study.....	18
Table 2.	Characteristics of reputational systems.....	51
Table 3.	Summary of the motivation theories and their application in this study	61
Table 4.	Main characteristics of inquiry from the inside and inquiry from the outside.....	74
Table 5.	Dimensions evaluated in the 25 dissertations reviewed and their linkage to key concepts.....	80
Table 6.	The research areas and themes of the survey	86
Table 7.	Number of dissertations analysed from each university.....	94
Table 8.	Validity and reliability issues in the various analyses.....	98
Table 9.	Assessment of this study by applying the synthesis typology	102
Table 10.	Topics researched at each university.....	109
Table 11.	Reasons for selection of topic	110
Table 12.	Number and percentage of dominant approaches.....	113
Table 13.	Number and percentage of dominant and secondary approaches combined.	113
Table 14.	Linking the dominant research method to Neilimo and Näsi categories.....	114
Table 15.	Inclination of universities to apply various Neilimo and Näsi approaches	115
Table 16.	Arbnor and Bjerke categorisation by university.....	118
Table 17.	Level of research problems	120
Table 18.	Level of empirical evidence.....	120
Table 19.	Dominant methods in the 1994-1998 sample.....	122
Table 20.	Dominant methods in the 1999-2003 sample.....	122
Table 21.	Dominant methods of dissertations published at each university.....	123
Table 22.	The number and percentage of dissertations applying each method in the dissertations published 1994-2003	124
Table 23.	The number and percentage of dissertations applying each method in the dissertations published 1994-1998	124
Table 24.	The number and percentage of dissertations applying each method in the dissertations published 1999-2003	124
Table 25.	Dominant methods for the various research topic levels.....	125

Table 26. Correlation of framework openness and contribution	127
Table 27. Methods linked to openness and contribution	128
Table 28. Comparing the two samples for openness of framework and contribution – averages	129
Table 29. The approach of theses by university regarding openness of framework and contribution approach	130
Table 30. The connection between the Neilimo & Näsi approach and contribution to theory testing, theory generation and pragmatism	132
Table 31. The connection between the Arbnor and Bjerke approach and contribution to theory testing, theory generation and pragmatism	134
Table 32. Emergence of dominant theories	136
Table 33. Secondary and tertiary theories	137
Table 34. Research order approaches	139
Table 35. Educational backgrounds of the authors	141
Table 36. Major subjects of the authors	143
Table 37. Statistically significant characteristics of research related to the researchers' work	144
Table 38. The statistically significant findings related to perceived practitioner and academic influence	145
Table 39. Means of funding doctoral research	146
Table 40. Most respondents had no difficulties in maintaining their motivation	147
Table 41. Interests to contribute to reputational audiences and self- development through the author's own research process	148
Table 42. Interests of respondents in particular areas of research	149
Table 43. Themes of frustrations and demotivation	151
Table 44. Career interests of the respondents	153
Table 45. Career aspirations and career realisation correlations	154
Table 46. Interpretation of the correspondence of expectations and career ..	154
Table 47. The average significance of the doctoral research project	159
Table 48. The statistically significant correlations of career aspirations, career consequences and perceived significance	160
Table 49. Relation of research approach to authors' perceived significance of the research process	161
Table 50. The number of authors that state a particular type of loyalty or disloyalty	163
Table 51. Correlations between dependency and certainty	166
Table 52. Researcher certainty correlations	167
Table 53. Most active supervisors	169

Table 54. Influential academics and the respondents who mention them	170
Table 55. Correlations of the influential individuals and contribution.....	171
Table 56. References in each reference category for each author	174
Table 57. References utilisation traits in quantitative and qualitative research.....	176
Table 58. The correlations between reference usage and methodological approach.....	177
Table 59. Statistically significant correlations with the reference types	178
Table 60. The number of dissertations that refer to any of the reference authors' publications.....	183

1 INTRODUCTION

1.1 Background, motivation and purpose of the research

Logistics is a young field of research and the topics that can be studied are diverse. The research field is characterised by numerous approaches and theories, including countless models, concepts and methods of analysis. The main influences and roots of internationally-recognised logistics research come mainly from economic and behavioural sciences (see e.g. Stock 1995, Mentzer & Kahn 1995, Norrman 1997). As the discipline is immature, it is also methodologically fragmented, and researchers face uncertainty on what approaches will serve well in each research situation. The immature state of this discipline makes it difficult for novice researchers who wish to work on their research interests, but are uncertain of which approaches work well and are acceptable. Consequently, individual researchers may perceive the research process as blurred, puzzling and frustrating.

The motivation for this study comes from the obvious need to develop a better understanding of the approaches applied in logistics research. At present, it seems that anything to do with material or information flows¹ can be seen as logistics research. Such a wide scope makes even the choice of a research topic a complicated task, and the choice of methodological approaches is also unclear. In contrast, mature disciplines have reached a paradigmatic state, in which the research process has clearly articulated understandable rules of what is good practice and what is not. Maturity increases the coherence of the discipline, which in turn increases the efficiency of the research process and reduces the frustration that the researcher feels due to being insecure concerning how to proceed with his/her research. Typically, natural sciences have reached a paradigmatic state by applying a positivistic approach, and social sciences have approached a paradigmatic state by applying positivist and hermeneutic approaches.

In addition to the methodological approach, the social and personal aspects of conducting research are significant – mature disciplines create less

¹ E.g. Arlbjörn and Halldorsson (2001) suggest in their definition of the “hard core” of logistics that the “flow” is essentially central, as logistics is “directed toward the flow of materials, information and services; along the vertical and horizontal value chain (or supply chain) that seeks to coordinate the flows and is based on system thinking (a holistic view), where the unit of analysis is essentially the flow.”

uncertainty and a clearer research agenda than immature sciences. The benefit of this is that improved clarity that is based on expectations from other scholars improves effectiveness and efficiency in conducting and communicating the research. 54 Finnish and Swedish doctoral dissertations were analysed in this study. Based on this analysis, it is obvious that the paradigmatic state of the logistics discipline has not been reached and will not be reached within the near future.

It is hoped that the findings and framework of this study will be useful for doctoral students and researchers in logistics, who wish to obtain a general overview of the research approaches and how they are typically used. This study draws attention to methodological options of which doctoral students and researchers should be aware when initiating their work. This study also provides aids to analysing one's own motives and interests, and to thinking of what research approaches might best serve them. Furthermore, it is hoped that this study will assist in deciding what kind of contribution a researcher is aiming to provide. The analysis framework of this study provides a tool for anybody interested in analysing his/her own or indeed anyone else's research approach. This helps researchers to focus on the main strengths of their approach, and to avoid the most visible pitfalls created by indecisiveness concerning what they are trying to achieve. It is also hoped that this study will be of interest in professors and supervisors of research projects, particularly by adding to the discussion of the state of the discipline of logistics research and the direction for which each professor, research team or post-doctoral researcher is aiming. Last but not least, as it is evident that logistics research can be conducted using a multitude of different approaches, it is hoped that the findings and discussion of the study at hand will help logisticians see that all the discussed approaches have the potential to be great and worthy of respect when they are applied thoughtfully and rigorously. A unified approach in logistics research is probably not even necessary for the foreseeable future.

The purpose of this study is to facilitate future research by adding to the understanding of the characteristics and applicability of methodological research choices, as well as the social and personal perspectives of the research process.

Methodological choices are the choices related to a methodological approach, which is assessed on several levels and analysis frameworks. The background of the analysis frameworks are explained in chapter two and the frameworks themselves are presented in chapter four. Although the evaluation frameworks have several dimensions, the highest level of methodological choices can be divided into three: positivistic, hermeneutic and pragmatic. Different approaches are applicable to different research objectives. Research can aim to provide disciplinary knowledge by contributing to theory testing or

theory generation, or to orientate the research to provide a practical contribution and workable applications. The conclusion of this study will strengthen the impression that the logistics discipline is in a preparadigmatic state and characterised by methodological pluralism, but also that there are certain regularities in the usage of methodological approaches, which may be a sign of emerging and strengthening schools of thoughts.

The social aspect means that the research process is considered a social process, in which individual researchers work in reputational systems that require them to follow certain codes of conduct. The more mature and established the discipline, the stricter the social expectations, but also the lower the uncertainty of the researcher. In other words, strict expectations of how to conduct research improve research efficiency and reduce frustration.

The personal aspects are related to motivational theory, which assumes that an individual must be motivated in order to be able to conduct a research project. On the highest level, motivation is divided into self-development motives and instrumental motives geared towards academic or practitioner goals. The personal level also investigates how significant and satisfying the researchers perceive their research and what contributes to personal satisfaction.

This dissertation is a continuation of the author's licentiate thesis (Vafidis 2002). The purpose of the licentiate thesis was *to investigate methodological choices in logistics research in order to add to the understanding of logistics as it develops towards a scientific discipline. The question was approached by considering a sample of 25 Finnish and Swedish doctoral dissertation in logistics, published between 1994 and 1998*. This dissertation continues the licentiate thesis and extends the research scope in several ways, and, at the same time, it aims to be readable so that the reader does not need to be familiar with the licentiate thesis. This means that the most significant areas of the licentiate thesis are reproduced in this dissertation, although they may be reformulated as the thoughts and opinions of the author have evolved over time. The most significant additions to the licentiate thesis (Vafidis, 2002) are as follows:

- 1) The empirical evidence has been extended significantly. The licentiate thesis covered 25 Finnish and Swedish doctoral dissertations in logistics published between 1994 and 1998. This study additionally covers 29 Finnish and Swedish doctoral dissertations published between 1999 and 2003, with the result that this study analyses a total of 54 dissertations over a ten-year period from 1994 to 2003.
- 2) The licentiate thesis concentrated purely on in-depth analysis of the methodological approaches. In addition to that analysis, this study includes a survey that was sent to the authors of the dissertations

analysed. The survey aims to collect information to assist in understanding the social environments in which the dissertations were made, as well as the motives, interests, research consequences and the methodological loyalty of the authors.

1.2 Diversity of approaches in logistics research

Logistics is practised by people from very diverse backgrounds, and the term logistics is often understood too narrowly by individuals for it to cover the entire field. (Stock 1990, 3-4, Ojala 1995, 3)

Hensvold (1997, 3, 6-8) finds that the diversity of logisticians causes logistics to lack a clear identity as a discipline, but suggests that a pragmatic managerial-systems perspective could be central to logistics research. The definition of the Council of Supply Chain Management Professionals (CSCMP) seems to be the most widely used definition of logistics researchers and is worth some further attention. The logistics definition of CSCMP encapsulates the highly managerial approach of logistics:

*Logistics Management is that part of Supply Chain Management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements.*²

This definition takes a highly managerial level approach, effectively placing most macro-level topics outside its scope.

The scope of the managerial system defines how broadly logistics activities and structures are investigated. Holistic views, such as supply chain management, have gained much emphasis in logistics. (Gammelgaard 1997, 15-16; Larson & Halldorsson 2002) As SCM has gained popularity, there is no shortage of attempts to define the concept – the common problem being the variety in discussion. Gibson – Mentzer and Cook (2005) present survey results revealing that most CSCMP members perceive SCM very broadly as a combination of strategy and activities – the main activity associated with SCM being supplier and customer collaboration. It appears that the various approaches towards SCM may differ very strongly from each other, making it conceptually fuzzy (Mouritsen et al. 2003, Haldórsson – Larsson, 2000). The

² It is interesting to note that when the Council of Logistics Management (CLM) changed its name to the Council of Supply Chain Management Professionals (CSCMP) in 2004, the definition of logistics was also adjusted so that the term logistics is subordinate to the term supply chain management. Fundamentally, the definition of logistics does not differ: in 2002 the definition of CLM for logistics was: *the process of planning, implementing and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods, and related information flow from point-of-origin to point-of-consumption for the purpose of conforming to customer requirement.*

scope of the investigated supply chain system may be anything between a minor activity and a highly complex relationship chain of several independent suppliers and customers (Cooper et al. 1997, 2-3).

Supply chain management clearly lacks the ability to deal with all logistics problems, and thus fails to incorporate logistics in a paradigmatic sense, being at the same time too broad and too narrow. Cooper (1997) states that supply chain management touches all business processes along the supply chain. This is a very broad definition for what could be included in SCM research. On the other hand, SCM is too narrow because: 1) supply chain management touches only companies' internal materials, information and money-flow management and planning, or inter-company-level management of these flows in cases where the linkages of the companies are clearly identifiable. Larger scale issues concerning a certain line of activities or macroeconomic activities are left outside the scope of supply chain management. 2) it is not able to accommodate complex networks, with many companies operating within the supply web targeting conflicting goals. The popularity of supply chain management indicates that logistics is often seen as a pragmatic managerial task. However, as was described above, there are areas in the logistics field that may not be called managerial. In conclusion, the emergence of supply chain management is just as unlikely to structure the logistics discipline as the institutional approach has been.

There are also other concepts for outlining logistics. Bechtel and Jayaram (1997, 15) particularly refer to business ecosystems and business networks. Business ecosystems view businesses as organisms, which can choose either to compete or to co-evolve with competitors. The concept of business networks is described as relationships between businesses, where the chain of connectedness is without limits and can span several relationships that are connected. Such research is quite often descriptive. Furthermore, operations analysis or approaches related to geographical research (such as location analyses) can be seen as alternative approaches for outlining logistics; both typically attempt to optimise or simulate particular operational problems and choose analytic approaches with quantitative methods. However, the alternatives mentioned are also too narrow to outline the field of logistics, they often overlap with other disciplines and are also less popular than the relatively pragmatic SCM. In conclusion, the scope of the logistics discipline is unclear and the methodological approaches to tackle its research are diverse.

1.3 Research related to this study

When the licentiate thesis work commenced in 1999, logistics-related research had already started to boom. Logistics was becoming increasingly popular for students and researchers, and the number of doctoral students in the field was growing. With the exception of Gammelgaard (1996), there was little Nordic research discussing how doctoral education and dissertations contributed to the field, and whether there were certain traits identified in their methodological approaches. At the time of publishing the study at hand, the situation has advanced greatly. There are several active authors in the Nordic region writing about the disciplinary development of logistics, and there are also some widely cited North American authors who have contributed to the discussion. Table 1 summarises the focus areas of such studies with areas of cursory discussion (D) and more serious contribution (C).

Table 1. Studies that investigate logistics research and the scope of investigation of each study

	Ontology/ episte- mology/ Metho- dology	Met- hods	Insti- tutions	Theo- ries	Social aspects	Personal/ moti- vation	Doctoral educa- tion	Litera- ture review
This study	C	D	D	C	C	C	C	C
Vafidis (2002)	C	D		C	C		C	C
Stock & Luhrsen (1993); Stock (2001); Stock & Broadus (2006)								C
Dunn et al. (1994)	C	D						
Mentzer and Kahn 1995	C	C						
Stock (1995)				C				
Gammelgaard (1996)	C	C	C				C	
Gammelgaard & Vafidis (2001)			D		C		C	C
Arlbjørn & Halldorsson (2001)	C			C				
Gubi et al. (2003)							C	
Kovács & Spens (2005)	C							C
Spens & Kovács (2005)	C	D						
Arlbjørn et al. (2006)			C		C			
Gammelgaard & Vafidis (2006)					C		C	

We can conclude from table 1 that there are several studies related to this one. Much of the research makes interesting empirical investigations and discusses the diversity of methodological approaches and methods that are used in logistics. Some of it states direct opinions on the direction in which research should be conducted (Dunn et al. 1994; Mentzer and Kahn 1995), while some takes a less normative approach and rather discusses the diversity of the field (Gammelgaard 1996; Arlbjørn & Halldorsson 2001; Spens and Kovács 2005). The investigation of social aspects has attracted interest in Nordic research, and the Whitley framework, which is also used in this study, has been used as a starting point in several papers (Gammelgaard & Vafidis 2001; Vafidis 2002; Gammelgaard & Vafidis 2006; Arlbjørn et al. 2006). Research subject area analyses have been presented in a series of articles mainly investigating various articles in journals (Stock & Luhrsen 1993; Stock 2001; Stock & Broadus 2006), as have literature reference analyses (Vafidis 2002; Kovács & Spens 2005; Spens & Kovács 2005). Doctoral education and the approach of doctoral research in logistics is discussed in several papers (Gammelgaard 1996; Gammelgaard and Vafidis 2001; Vafidis 2002; Gubi et al. 2003; Gammelgaard & Vafidis 2006). The institutional influences of NOFOMA, CSCMP (CLM) and ELA are also of interest, as they are seen to influence research approaches (Gammelgaard 1996, Gubi et al. 2003; Arlbjørn et al. 2006). Furthermore, the theoretical foundations of logistics and its potential enlargements, although borrowing theories from other disciplines, are another area of investigation (Stock 1995; Arlbjørn & Halldorsson 2001).

This study attempts to address all the aforementioned interests, with the exception of the institutional approach, and the addition of a personal and motivational perspective of the research process. The institutional approach is cursorily discussed, but no empirical investigation is undertaken that might have provided a deeper contribution than what is available in other research. Some of papers listed recognise the importance of the social environment, but none of them makes serious attempts to investigate the personal and motivational aspect of conducting research. In addition, this paper addresses the practitioner-related goals of doctoral dissertations, while the papers listed focus on disciplinary goals and the academic point of view. This study attempts to provide an understanding that combines the methodological, social and personal levels in the doctoral dissertation process in an environment where both disciplinary and practitioner pressures for contribution exist. In other words, logistics doctoral research is recognised as a combination of both academic and practitioner interests, which may differ for individual researchers and research settings, resulting in different approaches and end results.

1.4 Outline of the thesis

This dissertation is structured in eight main chapters and ten appendices. A brief explanation of each is provided below.

- *Chapter 1: Introduction.* This chapter introduces the research area and motives and explains the linkage of this study to the author's licentiate thesis. This chapter also discusses other related research and how this study is positioned and scoped in comparison.
- *Chapter 2: Scientific approaches to knowledge creation.* This chapter discusses core concepts such as methodology, methods and theory, which are typically used in the philosophy of science to discuss approaches to knowledge creation. This chapter also introduces the competing scientific traditions of knowledge creation. The purpose of this chapter is to offer a brief introduction to the topic, and to serve as a conceptual definition for the evaluation framework that is applied in the in-depth analysis in the empirical part of this study.
- *Chapter 3: Social and personal perspectives in knowledge and application creation.* This chapter discusses the role of the social environment and the researcher's personal motives and aspiration in the knowledge and application creation process. The concepts that are explained in chapter 3 serve as a conceptual definition for the survey framework in the empirical part of this study.
- *Chapter 4: Methods in this study.* This chapter explains methods and analysis frameworks for the in-depth analysis and survey, which are used to assess the methodological approaches. The chapter also explains the social and personal perspectives in the 54 Finnish and Swedish doctoral dissertations that were analysed. The selection of empirical evidence, the process of conducting this research and its validity and reliability are also explained in this chapter.
- *Chapter 5: Assessment of the methodological approaches.* This chapter provides the results of the in-depth analysis of the 54 Finnish and Swedish dissertations.
- *Chapter 6: Assessment of social and personal dimensions in knowledge and application creation.* This chapter provides the results of the survey, which investigates the social and personal perspectives of the research process. This chapter also presents findings that link the social and personal perspectives of the research to the methodological approaches.
- *Chapter 7: Conclusions and summary.* This chapter concludes the main finding of the study. More descriptive conclusions are also provided in

chapters 5 and 6, thus a reader who is most interested in finding the conclusions is advised to read these chapters as well.

- *Appendix 1: List of dissertations reviewed.* This appendix provides a reference list of the 54 Finnish and Swedish doctoral dissertations reviewed.
- *Appendix 2: Hall of Fame in the philosophy of science.* This appendix provides brief descriptions of the most famous philosophers whose ideas are discussed in chapter 2. This chapter is intended as an aid for a reader who is not very familiar with the philosophy of science, helping to direct him/her towards further reading material, and positioning the development of ideas on a time axis.
- *Appendix 3: Summaries of the dissertations reviewed.* This appendix is based on the in-depth analysis of the 54 dissertations reviewed, and is the most laborious part of the study. It summarises the purpose, methods, empirical evidence, applied theories and contribution of each of the dissertations analysed using one-page summaries. These summaries in themselves are interesting précis of the dissertations, but their main purpose is to be used as an aid in the quantification of the variables of the in-depth analysis of the dissertations, which is mainly presented in appendix 4.
- *Appendix 4: Summaries of the approaches in the dissertations reviewed.* This appendix plays an important role in the analysis of the methodological approach of the dissertations analysed. It summarises the main concepts of the synthesis framework (explained in chapter 4.1.4). The data in this appendix is used for qualitative reasoning, simple analytical charts and also to organise the data in the SPSS data sheets for statistical analyses. For the reader, this appendix is the most condensed view of the approach that each dissertation uses, and it can be used to obtain a quick descriptive overview.
- *Appendix 5: Categories of journals.* This appendix shows which journals were used in the literature reference lists of the dissertations analysed, and whether these journals are considered as academic or trade journals in the analysis presented in chapter 6.
- *Appendix 6: Web-based survey.* This appendix provides the screenshots of the web-based survey that was sent to the authors of the dissertations analysed.
- *Appendix 7: Survey responses.* This appendix provides the descriptive responses of the survey.
- *Appendix 8: Literature references by author.* This appendix provides additional information on the literature reference usage of the authors, which is analysed in chapter 6.

- *Appendix 9: Methodological approach and research interest correlations.* This appendix provides a correlation matrix related to the Arbnor & Bjerke and Neilimo & Näsi categorisation models. The results of the correlations are explained in chapters 5 and 6.

2 SCIENTIFIC APPROACHES TO KNOWLEDGE CREATION

As a guide to the reader, this chapter discusses the core concepts that guide the in-depth analysis of the dissertations reviewed. The synthesis analysis framework presented in chapter 4.1.4 is based on a number of measurable variables that are based on these core concepts, and the variables in turn are used to analyse each of the 54 dissertations. Additionally, the collective coherence (or lack of it) of the variables is used to assess the paradigmatic state of the discipline, which is based on the discussion of defining the paradigm in this chapter. The main operationalisations of the concepts are the following:

- Methodological approach: divided into positivist, hermeneutic and pragmatic. These concepts are used to evaluate the methodological orientation of each dissertation and to study the contribution of the dissertations analysed to theory testing, theory generation and practical applications.
- Method: divided into quantitative and qualitative with several named methods in either category. Many of the dissertations analysed also apply a combination of quantitative and qualitative methods.
- Theory: Theories are seen either as “strong” theories with explanatory power, or alternatively as more immature conceptualisations. As logistics research obviously lacks a strongly dominant theoretical foundation, the dissertations are assessed with the intention of identifying dominant theories.

A definition for methodology is needed to clarify the topic of this study. Methodology is defined as the ground between logistics as a discipline of science, and the philosophy of science. Given this definition, it is clear that this study will need to discuss methodology from two perspectives: 1) alternatives of knowledge-creation approaches in the philosophy of science, and 2) how logistics research applies these approaches to knowledge and application creation.

Niiniluoto (1984, 21-22) sees that the role of the philosophy of science lies in questioning common beliefs and “normal” ways of thinking, and explicating unclear and implicit concepts by making them more intelligible and specific. The questioning of what constitutes “normal” will lead to clearer definitions, resulting in better theories. The philosophy of science also

includes argumentation, not only for the applicability and validity of the concepts, but also involving justification of the views and discussion on what kind of science is acceptable and what is not.

The methodological choices of research depend fundamentally on the ontological and epistemological beliefs of the researcher (Blaikie 1993, 6-7; Raunio 1999, 28). Ontology refers to existence, i.e. assumptions concerning claims about what exists and what it looks like, what it is made of and how the units that constitute it interact. Epistemology examines the concepts, origins and varieties of knowledge; it refers to the objectivity of knowledge and to the ways in which it is possible to gain knowledge about reality. (Niiniluoto 1980, 36 & 125; Raunio 1999, 28 – 29; Blaikie 1993, 4) Ontological beliefs determine the assumptions a researcher has about an object of research, while epistemological questions determine the possible ways in which a researcher acquires knowledge from the object of research (Hirsjärvi 1997, 123-126). Ontological beliefs are reflected in the research topics chosen by the authors of the 54 dissertations investigated for this study, as they are indicative of what is seen as relevant reality for logistics research. Furthermore, the research topics and the research questions significantly direct the methods of inquiry, making the choice of a topic the most significant choice of a research project (see e.g. Raunio 1999, 30 & Yin 1984, 19).

The word ‘methodology’ must not be understood as a synonym for the word ‘method’. Methodology is a profoundly philosophical concept, concerned with a worldview, and is the starting point of scientific enquiry. Methods are technical approaches and tools, such as statistical methods or structured interview methods used for data collection and analysis. Blaikie (1993, 7) defines methods as “... the actual techniques or procedures used to gather and analyse data related to some research questions or hypotheses.” There is a loosely hierarchical relationship between the philosophy of science, methodology and methods: the philosophy of science argues about the ontological, epistemological, and value choices of methodology, while methodology is the guide by which methods are chosen. (Raunio 1999, 24-28; Niiniluoto 1984, 21)

A discipline is distinguishable both as a social context and as a methodological context. That is to say, groups of researchers who have a strong shared understanding of what topics should be researched and what methodological choices are acceptable, form disciplinary approaches. Turning to the disciplinary positioning of logistics research and the competing research traditions within logistics research, it is feasible to use a polarisation of positivist vs. hermeneutic approaches for theory generation and evaluation. This distinction is applied generally in debates on the philosophy of science. Discussion in the field of the philosophy of science is overwhelmed with

parallel concepts and jargon. For the purposes of this study, it is sufficient to understand ‘analytical’, ‘positivist’ and ‘naturalistic’ as synonyms. Additionally, the terms ‘hermeneutics’, ‘anti-naturalistic’, ‘interpretative’, ‘non-positivistic’, ‘antipositivistic’, ‘antinaturalistic’, ‘ethnomethodological’, ‘German idealism’, ‘historicism’, ‘Marxism’ and ‘critical theory’ can all be seen to involve similar ideas towards theory generation and testing, and can therefore also be understood as synonyms. To simplify the terminology, this study applies the terms ‘positivism’ and ‘hermeneutics’.

2.1 Development of paradigms

The knowledge and application creation processes can be summarised on a collective (disciplinary) level by using the concept of a paradigm. Kuhn uses the concept of paradigm to illustrate the development of scientific disciplines. Kuhn himself provides over 50 definitions for paradigm, making it a rather complex concept. In principle, research paradigms mean fundamentally different approaches to research, making it impossible to communicate research results to representatives of competing paradigms. Paradigms are a characteristic of a mature discipline, in which one paradigm is seen as a superior approach to the discipline and so becomes dominant.

The results of an individual study that conflicts with an existing paradigm are usually not accepted as valid. This lack of acceptance may start from the research topic, an ontological or epistemological view, choices of methods or a complete questioning of existing “knowledge.” However, if the results are defended in a credible manner, the paradigm faces a crisis, and must change to accommodate the newly accepted “truth.” The assumption that the earth is round or the theory of evolution are classical examples of inventions that were first questioned but eventually changed the paradigm and the entire worldview. Figure 1 illustrates the life cycle of paradigms.

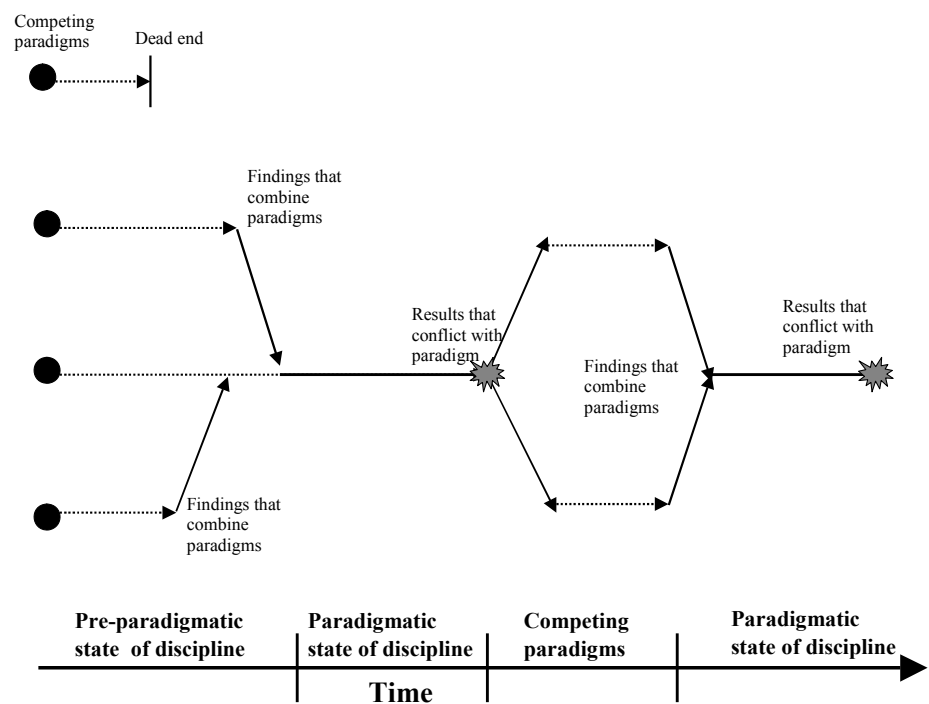


Figure 1. Evolution of paradigms

Kuhn’s ideas of evolving paradigms are relatively flexible, as they do not assume that science has any hard core, but rather that a paradigm can change whenever a new approach proves superior. Positivists, supporting the idea of covering laws, may find Kuhn’s idea of paradigmatic revolutions difficult to accept, i.e. that covering laws could rapidly be found to be non-valid. The idea of the research programmes of Imre Lakatos (see e.g. Lakatos, 1970 & 1976) may be more acceptable to positivist thinkers. These research programmes are seen to have a hard theoretical core that never changes (covering law), but is rather complemented by new research. Instead, the presuppositions for each situation may change, and there may be competition to explain the theoretical core. Logistics seems not to have a theoretical core as a discipline, but there may be several possibilities for research programmes, as is explained in the analysis and conclusions chapters.

Dunn et al. (1994) suggests that logistics research is abundant with complex concepts that are not directly measurable (called latent variables), and therefore are difficult to operationalise for scientific analysis. A diversity of approaches is seen as a strength in logistics, but the rigour of the research process should be better supported by applying a common paradigmatic methodology to help achieve better scientific rigour. Such an approach should

include a clearly defined process and methods for defining the framework, latent variables, measurable variables, and methods for data analysis and for testing for validity and reliability. In other words, logistics may have several potential research programmes, but, at the same time, an overall paradigmatic methodological approach would help with the rigour, effectiveness and efficiency of research.

In North America, it seems that logistics research is dominated by the positivist trait. This thinking often uses established natural sciences such as physics as the benchmark for methodological rigour. An ideal state is found to be a state in which scientific research methods are taught and applied consistently, providing and accumulating a knowledge base. Thus, according to this approach, logistics research aims to discover covering laws, using hypothetico-deductive testing, and considering objectivity and generalisability as the most important virtues (Dunn et al., 1994; Mentzer & Kahn 1995, 232; Halldórsson & Larson 2000, 5; Spens & Kovács, 2005).

According to the contrary point of view, positivism is often considered as inadequate and narrow in organisational and behavioural sciences, where a hermeneutic or interpretive approach is often preferred (Little 1991, 222 & 238, Raunio 1999, 16-22). The same criticism applies to business research in general, where the virtues of the positivist approach are often seen as overly emphasised, not because they are unimportant but because they are extremely difficult to apply in a complex and ambiguous reality. It is feared that heavy emphasis on the positivist virtues may lead to the neglect of more important issues, such as relevance to practice and the measurement of the right things, rather than simply measuring things right (e.g. Kasanen et al. 1993). Mears-Young & Jackson (1997) apply the Burrell & Morgan (1994) framework to assess the disciplinary status of logistics and claim that the functionalist paradigm prevailing in logistics is holding disciplinary development back. They argue that taking a more interpretative and holistic approach, including ambiguous people related aspects, would help logistics in developing towards a more strategic role.

The Nordic approach to logistics research is often found to be more diverse and to include more qualitative research than North American, and pleas for the allocation of more journal space for non-positivist logistics research are often heard in the Nordic countries. The NOFOMA network, which ties many researchers in the Nordic countries loosely together, is seen as an institution that could potentially form a research tradition with a specifically Nordic character, which is less positivistic and more action oriented and situational than the North American approach (see e.g. Gammelgaard 1996 & 2001 & 2004, Gammelgaard & Vafidis 2001 & 2006, Halldórsson & Larson 2000, Vafidis 2002, Gubi et al., 2003, Arlbjørn et al. 2006). However, it appears that

the quest for diversity in North American journals has been effective, as there is an increase in the published interpretative and in particular case study research in the major logistics journals in recent years (Sachan & Datta, 2005).

This study applies the concept of paradigm when discussing the disciplinary status of logistics research. As the paradigm is a very ambiguous concept, it cannot be measured directly. Therefore, the discussion of disciplinary status is based on indicators shown in the individual dissertations, and the paradigmatic state of the discipline is to be understood as a combination of the methodological, social and personal approaches. Two types of demarcation lines in the paradigmatic status of the discipline are discussed in the following chapters. First, demarcation is the polarisation of the discipline into positivist and hermeneutic traditions, which is an approach that follows the mainstream approach of the philosophy of science when discussing methodological differences. Additionally, a second type of polarisation is necessary in order to understand logistics research. Due to much of the logistics research being practically oriented and applied, the second demarcation is the polarisation into discipline oriented research and practically oriented research. It is evident that many researchers have different approaches towards how practical vs. “theoretical” research should function.

The two polarisations presented do not mean that research should or could be put into any category that might exclude the possibility of belonging to another category. On the contrary, it is suggested that logistics research often combines positivistic and hermeneutic research approaches and quite often attempts to combine a disciplinary and practical contribution. Such a situation of indecisiveness is a sign of pre-paradigmatic research. However, different schools of research practice are emerging, emphasising different aspects to varying degrees. At the moment, it seems impossible to draw conclusions on what would be a paradigmatic ideal for logistics, as several approaches co-exist, and they all appear equally valuable but for different purposes.

2.2 Positivism

Positivism represents the analytical research tradition. It is a very complex and vaguely defined “concept” or sentiment. The definition of positivism is not exact but it has certain widely recognised characteristics, and it seems to involve a basic belief that science does not differ fundamentally between natural and social sciences. Giddens (1974, 2-3) suggests that positivism implies two main elements: 1) the rule of phenomenalism, asserting experiences as the basis of knowledge, meaning that reality must be sensed by the researcher directly, and 2) values are meaningless in science where only

the directly sensed environment is accepted as knowledge, i.e. there is no room for prejudice in observation. Positivism is characterised by an approach of pre-defining which theories or concepts to investigate, after which empirical data is collected and analysed in order to verify or falsify them. Positivism states that the researcher must and can be kept independent from the research object, thus the objectivity of research is considered an important virtue. This idea reflects a belief that the approaches of natural sciences can be applied to the social sciences, and that knowledge should be acquired free of the researcher's values and preferences. Positivist research seeks law-like relationships and generalisable knowledge through causal explanation of occurrences between observable phenomena. (see e.g. Giddens 1974 3-4, Blaikie 1993, 13 – 17, Raunio 1999, 111-115, Burrell and Morgan 1988, 41-48)

Auguste Comte (1798-1857), John Stewart Mill (1806-1873) and Karl Popper (1902-1994) are some of the most important positivist thinkers: all of them have adopted the idea that all scientific explanation has the same basic structure. Scientific theories are sets of general laws covering a wide range of observations without exceptions. (Blaikie 1993, 13 & 15) Such laws are inferred from a basis of atomic observations on regularities of behaviour, and they are assumed to be capable of predicting future events within their domain of applicability. Positivist researchers may search for relationships between phenomena by dividing the investigated phenomena into absorbable units, i.e. positivism includes the idea of cumulative knowledge-building from the observation of atomic events. As such, positivists tend to concentrate on different aspects of the world instead of choosing holism. Atomic observations and discovered regularities can later be drawn together to build a more general understanding of phenomena (see e.g. Alexander 1982, 9, Blaikie 1993, 15).

The development of positivism is discussed in the two sub-chapters below, the first of which discusses its development in the early phases of classical positivism and logical positivism.

2.2.1 Classical positivism

Auguste Comte, the creator of classical positivism, divides the development of science into three phases: 1) theological, 2) metaphysical, and 3) scientific, which he also calls positive. That is to say, Comte sees positivism as the most developed form of knowledge creation, turning down the irrational reasoning of theological and metaphysical "science", and becoming concerned with finding regularities among observations (Niiniluoto 1984, 45).

Rejecting theological and metaphysical thinking means that non-observable prejudices or concepts are deemed non-scientific, and must therefore be rejected. For example, the concepts of fairies or goblins can be intelligible but cannot be regarded as scientific, since they do not have any known observable forms, and only observations are worth scientific attention in the positivistic approach.

Comte's hierarchical thinking extends even further, as he finds that different disciplines of science are on different hierarchical levels. Comte claims that sociology was the supreme form of science, which would include other lower forms of sciences. He saw sociology, the science of man himself, as the culmination of the hierarchy of sciences, and claims that positivism would make it possible to understand these complex phenomena in a logical and structured manner. (Giddens 1974, 1) Propositions of higher-level science can be reduced to propositions of lower-level science; thus propositions in sociology could be reduced to biology, chemistry, etc. (Blaikie 1993, 16).

Comte assumes that science has one method, regardless of whether it is natural science or social science, and therefore he rejects the distinction that the natural world consists of laws and the social world of cultures. A combination of reasoning and observation is needed to grasp the essentials of any kind of investigated phenomena. The method of observation, on the other hand, needs to vary according to the phenomena investigated and the research question. (Töttö 1997, 38-39, Töttö 1999)

2.2.2 Logical positivism

Logistical positivism combines the scientific ideals of logic, the hierarchical structure of science and the empirical observation of classical positivism with the ideal of a priorism. A priorism stands for predetermined theoretically drawn presuppositions, i.e. hypotheses, which are to be empirically tested for verification or falsification in the specific situation that the research is addressing.

Logical positivism was developed within the Vienna circle in the 1920's, with Moritz Schlick, Rudolf Carnap, Otto Neurath, and Herbert Feigl as the most active members. The leading character of the Vienna circle, Moritz Schlick, saw the meaning of philosophy as critique of language³, meaning that most philosophical problems occur because we do not understand the logic of

³ This thinking was significantly influenced by Ludwig Wittgenstein's *Tractatus Logico-Philosophicus* (1921), which suggests that a logically perfect language could solve the problems of science.

our language, and all problems could be solved through developing a logical analytical language independent of personal perception. This branch of philosophy is called logical positivism or logical empiricism (Niiniluoto 1984, 50, 52-53).

The members of the Vienna circle shared a perception that such a logical language is common to all sciences. This idea of commonality is known as the unity of science, which emphasises that only observable phenomena are useful in both natural and social sciences (Caldwell 1991, 16).

As did classical positivism, logical positivism also rejected all metaphysics and accepted only meaningful (i.e. analytic or synthetic) statements as a basis for knowledge. The basic idea of logical positivism was the verifiability requirement.⁴ Such discussion about distinguishing significant (true) statements from insignificant (non-true) statements is known as the demarcation problem. Karl Popper was especially keen to indicate the problems of the verifiability requirement, and introduced falsifiability as an alternative criterion to distinguish scientific from non-scientific statements. By this, he meant that it is not possible to verify statements, but only to falsify them (Caldwell 1991, 21, Popper 1995, 39-41).

In later development in the philosophy of science, the demarcation problem of significant and non-significant sentences as such has been transformed into a requirement that the explanatory and predictive power of a theory must be either proven or falsified. Here theories are seen as hypothetic-deductive systems that gain meaningfulness only when theories are interpreted against some empirical evidence via corresponding rules. In this view, theories are judged as systems, and the incompleteness or non-meaningfulness of a separate statement is not a reason to reject the entire theory. That is to say, significance is now in the choice of theory and its coverage, rather than determining sentences as being significant or insignificant (Caldwell 1991, 24-25 & 31).

Hempel and Oppenheimer introduced the deductive-nomological approach (also called the hypothetico-deductive approach) for scientific explanation in 1948. In this approach the aim of the conceptual part of the research is to define hypothesis as being empirically tested in the empirical part of the research. According to the deductive-nomological approach, “any legitimate

⁴ The verifiability principle asserts that a statement is meaningful only to the extent that it is verifiable, i.e. the testability of a statement concerning whether it is true or false is central. This principle was later rejected, as it has proved impossible to turn linguistic expression into observation language, and, on the other hand, it is possible to turn highly imaginary claims into observation language. For example, it is very difficult to turn expressions of atoms or magnetic fields into observation language, even though statements of magnetic fields are considered true. As a contrary example one might well be able to turn expressions of goblins or fairies into observation language and make a “realistic” drawing of them (Caldwell 1991, 13-15 & 10-21).

scientific explanation must be expressible in the form of a deductive argument, in which the explanandum, or sentence describing the event to be explained, is valid, logical consequence of a group of sentences called the explanans.” The general laws are seen so strongly deterministic that the final results must occur if the initial conditions and the general laws apply. This approach can be considered as the dominant positivistic approach even in present-day logistics research.

Hempel also introduced the inductive-probabilistic model, which describes the initial conditions along with highly probable statistical laws rather than universal laws. In these covering law models, legitimate explanations are considered potential predictors of future occurrence, thus hypotheses for further research can be drawn (Caldwell 1991, 28-29 & 53-54, Little 1993, 5-6).

According to the previous paragraphs, nowadays positivism includes the following characteristics (Caldwell 1991, 32): both deductive and inductive arguments can be considered legitimate in contrast to those that are metaphysical, i.e. explanations and predictions must be *logically symmetrical* and *causal*; science is *rational* and *cumulative*; theories are *axiomatic* (assumed true and used as starting points for further research) and refer to *observable* phenomena as being *empirically* and *objectively* tested.

2.3 Hermeneutics

The hermeneutic tradition is concerned with human and social behaviour. The general law models of positivism (deductive-nomological and inductive probabilistic) have been criticised as being unable to predict antecedent conditions when human motives are involved. (Caldwell 1991, 56-57) Human actions are seen as requiring a deeper understanding of human intentions, as social life consists of subjective meanings by which the individuals constitute their experiences (Giddens 1976, 78-79, Niiniluoto 1980, 54).

Hermeneutic tradition is considered as an alternative to positivism. In this chapter, the term “hermeneutic tradition” is used collectively to include discussions on research traditions covered by such words as ‘hermeneutics’, ‘interpretive research’, ‘antipositivism’, ‘antinaturalism’, ‘ethnomethodology’, ‘German idealism’, ‘historicism’, ‘Marxism’ and ‘critical theory’⁵. The roots of hermeneutics are ancient and often linked to religious explanation. As a

⁵ Instead, the common distinction between inductive and deductive research is not specifically linked to positivistic or hermeneutic approaches, as it was noted in a previous chapter that present-day positivism recognises both.

modern philosophical approach, hermeneutics originates from 18th century Germany, and is characterised by the *understanding* (*verstehen*) of human conduct, which is primarily related to the understanding of the morals and values of human actors (Giddens 1976, 23 & 52, Little 1993, 71, Raunio 1999, 227-229, Burrell & Morgan 1988, 5-8 & 21-37). Hermeneutics in its basic form interprets various elements of human and social behaviour. Human sciences are thus considered to be radically different from natural sciences. Their goal is not to make objective explanations of the phenomena, but rather to understand the phenomena through interpretation (Little 1993, 68).

Hermeneutic knowledge is narrative and pluralistic and not paradigmatic as positivism is, making it difficult to identify the exact features of hermeneutic approaches. In hermeneutic tradition, the emphasis on processes rather than on structures is found to be interesting, and due to its assumption of a dynamically changing world, this tradition is more in favour of longitudinal rather than synchronic studies (Czarniawska-Joerges 1992, 1-2 & 7).

Positivism is often seen to be related to the nomothetical sciences, which investigate large quantities of data and aim to explain generally the laws and regularities which govern the investigated phenomena. In contrast, hermeneutics is seen to be related to idiographic sciences, aiming to understand the investigated phenomena *per se*. This distinction between the traditions was originally made by Wilhelm Windelband (1848-1915) (Niiniluoto 1984, 56).

While Windelband distinguishable between general law-like explanations and idiographic understanding, Dilthey (1833-1911) did so between nature and spirit. He considered that the “spirit” is related to the human sciences, and, instead of naturalistic causal explanations, what is required is an understanding of human and social behaviour needs, this behaviour being based on projections of the mental processes of persons (Raunio 1999, 230-233). In other words, research is conducted from the inside of the object rather than from outside. Contrary to the positivist ideal, researching from the inside requires that the researcher interferes in the dialogue in order to understand the phenomenon (Giddens 1976, 54-56, Evered and Louis 1981, 387-391).

The debate concerning inquiry from the inside stems from the long-lasting debate between those who stress the observed, and those who stress the actors’ meanings. This debate is clearly present in the discussion of *emic* and *etic*, found within ethnographic discussions. *Emic* emphasises the concepts of those being investigated (i.e. empirical evidence), whilst *etic* emphasises the concepts of the researcher. In other words, *etic* means the formation and categorisation of data according to the researcher’s pre-established formula, while *emic* allows the formation and categorisation to arise from the speech or writing of the actors (Alasuutari 1999, 120-121).

The sub-chapters below discuss some of the key concepts of the hermeneutic approach, which help to distinguish it from the positivistic approach.

2.3.1 Objective vs. subjective observations

Husserl's (1859-1938) writings on existential phenomenology⁶ help further in elaborating the relationship between the hermeneutic tradition and positivism. Phenomenology adopts an approach where research is based upon the actors' experiences (Raunio 1999, 224, Saarinen 1986, 117-123). As such, phenomenology assumes subjective observations in contrast to the objective ones assumed by positivism (see also Burrell and Morgan 1988, 21-23).

Schutz (1972, 47, 49) further elaborates the discussion on the subjective and objective by stating that the processes behind actions are formed in the subjective individual consciousness. As such, actions are bound to the singular, and are unique to each individual at each moment in time.

Husserl adopted the scholastic idea, according to which consciousness always has an object that constitutes it. This means that the ontological presupposition in existential phenomenology is that reality and the human understanding of reality do not differ significantly, as long as consciousness is directed towards what is real. However, individual ways of looking at the world include so much bias, that we are unable to see reality objectively, making it difficult to distinguish objective observations from intentional projections, which the mind makes about the world. Existential phenomenology doubts whether anything in the world is anything more than it appears to be in the thoughts of those living in it, and thus the aim of the social sciences is to clarify what those living in the social world think of it (Giddens 1976, 24-27 & 30). As such, the understanding and interpretation of what individuals think and experience partly constitute the reality, and are essential to research. Successful interpretation of the subjective meanings of reality requires the following: 1) understanding of the mental processes, which filter human experiences and the expression of those experiences, 2) knowledge of the context where actors perform and express, and 3) knowledge of the social and cultural backgrounds, which give meanings to the expressions (Raunio 1999, 231).

⁶ Czarniawska-Joerges (1992, 3) defines phenomenon as "a part of the world, real or imagined, which arouses our curiosity."

2.3.2 Intentions and free will

In human sciences, action is often seen as being tied to the concept of intention⁷. It is usually thought that intention exists before actions, not vice-versa, and therefore it is necessary to distinguish intentional from unintentional action (Giddens 1976, 74). For example, buying a bottle of soda from a vending machine is likely to include the intention of having something to drink. If the bottle happened to be the last one in the machine, the machine is emptied as a result of this action, but this was unintentional. The intentions of the actors are linked to their cultural and social environment, and to the means of passing the information of the intention of the act to others (Giddens 1976, 86-89).

Durkheim (1858-1917) summarises the core difference between the natural and the social worlds by stating that the core axioms of the social world are differentiated from the natural world due to their moral character. Motives (as a synonym for 'intentions') may be treated as deterministic rules that cause action in society, or alternatively, as elements voluntarily linked to cultural and symbolic elements that more loosely limit an individual's freedom of motives (Giddens 1976, 93-94).

Giddens (1976, 76-77) suggests that intentional action is a problematic concept because: 1) intentional action does not only mean action for which the actors can purposefully find reasons, but may also include very regular daily routines or habits, 2) intentional action is not limited to human action, 3) all learned actions are intentional but not all intentional actions are learned (e.g. reflexes), and 4) intentional actions often produce unintended consequences or side-consequences, i.e. routine actions are also intentional even if actors do not require explanations for this type of action (see also Raunio 1999, 266 and Blaikie 1993, 111).

Von Wright (1984, 83-86) discusses whether intentions can be freely chosen by the actor or whether they are somehow predestined. From this point of view, the freedom of intentions depends on the actor's freedom in choosing the reasons to act, not only on the justification for acting as he does. For example, an invitation to dine may be freely turned down, but the justification for doing so in the social environment is not as free. In this example, the given justification might be that the actor is too busy to attend, while the real reason may be that he expects the party to be boring or that he does not like the other people who have been invited. This brings difficulties in understanding the

⁷ Giddens (1976, 76) defines an intentional act as "any act which an agent knows (believes) can be expected to manifest a particular quality or outcome, and in which this knowledge is made use of by the actor in order to produce this quality or outcome."

real reasons for an action. The actor may always lie to an outsider (a researcher) or even to him/herself. Sometimes the observer's interpretation of the motives may be more accurate than the actor's own understanding. Psychoanalysis seeks real reasons, but it is of course not possible to conduct very thorough psychoanalytical data-gathering in ordinary research work.

2.3.3 Culture's role in the hermeneutic tradition

As was explained, the hermeneutic tradition considers actors to act on the basis of their understanding and motives. Actors represent the culture, values and norms of the environment in which they live, and therefore they act according to the rationales of their cultural and social environment (Little 1991, 69-71).

Actions constitute the subjective meaning of the actor, and social action is oriented toward the actions of others (Little 1993, 74-75). Garfinkel (1989) finds that social correspondence between two persons is fundamentally biased by the pragmatic meanings each person has. This dramatically limits the accuracy of communication, as correspondents do not usually comprehend the differences in the meanings that they have for the discussed objects; these "natural attitudes" lead to different realisations in daily life (Giddens 1976, 35-36). These realisations are culturally bound, as culture forms the environment in which the meanings for different concepts and actions are formed, i.e. meanings are subjective but still socially shared (Little 1993, 81-82). The social community primarily judges what good knowledge is, as the community interacts with our interpretations of the reality (Czarniawska-Joerges 1992, 3 & 10). Even though the above statement is highly relativist, there have been viable attempts to give a cross-cultural explanation of social action, namely materialism and rational choice theory (see e.g. Little 1991, 114-136 & 210-214). For instance, economics is heavily based on these cross-cultural assumptions of human behaviour, attempting to bypass the meaning of culture in economic behaviour and approaching economic behaviour from a positivistic standpoint. Such an approach clearly has its merits, but has also clearly been problematic, for example in some tribal societies.

Ethnography, perhaps the most extreme approach within the hermeneutic tradition, assumes that it is not possible to explain language in mere logical structures, because words and sentences have subjective meanings that are constantly changing due to the reflexivity of communicating with other persons. In ethnography, language is seen as a key to making analysis of human behaviour through the understanding of concepts in different cultures. As such, culture (whether national, corporate or other) forms the realm for the

validity of the research (Agar 1986, 71-73). This is the exact opposite to the approach of logical positivism.

The research ideology of ethnomethodology is to “leave society as it is.” That is to say, it is not considered possible to produce theories that explain a phenomenon on a more general level than the particular observations, and it does not separate the researcher from the research object. Ethnomethodology does not deny the rationality of social life. It merely limits the rationality of actions to the extent that the actions are accountable to those human actors performing the observed action. According to this extremely relativistic and idiographic approach, human science is a moral explanation for understanding why actors do as they do, and although human action is usually predictable, there is no way to causally predict it (see Giddens 1976, 37-40 & 44-45).

As Michael Agar puts it, “ethnography is neither subjective nor objective. It is interpretive, mediating two worlds through a third.” This means that the ethnographer is the “third” and interpretive body that explains a culture to an audience (Agar 1986, 17-19 & 44-45). A good example of this approach is the French ethnographer Lévi-Strauss’ research of the cultures of the Amazonas (Lévi-Strauss 1955).

2.4 Pragmatism

As has been explained, the two main traditions of science are positivism and the hermeneutic tradition. These traditions are highly concerned with the observation and the interpretation of observation, so that science provides true knowledge. Pragmatism may be considered as an alternative for positivist and hermeneutic approaches. In pragmatism, the truth is not considered central for scientific discoveries or theories as long as the theories work well in practice, i.e. if they can be used to make reliable observations and predictions. This contrasts the view of the Aristotelian tradition, where thinking is considered the noblest action of human beings, suggesting that science is valuable for its own sake. Instrumentalism, on the other hand, requires that science be useful and practical, equipping human life with new discoveries (Niiniluoto 1980, 68-70, 228).

Pragmatism is also concerned with the truth of theories. In pragmatism, theories are considered as instruments for sorting experiences, and the truth of theories depends on whether they work in practice and are useful in practice. Meanwhile it is possible that more than one theory works in a useful way in a particular situation, in which case all these theories can be considered true, since they all lead to the same result (Niiniluoto 1986, 49).

Charles Peirce (1839-1914), the founder of pragmatism, suggested an approach in which information – or “truth” – is produced in interaction between the researcher and the research object, and where information is continuously adjusted. Peirce sees this flexible approach as more rational than producing the “truth” with stubborn, authoritarian or intuitive methods. Peirce also recognised the importance of the research community in relation to what is considered as true: the research community is seen as a dynamic driver of what is believed to be the true about reality. Since reality exists independently of researchers, their opinions will irrevocably move towards similar ideas of what is real and thus will develop science (Niiniluoto 1986, 45-46).

By emphasising practical relevance, pragmatism challenges methodological fundamentalism, which considers the presuppositions of a theory as true⁸. Instead, pragmatism emphasises the researcher’s responsibility to tailor methods according to the problem at hand, instead of a presupposed set of assumptions laden in a theory (Raunio 1999, 31-33). From this point of view, pragmatism is closer to hermeneutics than positivism, as positivists attempt to make law-like generalisations without necessarily doubting their relevance. Professional positivist researchers of course realise that law-like generalisations or regularities do not replace basic conceptual work and the distinguishing of the relevant from the irrelevant (see Töttö 1997).

There is an inherent danger in pragmatism: when do we know what is useful, and how long a time-span should we expect for the practical result of an act of research? Some researchers may truly seek to provide something useful for mankind, while others may be more concerned with personal reward, thus practising some kind of pragmatic scientific capitalism. This means that pragmatism may include a danger of being short-sighted and even unscientific, as it does not recognise long-term accumulation of knowledge, as positivism does, and does not seek law like relationships that help structure future research. Instead, pragmatic research may build up the experience base of the researcher. Another problem is that pragmatic research is often idiographic, i.e. it focuses on the situation, while, at the same time, it may lack a wider theoretical contribution.

The situation with logistics research is that there are no commonly accepted standards concerning which approaches are good and acceptable and which should be avoided. Individuals and scholars from different research environments have their own opinions and preferences, yet all the discussed approaches co-exist. Reading through the dissertations that are under

⁸ For example, in neo-classical economics materialism, the rational choices of humans are often taken as given without questioning their truthfulness, a view challenged by Austrian economics, which allows room for subjectivism and individual choices (Addleson 1995, 100-101).

investigation in this study, shows that the systems approach is often mentioned as a conscious choice.

Systems theory (or the systems approach) does not provide a clearly paradigmatic theory with clearly defined concepts. The generalisability criteria of the approach are somewhat positivistic, although the approach is also to bind the investigation with a holistic understanding of the investigated phenomena in a rather pragmatic way. Arbnor and Bjerke (1997) see the difference between analytical (positivistic) and systems approaches as follows: whereas in analytical approaches, the researcher assumes that he/she obtains factual knowledge when investigating the environment, in the systems approach, the researcher assumes that the information he/she obtains is always conditional to the system in question. According to Woxenius (1998, 23) a systems approach can be used as a paradigm in its own right. The systems approach does not pursue generalisations from the findings, and thus it is most suitable for ideographic research.

Systems theory criticises the basic assumptions of positivism, relating to the assumed ability to comprehend partial processes. Instead, the core idea of systems theory is that organisations can be studied only as a whole, since the different parts of the system interact and can therefore not be separated from each other. This is in sharp contrast to the positivistic *ceteris paribus* approach, where a part of the system is separated and analysed, assuming that the environment of the entity studied remains unchanged (Woxenius 1998, 46). Yet systems theory does not reject the formal explanation of reality; in fact, quite the opposite: systems theory attempts formally to describe the logic of a system, i.e. the organisation of a system (Angyal 1941).

The roots of the systems approach are in physics and more specifically in thermodynamics. Von Bertalanffy (1950, 71) discusses open and closed systems in thermodynamics. Closed systems (e.g. the Universe) must eventually attain an equilibrium state with a maximum of entropy and a minimum of free energy. This differs from an open system, which interacts with its environment and remains in a constant state, without reaching a maximum of entropy and a minimum of energy. To maintain this status, an open system requires energy and other inputs from the environment. Businesses can be considered as open systems interacting with the environment. See figure 2 for an open system in its simplest form, including input for processing, operations and output.

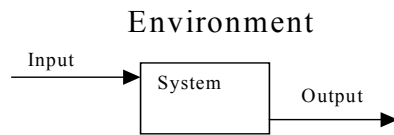


Figure 2. An open system

At first sight, the above characters of open and closed systems may not seem closely related to today's logistics research, yet the connection is clear. Various authors identify several reasons for the increased applicability of systems thinking in business research. The two most obvious are: 1) the increasing size and complexity deriving from increased specialisation. Systems theory can help in managing increasing complexity by division into manageable subsystems, and 2) technology and IT, which require specialisation and understanding of how sub-systems relate to the whole. Systems theory can be seen as a hierarchical way of thinking about related activities, making it an effective tool for managing interrelated business processes to form a well-functioning complete system.

It appears that theses prepared at Chalmers University in particular have actively applied the systems approach, and the applicability of the approach is frequently also mentioned in several dissertations from other universities. The systems approach appears the most promising approach to combining pragmatic relevance and analytical thinking.

2.5 Methods in logistics research – qualitative vs. quantitative

Even though there is no inherent reason for doing so, natural sciences and positivism are often associated with quantitative methods, while hermeneutic tradition is associated with qualitative methods. Natural sciences – for instance physics or chemistry – that are often considered mature sciences and typically attempt to produce covering-law types of research, are dominated by quantitative methods without questioning. The general methods debate concerns whether quantitative or qualitative methods are more suitable for human sciences, which have to deal with the unpredictable element of human behaviour, considering that research may be aimed at theory testing or/and theory generation (Alasuutari 1999, 31-32, Töttö 1997 40-41, Czarniawska-Joerges 1992, 6). Qualitative methods are often found to be more open to

surprising findings arising from the research material, while quantitative methods, in many cases, include a predetermined hypothesis and a careful plan of the progress of the research. As such, qualitative research is found to be more capable of generating hypotheses that quantitative, while quantitative statistical testing is often considered to be more suitable for testing hypotheses (see e.g. Morse 1994, 23, Alasuutari 1999, Töttö 1997, 71). However, the situation is not quite so straightforward, and the debate concerning the merits and applicability of these methods is fierce.

Töttö (1997), a supporter of quantitative methods, questions the capability of creating theories using qualitative observation. His argument is that the general logic of discovery has not yet been invented, thus it is not possible to create theories from pure observations. Therefore, it is essential to a priori to limit the investigation, in order to be able to make sense of the observations and to focus analysis efforts on relevant observations. According to this view, the grounded approach in its pure form – which means that the empirical evidence is interpreted for regularities without a priori framework – cannot be correct, although it may sometimes end up making lucky guesses.

Töttö (1997, 71-74 & 1999) argues that qualitative methods can ask only “what” and “how” questions, while “why” questions can only be answered in causal analysis⁹ with quantitative research methods. As this is a clearly positivistic point of view, it is in sharp contrast to those supporting qualitative research methods, in which explanation is seen as the ability to make the research intelligible and not necessarily to prove causal relationships. In the contrasting view, “why” questions may be answered by experimentation or by case studies but not by quantitative surveys (see Yin 1988, 16-22 & Lukka 1995, 75-77). For example, Alasuutari (1999, 213-214 & 216-218) suggests that it is essential to be open-minded in order to find new and surprising “why” questions that may arise from the material, instead of proving causal relations of pre-assumed connections between phenomena. As such, the new and surprising findings may answer “why” questions better than pre-assumed proofs of causality.

Yin (1988, 19) discusses the role of the research question (aim of research) and claims that it largely defines the applied research strategy. Töttö (1999) strengthens this idea by arguing that defining the research question fully determines whether to use qualitative or quantitative methods. This means that regardless of the highly differing opinions as to whether “why” questions apply to causal explanation (quantitative) or to the understanding of events

⁹ Causal relationships should not be confused with mere correlation. For instance, there might be a correlation between consumption of ice-cream and the number of drowned people, but there is obviously no causality in this correlation. ‘Causal relationships’ means a theoretical explanation concerning how X causes Y (Töttö 1999).

and processes (qualitative), there seems to be a consensus that the research question is highly important when deciding on research methods (see also Alasuutari 1999, 37).

Raunio (1999, 344-345) suggest that the level of a research problem has a significant impact on which methods should be chosen. In his view, qualitative methods make for a dynamic, and quantitative methods for a static view of society. The static view is possible when looking at society on a macro level, while dynamic qualitative research stays on the micro level of social intercourse¹⁰. It is obvious that pragmatic business research is most often concerned with micro-level rather than macro-(society) level problems. It is of no interest in the pragmatic researcher to find macro-level law-like relationships, as long as the research helps to improve what it is intended to improve.

Pragmatic business research is often qualitative case research. Kasanen & Lukka (1995, 75-77) discuss generalisability, i.e. whether the findings of research should be presented as covering laws. They find that, in addition to the two extremes found in case study research (one denying the possibility of generalisation and the other denying the rationale to generalise), there is also a moderating view, which suggests that proper case studies can provide generalisable results. Generalisation is not made in statistical terms, but depends on the transferability of the generalisation to other cases. From the pragmatic point of view, the usefulness of research is paramount, and generalisation is not considered that important.

Regardless of the lack of obvious connection between research tradition and methods on the principle level, a connection exists in practice in the field of logistics. Supporters of positivist tradition seem to favour quantitative methods, and, many times, qualitative research is sought as an alternative. Dunn et al. (1994) have applied a research method typology developed originally for the area of operations management by Meredith et al. (1989) to explain method usage in logistics research. The dimensions of this model are concerned with how dependent the research is on the researcher person (rational-existential) and the objectivity vs. subjectivity of the information that is used (natural-artificial). It has been found that the discipline is fragmented in these dimensions and the use of methods. A simplification of the model and findings is presented in figure 3.

¹⁰ Vihanto (1986, 16-17) suggests that action oriented and subjective research can also be applied to the investigation of macro-economic phenomena.

The diagram illustrates the Research methods framework (Meredith et al. 1989). It features a 4x3 grid. The vertical axis on the left is labeled 'Nature of truth' with an upward arrow pointing to 'Rational' and a downward arrow pointing to 'Existential'. The horizontal axis at the top is labeled 'Kind of information used' with a double-headed arrow between 'Natural' and 'Artificial'. The grid cells are defined by these axes and contain specific research methods.

Nature of truth	Kind of information used		
	Natural	Artificial	
	Direct observation	Peoples perception	Artificial reconstruction of reality
Rational	Axiomatic		-Reason/logic/theorems -Normative and descriptive modelling
	Logical positivist / empiricist	-Field studies -Field experiment	-Structured interviewing -Surveys
	Interpretative	-Action research -Case studies	-Prototyping -Physical modelling -Laboratory experiments -Simulations
Existential	Critical theory	-Historical analysis -Delphi -Intensive interviewing -Expert panels -Future scenarios	-Conceptual modelling -Hermeneutics
		-Introspective reflection	

Figure 3. Research methods framework (Meredith et al. 1989)

Dunn et al. (1994) find three dominant approaches in logistics research in an analysis of journal articles published 1986-1990: 1) the axiomatic-artificial applying methods of logical reasoning and modelling, 2) the logical positivist-perceptive applying methods of structured interviews and surveys, and 3) the interpretive-perceptive applying methods of historical analysis, delphi studies, intensive interviewing, expert panels and future scenarios. Interestingly, the interpretive-direct approach that is characterised by action research and case studies, and the interpretive-artificial characterised by conceptual modelling and hermeneutics, were not found to be common, which is stark contrast to the situation in the sample investigated in the study at hand.

Sachan & Datta (2005) used Meredith's (1989) framework to analyse journal articles published 1999-2003 in comparison to the results of Dunn (1994). The analysis shows that the logical positivist-perceptive approach has further increased popularity, while the popularity of the interpretive-perceptive and axiomatic-artificial approaches have fallen. Most interestingly, action and case study research has increased in popularity while the interpretative-artificial reconstruction approach remains marginal. In conclusion, it appears that direct observations and real situations are gaining ground over artificially generated imaginary information and models.

2.6 Definitions of theory

Logistics lacks a dominant theory foundation, which is a characteristic of mature sciences. In this situation, it is interesting to investigate in the doctoral dissertation analysed what theories emerge as candidates to become dominant theories, as the discipline matures. However, in order to be able to identify theories and theoretical contribution, a discussion of what theory is, is conducted in the paragraphs below.

Bothamley (1993, 523) defined a theory as “a general principle supported by a substantial body of scientific evidence, which explains observed facts. As a probable explanation for observations, a theory offers an intellectual framework for future discussion, investigation and refinement.”

According to Niiniluoto (1984, 192- 194), theories make it possible to explain, understand, predict and manipulate phenomena. A theory is a collection of laws that systematically explain and predict empirical regularities within the theory’s domain of applicability. Theories give a more widely applicable view of the investigated type of phenomena by using theoretical concepts, instead of using concepts that are directly observable in the empirical evidence.

In the positivist tradition, the “goodness” of theories is assessed on the strength of their confirmation by empirical evidence. Theories that survive many and serious falsification attempts are preferred and are considered to have a high empirical content (Caldwell 1991, 38 & 45). Such theories are constantly used to formulate hypotheses for various research problems, with the aim of testing the applicability of the theory. This type of positivist research aims to improve the theories to reflect reality more accurately and in a wider domain of applicability.

Mentzer and Kahn (1995, 235) apply the positivist definition of theory in logistic research, and state that the purpose of theories is to explain, predict, understand and control the phenomena under investigation. They also state that the researcher is influenced by previous literature and observation, as well as by the historical values and beliefs of fellow researchers. As such, the strength of theories is judged on the basis of how well they subsume older theories, account for current anomalies and lead to future discoveries.

Sutton and Staw (1995) find that theory aims to find the “systematic reasons for a particular occurrence and non-occurrence.” Furthermore, theory seeks to answer the question “why.” The authors conclude that strong theory and good theory testing (i.e. empirical skills) are rarely present in the same article, and, if they are, they make the article into an “instant classic.” That is, the strong theory in this view primarily manages to illustrate and explain the causal relationships of phenomena. This kind of research is most often driven

by a hypothesis-testing approach (positivist approach), where a large amount of empirical evidence is analysed to test the presupposed proposition. This view of theories gives great respect to understanding causal relationships and to providing strong empirical evidence to justify the findings or hypotheses.

Sutton and Staw (1995) also indicate that there may be cases against the positivist ideals of strong theory, especially when there is a perceived need for more descriptive research. Qualitative research may be more appropriate in isolating a few successful change efforts than it would be in describing the causal nuances. According to this view, qualitative research is often more suitable for the investigation of the processes behind causal phenomena. Descriptive research makes observations of some special situations (idiographic), rather than attempting to make highly generalised statements of causal relationships. Such research would not be so greatly concerned with the testing of hypotheses: instead it acts as a hypothesis generator, providing interesting research topics and further hypotheses to be tested in later research with the help of empirical evidence.

Sutton & Staw (1995) recognise that references, data, variables, diagrams and hypothesis are not theory. Weick (1995) adds to this discussion by suggesting that there are several useful and identifiable interim steps to theory building, which he calls theorising, including references, data, variables, diagrams and hypothesis. DiMaggio (1995) adds to the discussion by suggesting that theories may be identifiable either as covering laws, as enlightenment also referred to as “a surprise machine”, or as narrative, which takes the scope of the surrounding conditions into account.

The idea of Sutton and Staw (1995) is further elaborated by Weick's (1995) suggestion, that theory is a product rather than a process. Weick suggests that the process of “theorising” includes many approximations before it can be formulated into strong theory. These interim stages are not theories as such but they serve as important milestones towards further development. As such, there is more than one type of good theory (DiMaggio 1995):

- Theory as covering laws: “generalisations that, taken together, describe the world as we see (or measure) it.”
- Theory as enlightenment, meaning that complex, defamiliarising and paradoxical theories can be good, because “...the point of theory...is not to generalise, because many generalisations are widely known and rather dull. Instead theory is a surprise machine.”
- Theory as narrative, which means: “...emphasis on empirical tests of the plausibility of the narrative as well as careful attention to the scope conditions of the account.”

Only the first definition is the strict positivistic definition of theory, but the two latter categories are clearly relatively open to what theory is. According to

these categories, most research could be defined as having a theoretical basis. Research may be separated into theory developing (inductive) and theory testing (deductive). Both these types can be accommodated into DiMaggio's three categories, and, additionally, straightforward and well-structured descriptions could be considered as theories.

As a supporter of the hermeneutic tradition, Czarniawska-Joerges (1992, 4-6) suggests that the choice of a theoretical frame is always situated in time and space, and that it is adapted to the purpose at hand. In interpretive sciences, theories are seen as "conversational devices", facilitating conversation and enabling interpretation. Interpretive sciences do not intend to test, verify or falsify theories as they need to be re-interpreted for every use and all cases, because their uses are different. Although non-positivist approaches to theory may be seen as more open to the definition of theory, there are certain collectively-put limits that the researcher has to keep in mind in order to be understood by the audience of the research. DiMaggio (1995, 392-396) claims that it is important for theories to hold a balance between being novel and containing new ideas, and being sufficiently familiar to allow others to understand what is written. Novelty often requires that the researcher looks at phenomena with minimal disturbance by cultural presuppositions, but, at the same time, the researcher must remember that theory may be formulated as a process in interaction between what the researcher has written and how other authors understand and further utilise the theory.

The concepts *model* and *theory* are often confused. While there are many parallel aspects to theories and models, it is still possible to differentiate between them. Mentzer and Kahn (1995, 236-237) discuss the term "construct" as meaning the same as the term "model". Constructs are abstract, non-observable concepts, representing different components of theories. Constructs are specifically designed for special purposes, to organise knowledge and direct research. Constructs are interpreted in relation to theories, and must be empirically operationalised if they are to have explanatory power. Constructs are operationalised by the use of empirically testable hypotheses, to see whether the construct can be used to predict the phenomena investigated. If this happens, constructs may be accepted as a part of the respective theory. Niiniluoto (1984, 205-207) explains that modern semantics understands models as interpretations, which act according to theories. While theories are fundamentally linguistic entities (groups of propositions expressed by sentences), models are non-linguistic structures of a group of physical or abstract objects. Another meaning of the word model is as a group of assumptions to describe a phenomenon or system. In this definition, models are simpler than theories, and the assumptions are known to be either inaccurate and with very limited applicability, or even untrue, meaning that a

model is not necessarily tested and established with similar rigour as theories. This type of models may be called theoretical models, or - if they are not even expected to be true - they may be called imaginary models. As such, models can be seen as a stepping stone towards theory building. The term “model” can also mean an illustrative description of a phenomenon or object, e.g. a model of an atom. These types of models may be called representational models. Pragmatist may be satisfied with models as long as they apply to a specific situation. That is to say, pragmatists do not care whether theories refer to reality as long as they perform the task for which they are required (Caldwell 1991, 45 & 51-52).

This lengthy discussion about definitions for theories is necessary, since the dissertations reviewed are evaluated to identify the efforts that they make towards testing or creating theories. Additionally, attempts are made to discover the main theories that are applied in each of the dissertations. When evaluating the contribution efforts for theory creation, a relatively loose definition for theories is accepted. Such include the theorising and regularity-seeking type of interim stages, constructs and models.

When attempting to find the main theory of each dissertation, a stricter definition of theories is applied, meaning that the theory has to be identified as an identifiable and dominating framework, which suggests some covering-law type of deterministic outcome, and which has been, or at least could be, used to draw credible hypotheses. Arlbjørn & Halldorsson (2001) distinguish between “solid” and “loose” theories, “solid” referring to established theories and their testing and development, and “loose” referring to the development of new concepts and situational and normative theories. According to this classification, the main theories in the dissertation have to be solid in order to be identified.

3 SOCIAL AND PERSONAL PERSPECTIVES IN KNOWLEDGE AND APPLICATION CREATION

While the previous chapter introduced concepts that are traditionally used to explain disciplinary approaches and development, this chapter approaches the research process from a more human perspective. A research process may be significantly influenced by the social environment and personal endeavours of the researcher, as researchers face expectations, encouragement and limitation from their social environment. Researchers also have a personal agenda and motives and the value of their research undertakings are perceived personally.

3.1 Research work in a social context

3.1.1 Reputational systems

The previous chapter discussed how Kuhn and Lakatos find that disciplinary development proceeds similarly to the way in which evolutionary systems develop towards their most effective form, through ontological and epistemological changes. This process is profoundly based on the cognitive development of the science, but gives little attention to the social aspects. Whitley's (1983) approach is different, as his framework treats research as a social system, where research practices are influenced by reputational preferences in the discipline.

In Whitley's framework, reputational organisations in science mean that scientific work is carried out with the goal of convincing other researchers in the field that the research results are significant and correct. This makes the research dependent on others in the field to which the researcher wants to contribute. The researcher's reputation is enhanced each time a researcher successfully convinces fellow researchers of his new results. Similarly, the reputation a researcher has gained largely determines how the research community accepts the researcher's ideas and research results, and how credible and useful they are found to be for the development of the discipline. Whitley finds that, in management studies in general, international reputation building is dominated by American journals (Whitley 1983, 2-6, 11).

Reputation is an important determinant when competing for resources to conduct research. In many cases, other members of the discipline act as gatekeepers and allocate resources and funding, basing their decisions largely on the researcher's, or research community's reputation. However, this is not necessarily always the case, as practitioners or members of other disciplines can also determine the allocation of many resources. As such, researchers may also find it necessary to build a reputation among reference groups other than simply peers in the researcher's own discipline. This is particularly true for practical and applied fields such as management studies, in which logistics research is usually classed¹¹.

Whitley's framework is built around the concepts of dependency and uncertainty. There are two types of dependency in the social system of a discipline: 1) functional dependency and 2) strategic dependency. Functional dependency refers to the extent to which research must build upon existing knowledge and results by using accepted methods. High functional dependency means that research must be conducted using known and proven research methods, if it is to be accepted as valid, whereas researchers in fields with low functional dependency are less certain of what methods to use. Strategic dependency refers to the extent that the research community shares a vision of the further development of the field, in terms of research topics and of the methodological grounds from which to approach those topics. With a high degree of strategic dependency, the opinions as to which research topic are relevant, and as to the methodological issues involved in approaching them are strong. With a low degree of strategic dependency, various approaches exist in the field of scattered topics, and mutual understanding between researchers is thin, meaning that dependency refers to the organisational structure and strength of the reputational bonds, which a researcher has with the research community.

Uncertainty, the other main concept in Whitley's framework, refers to the uncertainty of the individual researcher when choosing a research approach. In other words, uncertainty is a personal experience and it has two dimensions, technical task uncertainty and strategic task uncertainty. Technical task uncertainty refers to the extent to which work techniques are understood and found to produce reliable results. When technical uncertainty is high, there is little confidence in the interpretation or correct use of technical procedures.

¹¹ In particular, the Council of Supply Chain Management Professionals (former Council of Logistics Management) sees logistics as a managerial field geared towards developing the management of private or public enterprises. Additionally, there are also other types of logistics research. In Nordic countries some prominent names such as S. Wandel, L. Sjöstedt and L. Ojala are more interested in macro-logistics, aiming logistics research at the macroeconomic, infrastructure and societal level of research, than in studying the managerial problems of private companies.

When technical uncertainty is low, formal training can provide researchers with well-established “tool-kits” for conducting standardised research tasks. Strategic task uncertainty refers to the extent to which relevant research topics and methodological approaches are clearly stated and prioritised by the research community. When strategic task uncertainty is high, researchers have difficulties in knowing which research problems will be considered significant and would therefore bring a high reputational pay-off. In fields with a low strategic task uncertainty, the priorities of research problems to be solved are clear and indisputable. These variables describing a reputational system are summarised in table 2 (Gammelgaard & Vafidis 2001 & 2006). Please note that, for the sake of consistency, uncertainty has been termed as its opposite, certainty.

Table 2. Characteristics of reputational systems

	Dependency		Certainty	
	Functional	Strategic	Technical	Strategic
High	Research must build on earlier results and accepted methods	One approach to the epistemological, ontological and methodological foundation of the field	Standard work techniques that are well-understood	Clear and prioritised research agenda
Low	Research may build on earlier results and the question of method is not considered important	Various epistemological, ontological and methodological approaches with little or no mutual understanding	No standard work techniques	No agreement on significant problems and their priority

The framework indicates that, the more a scientific field scores on the “low” squares and the more liberty in work organisation, the less dependent the individual researcher is on the reputational system, and the less developed the field. Furthermore, the more a scientific field scores on the “high” squares, the tighter the work organisation and reputational system are and the more developed the scientific field. Referring to Kuhn’s work on scientific paradigms (Kuhn, 1995/1973), we might interpret the “low” scores as characterising a pre-paradigmatic field (either a new field or a field recovering from a scientific revolution) and the “high” score as describing a field in its

normal science or paradigmatic phase. Whitley himself also refers heavily to the work of Kuhn.

When dependency is high the researcher can be very certain of what is accepted as valid research, limiting the choices of the researcher who is more certain of how to proceed. Figure 4 illustrates the relationship between dependency and uncertainty, i.e. high dependency means low uncertainty and vice-versa.

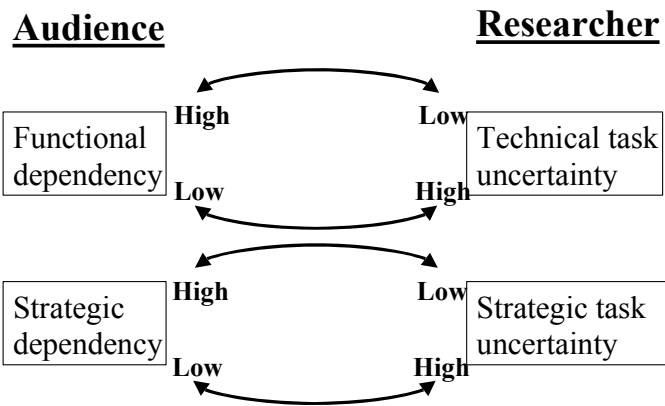


Figure 4. Interrelationship of dependency and uncertainty

The implications of this framework for doctoral studies are that a pre-paradigmatic field will leave ample room for new ideas and approaches, but also for frustration, uncertainty and sloppiness. In such an environment, the doctoral student does not have directions for methodology or an order of priority for relevant research questions. A professor supervises the studies, but the professor is not very dependent on the reputation of his peers, as no one really has a reputation yet. At the other extreme, the doctoral student knows very well what to do in respect to both research questions and methodology, and he/she is supervised and directed by a professor who is dependent on his/her professional reputation. The study conducted by the doctoral student may very well be a part of the supervising professor’s own reputation-building process (Gammelgaard – Vafidis 2001).

Weary & Edwards (1994) and Weary et al. (2001) have also investigated social uncertainty. Their research finds that social causal uncertainty¹² affects information processing. The higher the social uncertainty of an individual, the

¹² Uncertainty is defined by Edwards (1994 & 1996) as the ability to identify and understand the causal conditions for social events. Also, causally uncertain people do not believe that they understand what is causing the events in the world around them (Edwards, 1997).

more cognitive effort is put into information processing to achieve accuracy. Most people believe that putting additional cognitive effort into information processing brings better accuracy, thus people tend to strengthen the use of their preferred form of information processing when they are strongly accuracy-motivated in socially uncertain situations. This means that social uncertainty is likely to increase the effort of the doctoral student and also delay the completion of his/her studies.

3.1.2 Communities of practice

Gammelgaard and Vafidis (2006) discuss the “learning school” and communities of practice. The learning school is a concept introduced by Wenneberg (1999). The learning school looks at science as a result of social activity rather than cognitive processes. By studying social activity, we can learn how to organise scientific work to improve the outcome, i.e. to create increasingly higher levels of scientific knowledge and cognition. From this point of view, doctoral education is part of a particular social activity, and by studying how the learning processes are organised, we will gain more knowledge about science itself.

Lave & Wenger’s (1991) and Wenger and Snyder’s (2000) approaches to learning as a social activity, the so-called *communities of practice*, provide a framework for analysing and understanding disciplinary development. The idea of communities of practice is rooted in the apprenticeship model, which is an ancient model of learning. Lave and Wenger (1991) suggest that the relations between an apprentice and his/her master, the relations between apprentices and between the master and his/her peers affect the outcome of the learning process. Such relations between the actors in the immediate work environment constitute a community of practice. In Whitley’s terminology, a community of practice in science is a reputational system. Lave and Wenger suggest the following analytical framework to identify communities of practice (Gammelgaard & Vafidis, 2006):

- *Structure of the learning process.* In a community of practice, learners learn from each other. They also learn from the master, but the role of the master is to legitimise the learning process and the outcome as a locus of authority rather than to act as an actual teacher. The curriculum is created – not only by the master, but also - by the community of practice.
- *Participation.* In a community of practice, the apprentices learn by participating in actual working processes, which creates a learning curriculum that cannot be considered in isolation from social relations.

A learning curriculum – as opposed to a teaching curriculum featuring an external view of what knowing entails – is characteristic of a community of practice.

- *Access.* Apprentices in communities of practice have access to ongoing activities, old-timers, and other members of the community and technologies of practice.
- *Language and discourse.* In the traditional approach to learning, language is seen as a knowledge transmitter. In communities of practice, language is merely seen as a transmitter of legitimacy of participation, and therefore as access to the knowledge of the community. Knowing the language of a profession gives newcomers face validity.
- *Motivation and identity.* In a community of practice, participation is considered to be the central motivator and creator of professional identity. In contrast, schooling is a structured pedagogical activity in which the teacher takes responsibility for motivating newcomers. In schooling, newcomers are “objects to change” rather than valued participants in a community where participation and professional identity are the goals of the learning process.
- *Dilemmas.* Asymmetric power relations constitute a dilemma inherent in the traditional and the community-of-practice model. As a result of such power relations, apprentices may become “clones” of the community of practice, which will limit and maybe even prevent regeneration of the community. As Lave and Wenger argue: “Granting legitimate participation to newcomers with their own viewpoints introduces into any community of practice all the tensions of the continuity-displacement contradiction.” (Lave and Wenger, 1991, 116). In other words, continuity may be disturbed by newcomers who may not accept the situation as it is; suppressed disagreement may result in rebellion later on.

3.1.3 Social systems in logistics research

The concepts of reputational system and communities of practice form the backbone of this study, as far as describing and understanding the researchers’ social system domains and their relations to the research process is concerned. Whitley considered disciplines as reputational systems and largely disregarded the role of practitioners. In applied research such as logistics, much work is performed with a view to practical purposes, and thus Whitley’s framework has to be extended to cover the practitioner dimension. Figure 5 combines the

idea of paradigms as presented by Kuhn and an extended framework of Whitley, in order to illustrate how the domain of the individual researcher interacts both with the domain of the discipline and with the domain of the practitioners.

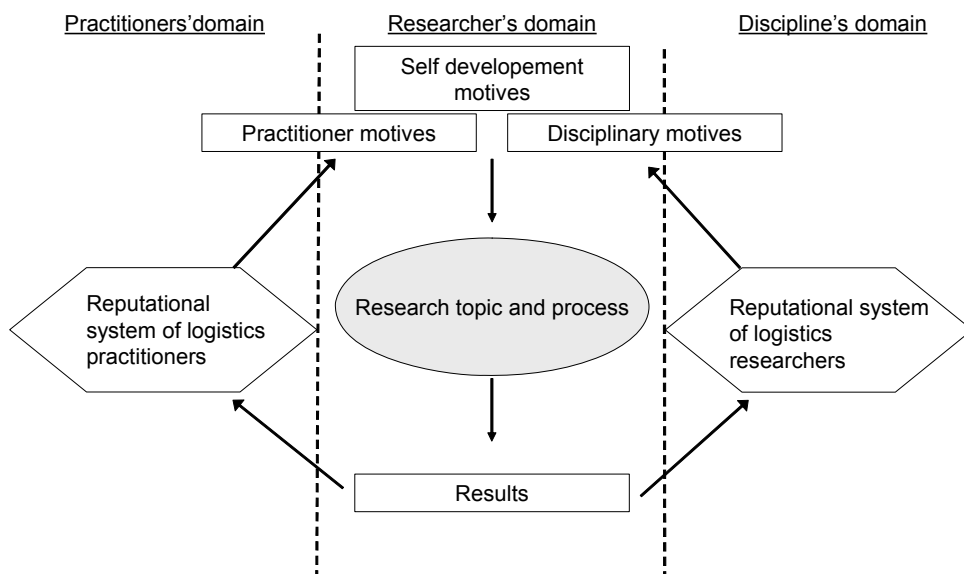


Figure 5. Interaction between the individual researcher and the domains of a discipline and its practitioners

It can be seen from figure 5, that the research process is based on the motives of the researcher. These motives are likely to be influenced by what the reputational reference groups in the domains of the discipline and its practitioners find important. For a doctoral student, the disciplinary reputational system may consist of the supervisor's opinions and the preferences of funding organisations,¹³ while a more established researcher may be more dependent on the preferences of international journals. For example, the North American tenure system ensures that researchers must have a good track record of publications before they can become fully tenured professors. Additionally, the salary level in different universities can be very different, pushing researchers to aspire to better positions.

¹³ Funding is largely dependent on the previous reputation of a researcher or research institution, although several foundations and doctoral student positions do provide a good starting point for a novice researcher without a pre-established reputation.

The disciplinary domain influences the entire research process, as the researcher reads existing literature and discusses with colleagues when building his/her theoretical framework and designing the methodology of the research. However, the researcher has an active role in interpreting existing literature and in selecting the ideas which he/she finds suitable for the research at hand. Strict disciplinary expectations may cause rejection of approaches that would conflict with the existing paradigm, either because the researcher finds them unacceptable or unsuitable, or because of fears that results contradicting the existing paradigm would be turned down by the research community. Nordic logistics research is to a high degree connected to the American approach, as almost all editors and editorial boards of the highly ranked international journals are U. S. based. The widespread understanding in Nordic disciplinary discussion is that these journals limit the approaches in logistics research, since they clearly favour positivist approaches and quantitative methods, and there is a quest for more paradigms within the same field (Näslund, 2002; Frankel, Näslund and Bolumole, 2005).

From the doctoral research and education point of view, several institutions contribute to the discipline by organising doctoral workshops and gatherings. In particular Nofoma, the Council of Supply Chain Management Professionals (CSCMP) and the European Logistics Association (ELA) are active in organising such workshops annually. Typically such workshops last two to three days and give doctoral students the opportunity to present their work and receive feedback, but they do not have any follow-up or mentoring relations after the workshop. Also, there are no known national post-graduate education programmes in Finland or Sweden, which would allow the structured and long-term facilitation of research approaches. Arlbjørn et al. (2006) conclude that a Nordic research paradigm is not identifiable, and that active participation in the Nofoma network does seem to support the formation of a Nordic research paradigm. The CSCMP or ELA networks are no more significant to Nordic doctoral students in logistics than is Nofoma. It can be concluded, that there are no facilitating institutions that would significantly support the development of a research paradigm, and that attempts to use the institutional approach to clarify the orientation of the discipline have so far failed.

For the practitioners' domain, the research process itself is not usually significant. Practitioners are mainly concerned that the results are effective and applicable to the solution of their specific problems. Practitioner influence may be significant to researchers who rely on empirical data or financing from the practitioners' domain. Furthermore, the personal interests of the researchers may add to the influence of the practitioners' domain. Amongst 44 survey respondents who completed a doctoral dissertation between 1994 and

2003, 61% were interested or very interested in a practitioner career, which is significantly more than the 44% who were interested or very interested in a research career. Additionally 60% of the respondents agreed or strongly agreed with the statement that their thesis should contribute to the discipline, and 55% agreed or strongly agreed that the thesis should contribute to practice. Thus, the communities of practice and the reputational systems in logistics doctoral education extend beyond the academic world. This point is often overlooked in discussions on the disciplinary status, which tends to be academically driven and neglects the fact that many novice researchers are more interested in the practitioners' domain.

3.2 Research from a personal perspective

3.2.1 Role and concepts of motivation

In addition to having a disciplinary and social dimension, the research process also relates to the researcher as a person. Any rigorous exemplar of research is a significant mental achievement. Participation in such a project requires that the person attempting it must be motivated, interested and see some personal benefits.

Concepts of motivation are central to understanding the personal perspectives of the research. Motivation is defined as *the psychological process that causes the arousal, direction and persistence of voluntary actions that are goal directed*. (Mitchell, 1982, 81) The arousal motives are typically researched from two theoretical perspectives. The most typical is need-based motivation, which is the basis of such things as the widely known Maslow's hierarchy of needs. The other theoretical perspective in motive research, which is more significant for this study, emphasises social apprehension (Mitchell, 1982, 84). In this perspective, the motives of the researcher are likened to the background of the research, the immediate environment in which the researcher works, and the future aspirations and goals that the researcher has.

Motivation is a very widely researched topic in psychology, where numerous frameworks and methods are widely available. Goal-setting theory, control theory, contingency theory, achievement motivation inventory and elaboration likelihood model are described below to clarify the role of motivation in the research process.

Goal setting theory is often used to address motivation in organisational theories, and it assumes that behaviour and actions reflect conscious goals and intentions, which may be either selected or given. Fried & Slowik (2004) examine the relation of time to the goal setting theory and find that time

allocation between tasks depends on the prioritisation of the tasks. In addition, the pace of work slows down when the time allocated to a task is longer than needed, but excessively tight deadlines reduce performance.

Fried and Slowik (2004, 409, 414) suggest that people who are oriented towards future opportunities will have a higher motivation than people who are not future oriented. Goals are prioritised hierarchically, and the priority of the dissertation project depends on competing goals. Competing goals may depend on career stages and other opportunities that the researcher identifies. Often goals conflict, as the available time is limited. Austin and Bobko (1985) discuss the role of conflicting goals as a potential source of frustration. In this study, particularly interesting types of conflicting goals are those between the requirements for disciplinary and practical contribution, and the conflict between research and other work or personal life. Asking the survey respondents about goals for self- and career-development and also about causes of frustration and conflicting goals, is actually an application of the goal theory.

Klein (1989) investigates the suitability of *control theory* for understanding work motivation. Control theory is a metatheory of motivational theories, incorporating elements from feedback, goal setting, expectancy and attribution theories. It is a heuristic theory, focusing on the cognitive processes underlying motivation and assuming that the feedback loop is a determining element in these processes. The feedback loop is easily understood by thinking of a thermostat that has a sensor to measure the temperature of a room, and consequently determines the heat output, which again affects the temperature of the room. Human behaviour is, of course, more complex and less deterministic than the behaviour of a thermostat. However, human behaviour is also partially controlled by feedback loops, as illustrated in figure 6.

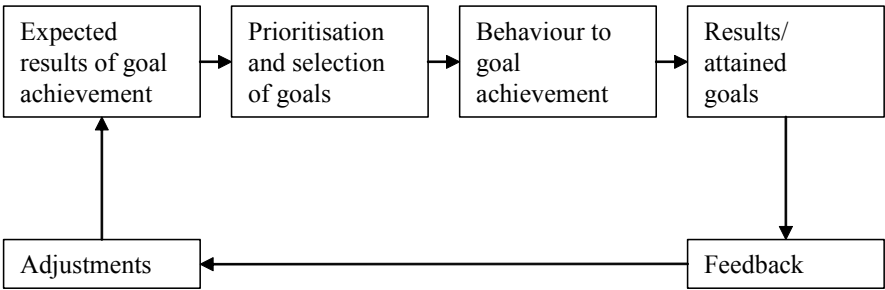


Figure 6. Integrated control theory for work motivation (simplified from Klein 1989, 153)

The feedback loops in human behaviour, illustrated in figure 6, operate between setting goals with expected attainments, making choices between the goals, choosing actions to achieve the chosen goal and eventually measuring feedback on the attainment of the goals. The control loop is hierarchical, as goals tend to have different priorities and higher priorities override lower ones. Based on the feedback, previous behaviour is either continued or changed.

The control theory is applied in this study to ask about the survey respondents' career after the completion of their dissertations, which is compared to their career interests before their dissertations. The respondents are also asked how significant they consider the doctoral research project has been in their careers, whether they have conducted later research and how loyal have they been to the methodological approach of their doctoral dissertation.

The goal setting and control theories represent a rather deterministic and mechanistic approach to motivation. Österåker (1999a, 106 & 1999b, 73) expands this view by illustrating a *dynamic triangle of motivation* model as a general framework for investigating motivation. This model assumes that values, attitudes and needs are reflected in motives through a person's identity, which is represented by physical, mental and social dimensions. This view is related to the Elaboration Likelihood Model (ELM) developed by Petty & Cacioppo (1986). The essence of the ELM model is that attitudes are fundamental for decision-making and that attitudes can be adjusted by persuasion. ELM describes two routes of persuasive influence: central and peripheral. The peripheral route means that the individual chooses to make simple association and effortless reasoning, while the central route means a rigorous thinking and evaluation process that elaborates the message. Choosing the central route and high elaboration requires that the person is both motivated and able to do so. Any research project includes countless such decisions, where the researcher has to choose between going deeper into a subject and leaving it as it is (see also Cacioppo & Petty 1984). The elaboration likelihoods in complex research setting is a multi-faceted concept, and the end result of the attitudes of the researcher is present in the final work in countless choices. For the purposes of this research, attitudes towards the importance of disciplinary and practitioner contribution are considered as central drivers for many of the research choices.

The *contingency approach* for measuring motivation assumes that the motives and structures that give rise to motives are different in different situations. This contrasts with the static motivational theories, such as the well-known Maslow's hierarchy of needs, which does not take situational factors into account. Such situational factors are largely put in place by the organisational environment of the individual (Österåker 1999a, 103-104).

According to the contingency approach, in motivational research it is important also to understand the organisational environment in which the authors have worked at. Social and educational backgrounds are typical factors used as independent variables in various demographical statistics to explain such things as health, education, earnings, various social problems, etc. Situational characteristics offer almost infinite possibilities to investigate their effect. In this study, the researcher background is limited to describing the educational backgrounds and work backgrounds. However, due to the relatively superficial investigation of the backgrounds, the main intention is to provide descriptive information rather than to use it as an independent (i.e. explaining) variable in causal analysis. However, an experimental investigation is conducted to investigate the effect of researchers' work background as a practitioner. This investigation is motivated by numerous discussions with logisticians in academia and practice, which have given the author of this research an impression that researchers with a practitioner background differ in their motives and approaches from researchers who lack practical work experience.

Readily available frameworks also exist for investigating specifically academic motivation. The Academic Motivation Inventory (AMI) includes 16 facets to assist in assessing academic motivation and orientation of interests (Komarraju & Karau, 2005).¹⁴ The academic motivation inventory is an application of the Achievement Motivation Inventory, which is a widely used concept for measuring motivation in psychological research. Several authors have presented their own Achievement Motivation Inventory constructs totalling more than 100 dimensions of motivation. Thus the construct of achievement motivation inventory lacks theoretical consensus and is instead more of a projective method to measure components of achievement motivation. (Schueler et al., 2004).

¹⁴ The facets of academic motivation according to Komarraju & Karau (2005) are:

- Thinking: enjoys thinking and analysing
- Persisting: tends to keep working until the work is done
- Achieving: enjoys hard work and doing well
- Facilitating anxiety: anxiety that helps learning
- Deliberating anxiety: anxiety that interferes with learning
- Grades orientation: desires good grades
- Economic orientation: focuses on career development
- Desire for self-improvement: desire to increase competence
- Demanding: wants good teaching
- Influencing: enjoys arguing and influencing others
- Competing: wants to do better than others
- Approval seeking: seeks to do well and get praise from others
- Affiliating: enjoys being with others in school
- Withdrawing: prefers to work alone
- Disliking school: lack of interest in school
- Discouraged about school: feels school is too hard

3.2.2 Application of the motivation frameworks in this research

This study measures several areas of interest for the respondents. The main purpose of this measurement is to provide a descriptive understanding of interests. The second purpose is to make an initial attempt to create hypotheses on the effects of the researcher interests and the research process in doctoral research projects, and to construct a testable causal model based on these hypotheses.

Table 3 summarises the main themes of each of the motivation theories discussed and the application of the theories in this study.

Table 3. Summary of the motivation theories and their application in this study

Theory	Main themes	Application in this research
Goal setting theory	Goals and intentions as originators of action and conflicting goals as a source of frustration	Investigate goals for self- and career-development, investigate potentially frustrating conflicting goals
Control theory	Feedback loop: expected utility of goal attainment-> Goal selection ->Behaviour->Feedback and corrections	Compare career goals with career outcome, investigate perceived significance of doing the doctoral research, and investigate methodological loyalty
Contingency theory and ELM	Motivation is situational and dynamic and related to the social environment	Investigate the educational and work background of the respondents and relate to the dependency framework of Whitley
AMI	Assesses subclasses of academic motivation	Investigation of researcher interest areas

The framework of the personal perspective in the research process is synthesised by applying the concepts discussed above. The framework is illustrated in figure 7, which also illustrates the chronological order of the personal-level elements.

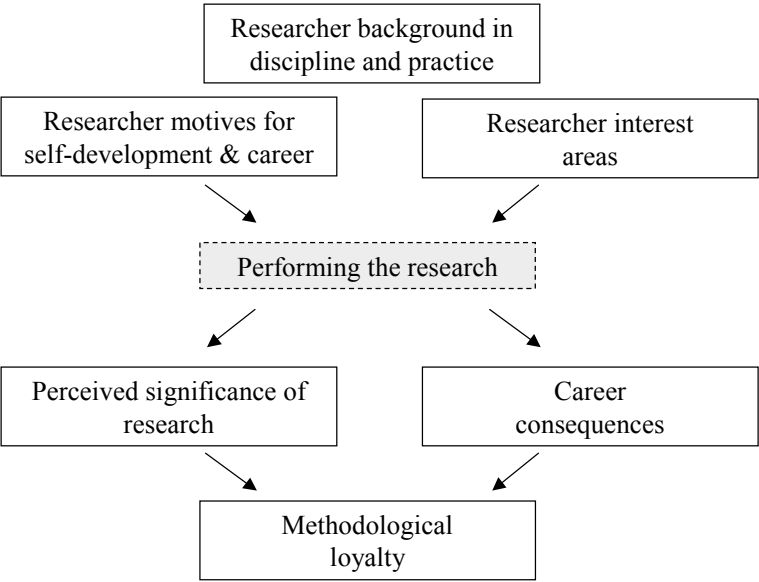


Figure 7. Chronological framework of the personal level of the research process

As illustrated in the figure, the background, motives and interests of the researcher affect the research process. After conducting the research, the researcher will compare the significance of the research process with his/her expectations, and, in the case of a doctoral dissertation, the completion of a thesis is also expected to affect the author’s career, whether in academia or as a practitioner. Eventually, the personal interpretation of the effects of the research will guide the methodological loyalty of the researcher in future research.

The personality of the researcher also significantly affects motivation and interests (e.g. Komarraju – Karau , 2005). It was seriously considered to include a personality investigation in this study by, applying either the MBTI or NEO-FFI15 framework (see e.g. Myers – McCaulley, 1990 & Komarraju – Karau, 2005). Both frameworks are actively used in psychological research and both provide a readily available and tested framework and tools for measuring personality. However, due to practical limitations in the survey, the idea was abandoned, as each of these tests typically require more than one hundred survey questions.

3.3 Summary of the analysis frameworks in this research

The conceptual framework of this study is aimed at describing the knowledge and application creation processes in logistics. The framework summarises the concepts of methodological approaches (chapter 2), social context (chapter 3.1) and the personal perspective (chapter 3.2). When the understanding of the different levels is summarised, the disciplinary paradigmatic state can be understood analytically. A graphical illustration of the analysis framework includes all the levels in the process for knowledge and application creation, and is presented in figure 8.

¹⁵ MBTI (Myers Briggs Type Indicator) is a personality typology that identifies personality types in the following dimensions:

- Extravert – Introvert
- Sensing – Intuitive
- Thinking – Feeling
- Judging – Perceiving

The NEO-FFI (The Five Factor Inventory) identifies personality types in the following dimensions:

- Neuroticism: emotional stability, impulse control, ability to cope with stress
- Extraversion: sociability, assertiveness, talkativeness
- Openness: intellectual curiosity, preferring variety
- Agreeableness: sympathetic, helpful, trusting, co-operative
- Conscientiousness: being organised, purposeful and self-controlled

Both MBTI and NEO-FFI are very extensively researched and widely applied in research, clinical use and also personality consultants. Several websites for quick self-assessment can also be found using an internet search engine.

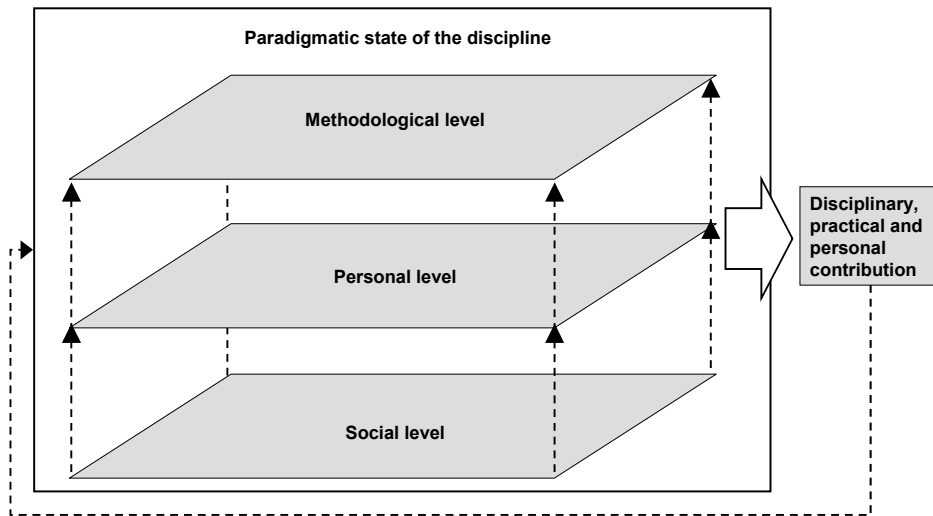


Figure 8. The process for generation of knowledge and applications

The model presented in figure 8 is an analysis model that is used to structure the gathering and analysis of empirical information. It is not a deterministic model, but rather a model for elaborating the meta-scientific discussion and providing a practical means for researchers to structure the key aspects in their social environments, personal goals and methodological approaches. Although the framework is not to be considered as an attempt to form a causal deterministic framework, there are certain causal – although loose – relations that are illustrated with arrows in figure 9 and explained below:

- The paradigmatic state of the discipline, i.e. the accepted research traditions, is considered the strongest and one that predates any individual research project. In paradigmatic disciplines, it determines what can and cannot be done in research, but, in a pre-paradigmatic field such as logistics, it does not play a determining role but rather an influencing role, and this influence is often channelled through the social audiences that influence the researcher. The paradigmatic state of the discipline cannot be measured directly, but the views of the status are based on a subjective synthesis of the other dimensions presented in the figure.
- The social level also largely predates any individual research project, but the researcher may choose the social audiences that fit best with his/her personal interests, motives and aspirations – after which the individual researcher becomes a member of that social system. The reputational domains influence and further develop the individual's

personal interests, and also influence the methodological choices of the researcher.

- The personal level of the research is constructed of the researcher's motives, interests and ambitions. The personal level is influenced by the social environment, but eventually the individual is responsible for choosing his/her own interests and ambitions, which in turn have an effect on the methodological level of the research process.
- The methodological level is largely considered a result of the preferences of the social audiences and the researcher's personal interests and motives. This can particularly be expected in the case of novice researchers, while more experienced researchers may be inclined to base much of their methodological choices on experience, as suggested by control theory (see chapter 3.2.1).
- The contribution of research is seen as generated disciplinary knowledge, practical applications, and personal experiences and consequences. The contribution of the research is a summary of the influence of the social, personal and methodological levels, as well as the rigour and success of operationalising the research choices. The contribution is interpreted by the disciplinary audiences in the context of the discipline's paradigmatic preferences, and by practitioner audiences in the context of practical applicability. Additionally, the researcher interprets the contribution in terms of the personal experiences and consequences, which affects the future choices of the research.

The framework presented above is applied to analysing the methodological approaches in 54 Finnish and Swedish doctoral dissertations. The complete process of knowledge and application creation, including the social and personal levels and methodological approaches, is analysed for 44 of these dissertations. The analysis application of the framework is illustrated in figure 9.

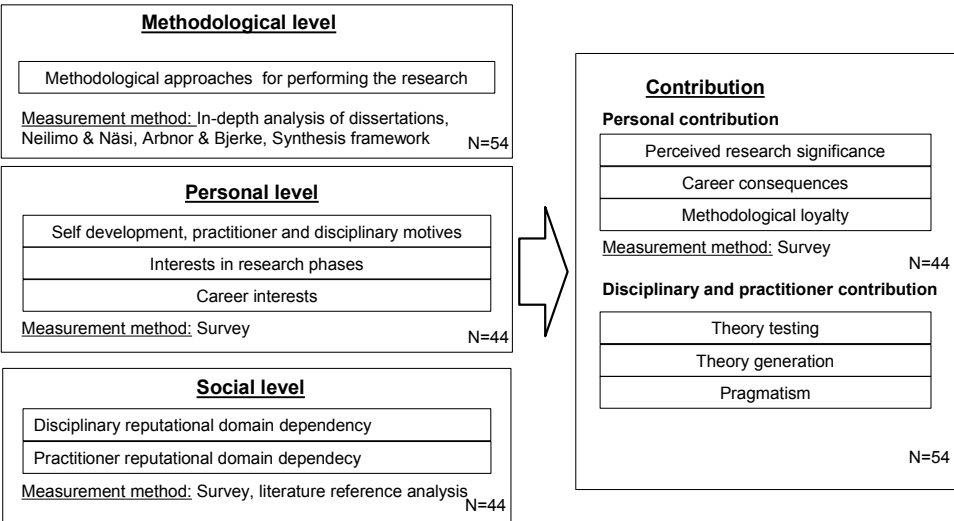


Figure 9. The dimensions and analysis applications for investigating the levels of the research process

As illustrated in figure 9, three methods are applied in the analysis: an in-depth analysis of the dissertations, surveys of the authors and a literature reference analysis. The in-depth investigation of the dissertations is used to investigate the methodological approaches and the disciplinary and practical contribution of the dissertations. The results for the methodological approaches are presented in chapter 5. The survey is applied to investigate not only the social and personal levels in the research process, but also the personal contribution of the individual research processes. These results are presented in chapter 6. Additionally, the literature reference analysis method is used to support the investigation of the social level. Although this investigation is used in a supporting role, it can also be seen as a separate investigation.

4 METHODS IN THIS STUDY

As explained in chapter 3.3, the analysis in this research is divided into methodological, social and personal levels. The methodological level is approached by analysing the published dissertations using readily available in-depth analysis methods explained in chapter 4.1, and a synthesis typology developed for this research, which is explained in chapter 4.1.4. The social and personal levels are approached by conducting a survey amongst the authors, and the methods for this are explained in chapter 4.2. Chapter 4.3 explains the selection of the empirical evidence, and chapter 4.4 explains the research process and phases. Chapter 4.5 discusses validity and reliability. Since the methods in this study are geared towards assessing research, it is appropriate to conduct a self-assessment by applying those methods to this dissertation in chapter 4.6.

4.1 Methods for analysing the methodological level

The methodological approach of each dissertation is assessed by reading and analysing each of the 54 reviewed Finnish and Swedish doctoral dissertations. The analysis was conducted in two projects: the 25 dissertations published in 1994–1998 were analysed in 1999 and 2000, and the 29 dissertations published in 1999–2003 were analysed in 2005 and 2006.

Figure 10 illustrates that specific characteristics of methodological approaches are assessed in each dissertation with the help of several analysis frameworks. The analysis is based on identifying reflectors for methodological approach in each of the dissertations analysed. Such reflectors are presented on the left-hand side of figure 10 and include empirical evidence, reference literature, research subject, methods that were used, applied theories and type of contribution. The reflectors are analysed by applying four frameworks:

- Stock (1993) subject area assessment, which is explained in chapter 4.1.1
- The Neilimo and Näsi (1980) framework, which is explained in chapter 4.1.2
- The Arbnor and Bjerke (1997) framework, which is explained in chapter 4.1.3

- A synthesis typology (Vafidis 2002), which was created for the author's licentiate thesis and which is explained in chapter 4.1.4.
- Finally, the disciplinary status, and, since logistics is pre-paradigmatic, the potentially emerging schools of thought are discussed in the conclusions.

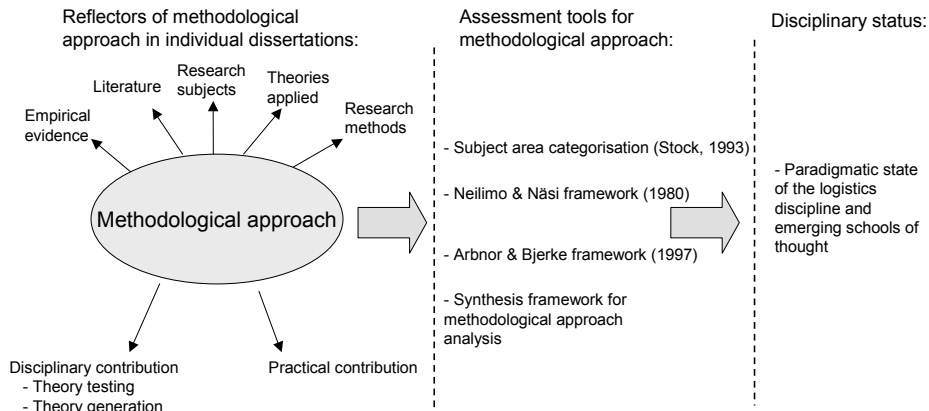


Figure 10. The main characteristics identified in the dissertations analysed, the tools for analysis and the reflection to disciplinary status

The in-depth analysis is based on reading each dissertations thoroughly, while writing notes on the methodologically interesting points. The notes were guided by the predetermined frameworks, which are listed in figure 10. Based on the notes, a one-page summary of each dissertation analysed was written to describe the purpose, empirical evidence, methods, theories and contribution to discipline and practice. These one-page summaries are presented in appendix 3. As such, the analysis of the dissertations is subjective, yet it is based on a predetermined analytical framework. A common approach and vocabulary to describe the methodological choices does not exist, and in many instances such descriptions were obviously not even considered important to make. The analytical framework helps significantly in identifying dimensions of the methodological approaches and in describing so that the dissertations are comparable to each other. The predetermined framework also helps to reduce the bias that a subjective analysis may bring.

The in-depth analysis was the most time-consuming phase of this study, even though the speed in which the dissertations were analysed increased over time from three weeks and twenty pages of notes to about one intensive working day and notes only of the most essential characteristics. On average, the target was to analyse one dissertation per week amongst other tasks

involved in research, work and free time, but, in practice, the time used per dissertation almost doubled, as it was a most educative reading experience.

4.1.1 Research subject area categorisation

It is obvious that the research subject area topic is a very significant decision involved in any research project, for several reasons:

- Ontological beliefs are reflected in the topics and the topics substantially affect the methodological choices (see e.g. Raunio 1999, 30 & Yin 1984, 19).
- The subject areas are indicators of strategic dependency, as explained in chapter 3.1., meaning that coherence in subject areas or emergence of very extensively researched subjects would indicate a relatively high strategic dependency.
- A longitudinal analysis between the 1994–1998 and 1999–2003 samples, and the samples investigated by Stock & Luhrsen (1993), Stock (1987; 1988; 2001) and Stock & Broadus (2006) gives an understanding of which subjects are fading and which are emerging¹⁶.

There are two major challenges in classifying dissertations into subject areas: First, as pointed out also by Stock (2001), the classification of the dissertations is not straightforward. In this study, the decision was made to classify according to the dominant theme of the entire dissertation rather than mere abstracts. Although this method is capable of giving a very thorough understanding of the research, it is often very difficult to say which theme dominates, especially if the dissertation is article-based and fragmented into a multitude of topics. No word count, or other quantitative methods were used in this study, and, consequently, the classification is the author's subjective understanding of what the dominating subject area of each analysed dissertation is.

Secondly, although there were readily available classification categories, logistics research has developed over the years, and, consequently, the relevant subject areas are in a state of constant flux. Stock (1987; 2001), Stock & Luhrsen (1993) and Stock & Broadus (2006) apply slightly differing classes, even though their articles are intended as longitudinal research. The classification and analysis of Stock & Luhrsen (1993) was used as a reference for this study and also for Vafidis (2002), which applied a simplified version

¹⁶ Stock & Luhrsen (1993) and Stock (1987; 1988; 2001) and Stock & Broadus (2006) have published a series of articles, assessing logistics doctoral research topics in North America. Together these analyses include 1,833 doctoral dissertations published between 1970 and 2004. The classification of the dissertations in these articles was based on the dominant theme of the abstracts.

of the classification. This simplification was done by combining several transportation classes under one class, covering all transportation-related subjects, effectively reducing the 22 subject areas from Stock (1993) to 13. The study at hand adds seven new subject areas to make a total of 20. This addition was done in order to be able to accommodate the newly emerging topics in the analysed dissertation. As it is obvious that there is no definitive and final way to categorise a developing research discipline, the proposed topic categorisation is not presented as an exhaustive categorisation. Furthermore, the relatively small number of dissertations analysed limits the ability to identify rarely investigated subject areas.

It was considered important to be consistent within the two samples analysed. Therefore the 25 dissertations that were analysed and classified into 13 categories in Vafidis (2002) were re-classified into the 20 categories of this research. This re-analysis also made it possible to point out differences between the two five-year periods analysed. Vafidis (2002) also includes an additional analysis where the subject areas of published doctoral dissertations and the proposals of PhD students are compared. These results are not included in this research due to the fact that research proposals collected in a Nofoma PhD workshop in 2000 were no longer available, thus it was not possible to re-categorise the proposals into the 20 classes.

4.1.2 Neilimo and Näsi categorisation model

Neilimo and Näsi (1980) developed a model for business research categorisation in a two-dimensional framework: theoretical-empirical and descriptive-normative. The methodological categories included in these dimensions are conceptual, nomothetical, decision oriented and action oriented. Lukka (1991) further adds constructive research methodology to this model. Figure 11 describes the model (Neilimo Näsi 1980; Lukka 1991; Kasanen, Lukka & Siitonen 1993).

	Theoretical	Empirical
Descriptive	Conceptual approach	Nomothetical approach
Normative	Decision-oriented approach	Action-oriented approach Constructive approach

Figure 11. Business research methodologies Neilimo & Näsi framework

The concepts at each end of the axis are explained as follows (Lukka 1991):

- Theoretical research means reasoning, i.e. theoretical knowledge is a priori knowledge that is observable without experimenting.
- Empirical research means that the data is collected on the field or in a laboratory.
- Descriptive research aims to describe “what is” and “how is”, i.e. the emphasis is on describing, explaining and forecasting.
- Normative research is explicitly target oriented, i.e. it aims to recommend a way of acting in practical situations.

The theoretical-empirical dimension is open to criticism, since research usually includes both (see e.g. Töttö 1999). As such, the *conceptual approach* is difficult to recognise because it is found in basically all research (Hahtola 1986, 378). A piece of research might be categorised as conceptual if it offers no normative advice and no, or very little, empirical evidence. Norrman (1997, 45) approaches this dimension by stating that research that is rich in detail but bounded in space and time is empirical, and thus generalisability is limited. On the contrary, research, which gives grand theoretical¹⁷ statements, is abstract

¹⁷ Norrman uses Bacharach's (1989) definition for theory, "a statement of relationships between two units observed or approximated in the empirical world. Approximated units means constructs, which, by their very nature, cannot be observed directly (e.g. centralisation, satisfaction, or culture). Observed means variables that are operationalised empirically by measurement. The primary goal of a theory is to answer the questions of how, when and why, unlike the goal of description, which is to answer the question of what."

and relatively unbounded in space and time, and which is thus more generalisable, is considered theoretical.

The methodological categories of conceptual, nomothetical, action oriented, decision oriented and constructive are explained next. Neilimo & Näsi (1980, 32-33) suggest the following characteristics as typical of the *conceptual* approach:

- The doctrine of the research is mainly based on previously formulated concepts and their analysis, but it can also include some empirical evidence and research findings.
- The main method is the “method of thought”, i.e. analysis and synthesis are used to create new concepts and frameworks.
- There is no real verification of the research findings. Logical argumentation is considered to verify the findings.
- The research may investigate reality as well as values and norms.
- The research findings may be both a mere statement and recommendatory.
- Empirical evidence is at best marginal, and there are no clear rules or formulae as guidance as to how the research must be conducted.

The *nomothetical approach* is clearly an implication of the positivist tradition and nomothetical research applies norms and bonds offered by positivist ideals (Neilimo and Näsi 1980, 4, 28-29, 36). Nomothetical research may be either hypothetico-deductive or inductive-probabilistic (see discussion on positivism in chapter 2.2). In both cases it relies on substantial empirical data, and the aim is to find covering laws or regularities. (Lukka 1991, 170)

The following list explains the characteristics of the nomothetical approach (Neilimo & Näsi 1980, 36-40):

- Atomism prevails, fostering a causal and analytical approach in generating ideas and assuming relationships.
- A hypothesis is usually put forward and tested with the empirical evidence.
- The research is often divided into a conceptual part (framework and hypothesis) and an important empirical part.
- Explanation of the findings is central, that is, the nomothetical approach seeks to understand why A follows B, etc. If causal relationships do not work as assumed, the research should find the reasons why this happens.
- Understanding is not of major concern in the nomothetical approach.
- As a result of the above statement, empirical evidence can rarely be used to formulate new theories. The nomothetical approach can usually only describe the causal relationships between the empirical observations.

- Assumes the researcher has an exclusive seat for making observations from the outside without disturbance to the research object.
- Assumes objectivity of the researcher.
- Avoids coping with values and norms.
- The nomothetical approach has developed several methods for allowing simplification of complex problems (e.g. various scales and methods for measuring).
- An obvious strength of the nomothetical approach is the requirement for a carefully prepared plan for conducting the research.

Contrary to the nomothetical approach, the *action oriented approach* is an implication of the *verstehen* kind of hermeneutic tradition. As such, it is more diversified and no exact methods are recognisable in it. Similarly to the nomothetical approach, the action oriented approach also relies on empirical data. (Lukka 1991, 170-171)

The main characteristics of the action oriented approach are listed below (Neilimo Näsi 1980, 34-36):

- Aims to understand the research object, while the nomothetical aims to explain the research object.
- A background in hermeneutics and teleological explanation, which assumes humans to be intentional beings.
- Empirical evidence is gained from relatively few examples, often cases.
- Empirical evidence is examined by informal but versatile methods.
- Often results in multiple-level conceptual frameworks – or languages – that are used to analyse or plan the surrounding world.
- Emphasis is on human sciences and the Aristotelian heritage.
- Objectivism is not of major concern in the traditional sense.

The differences between nomothetical and action oriented approaches are easily understood by the division to inquiry from the inside and outside (Evered & Louis, 1981); see table 4. The main characteristics of inquiry from the outside are clearly similar to nomothetical research, while inquiry from the inside is similar to action oriented research.

Table 4. Main characteristics of inquiry from the inside and inquiry from the outside (Evered & Louis 1981, 389)

Dimension of difference	MODE OF INQUIRY	
	From the outside	From the inside
Researcher's relationship to setting	Detachment, neutrality	"Being there", immersion
Validation basis	Measurement and logic	Experiential
Researcher's role	Onlooker	Actor
Source of categories	A priori	Interactively emergent
Aim of inquiry	Universality and generalisability	Situational relevance
Type of knowledge acquired	Universal, nomothetic: <i>theoria</i>	Particular, idiographic: <i>praxis</i>
Nature of data and meaning	Factual, context free	Interpreted, contextually embedded

Inquiry from the inside is relevant to real-life situations, but it is difficult to conceptualise and communicate to others. Only real-life experiences are believed to prove the validity of the results and to show the cases where the results are applicable. Action oriented research considers the real life situation too complex, in the sense that it is either not possible or not feasible to formulate simplified research problems, which would result in simplified laws or regularities. The denial of the necessity of making covering laws is seen as the major weakness of action oriented research. (Hahtola 1986, 377 & 379)

The two remaining approaches are the decision oriented approach and constructive approach, which are found at the normative¹⁸ end of the framework. The *decision oriented approach* differs from positivism in the sense that it is normative, but it also includes a positivistic belief in rationality and causality, which are required to build a decision oriented model. The

¹⁸ Normative means that the research attempts to solve a problem in a particular case, and generalisability is more concerned with transferability of the results than with positivistic covering laws

emphasis in decision oriented research is more in building a model that is expected to work in a specific situation, than in feeding empirical data relating to a practical case in order to solve the problem. (Neilimo & Näsi 1980, 30)

In the 1970s in particular, the development of computers and efficient computation tools made decision oriented researchers confident that more and more problems could be solved with computation models. Although trust in the practical applicability of such models may have deteriorated over the last two decades, optimisation models are still an important type of logistics research. Optimisation models, as decision oriented models generally, are often criticised, since it is obvious that optimal solutions are almost impossible to achieve in a dynamically changing real environment. There are also other interesting applications of decision oriented research in logistics. Heuristics brings near-optimal solutions, but requires far less computation power compared to optimisation (see for example, the dissertation of Inkiläinen 1998, which is predominantly constructive, but also has strong decision oriented characteristics). Additionally, route optimisation, for example, has found a new method based on genetic algorithms and DNA-chains (see Berry et al. 1998), and articles about research based on structural equation models appear increasingly numerous in journals.

Neilimo & Näsi (1980, 33-34) suggest the following characteristics as typical to the *decision oriented approach*:

- Based on micro-theory, decision-theory and game theory.
- Mathematics and logic, not observations from the environment, are used for making selections in the model.
- The objective of the research is to invent a model that solves a certain type of problem under certain conditions.
- Defining the external and the decision-making conditions in which the model works is one part of the research problem.
- The assumptions of the model are taken as self-evident. Testing the model is mainly used to prove that it works technically.
- Empirical evidence is not important. It may be used as an example of application.
- Law-like relationships based on empirical evidence are not of major concern.

The model is created for a practical problem and the decision oriented approach aims to create a model that can be implemented in a real example. As the name of this approach indicates, it tries to help in decision-making by providing a suitable model.

The *Constructive approach* did not exist in the original model of Neilimo and Näsi (1980); it was added to the model by Kasanen, Lukka & Siitonen (1993). This approach was initiated by criticism suggesting that the relevance

of business research to practice is often neglected. This criticism stems from the fact that the approaches borrowed from the exact sciences (natural sciences) seek to provide highly generalisable results, which are often too vague to be implemented without far-reaching tailoring to each specific situation (see e.g. Stank and Goldby 1998).

On the other hand, case studies have often described and documented practices that are already known to be self-evident in the case companies. The constructive approach is presented as an approach that could help bring the worlds of research and practice closer together. It aims to “solve real managerial problems so that the functionality of the suggested solution is tested over the research process” (Lukka & Tuomela 1998, 23-24). In other words, the constructive approach is highly pragmatic (see discussion on pragmatism in chapter 2.4). Näslund (2003) presents an approach called “action research”, which is related to the constructive approach in the sense that it is also a highly involved approach, in which the researcher aims to have an impact to the research area instead of staying in an observer’s role. While constructive research is very liberal in terms of the methods that are applied, action research is tightly coupled with systems thinking and qualitative methods.

Constructive research aims to build a solution construct, based on a combination of theoretical knowledge and a practically oriented research process. In other words, the researcher and his/her research project are directly involved with the research object, typically a company, and have a direct effect on its behaviour. This approach means that the results of previous project stages as well as the researcher himself, become part of the data of the research. It is obvious that those selecting the constructive approach can never please keen supporters of positivist virtues of objectivity.

It is implicit in the constructive research process that results from previous research and knowledge of the researched organisation are applied to various projects in the research organisation, until the research construct matures into a working construct or solution, which is then tested in real-life situations (Lukka & Tuomela 1998, 24-25, see also Korpela 1994, 42). The testing of the construct in practical situations is an important phase of constructive research. Reaching the testing phase requires that the researcher is able to justify the value of the suggested solution to the business managers, so that they are willing to apply it to a real situation. If the researcher succeeds in convincing management to test the suggested solution, and if the solution proves to be a good one, then the results are considered as “true” in the same sense as the pragmatic approach suggests. (Lukka & Tuomela 1998, 25). Kasanen et al. (1993) divide the testing of a construct into three categories:

- *Weak market test*: a manager who is financially accountable has been willing to apply the construct in his/her decision-making.
- *Semi-strong market test*: the construct has been widely applied in companies.
- *Strong market test*: the companies applying the construct have achieved better results than the companies that have not.

As can be seen above, even the weakest market test is rather demanding, and the role of personal relationships and the credibility of the researcher play an important role in reaching the testing phase. As such, the constructive approach assumes that theory is built in a relationship between the researcher and the management, making the approach most applicable to researchers with a practitioner background, or who are, in other ways, well-connected with practitioners.

4.1.3 Arbner and Bjerke model

Arbner and Bjerke (1997) have developed another model for categorising research. The model of Neilimo and Näsi is more concerned with evaluating the methodological approach and the extent to which the research emphasises the practical and the theoretical extent of the research. The model of Arbner and Bjerke, on the other hand, is more concerned with subjective-versus-objective approaches for conducting research, comparing an objective explanation-type of research with a more subjective *verstehen*-type of research.

Starting from the most objective (positivist) and moving towards the most subjective (hermeneutic) approaches, Arbner and Bjerke give the following three categories:

- The *analytical approach*, which means that subjective human interference is neither desired nor required to generate scientific knowledge. Different parts of the research object may be researched independently of each other, and causal relations between the different parts are considered highly interesting
- The *systems approach*, which means that knowledge depends on the entire system and that parts of the system cannot be analysed independently of each other. The systems approach can include both the positivist and hermeneutic types of research, insofar as parts of the system are understood by characteristics of the whole instead of causally related parts, and insofar as these characteristics are objectively accessible.

- The *actors approach*, which means that knowledge is inherent in socially constructed meanings, and subjectively depends on individuals (i.e. actors). Research can progress only through interpretations of the individuals and cannot be accessed objectively, as different actors may have very different perceptions. As such, interpretation is based on hermeneutic approaches.

The Arbnor and Bjerke model is more generally concerned with ontological and epistemological issues than is the Neilimo and Näsi model, which is also concerned with methods that are applied in research. The basic three dimensions of the Arbnor and Bjerke model can easily strengthen the common misunderstanding that qualitative methods are found in actors and systems approaches, and that quantitative methods are found in the analytical approach. As was stated in chapter 2.5, this kind of thinking is misleading.

The Arbnor and Bjerke model can be enhanced so that it can be used as an analytical tool to ascertain whether qualitative or quantitative methods have been dominant in the research, as presented in figure 12.

	Analytical	Systems	Actors
Quant			
Qual			
Both			

Figure 12. A framework for evaluating research according to the main method combined with the approach of Arbnor and Bjerke.

The addition of qualitative and quantitative research methods to the Arbnor and Bjerke framework was originally presented by Britta Gammelgaard in a Nordic logistics doctoral workshop in Copenhagen in January 2000. According to Gubi (2003) and Larson & Halldorsson (2004), the case study approach is popular in logistics, and this is most often accompanied by qualitative methods. However, a strict division between qualitative and quantitative research approaches seems problematic in logistics research, as dissertations often use a mix of quantitative and qualitative methods and the method choice appears not to be a key decision criterion in the same way as in North American research (Gammelgaard and Vafidis, 2006; Mentzer and

Kahn 1995). Due to the difficulty of dividing the research clearly into qualitative or quantitative, a category of *both* was added to the framework that is used to assess the empirical materials in this study.

4.1.4 Synthesis typology

The Neilimo & Näsi and Arbnor & Bjerke models, which are discussed in the previous chapters, are simplified and visually understandable models that serve well in categorising research according to simple dimensions, and they help in comparing individual research papers to each other. However, these are general models, while logistics is very much a versatile, applied and pre-paradigmatic science. As such, the models lack several important dimensions that are needed to be able thoroughly to outline the methodological approaches. The evaluation dimensions and the reasons for their use are summarised in table 5 and explained in more detail after the table.

The empirical part of this study assesses each of the dissertations analysed according to the dimensions presented in table 5. The assessment is based on subjective assessments done during the in-depth analysis of the dissertations. During the analysis, a one-page descriptive summary was written for each dissertation, discussing the dimensions of table 5. These summaries are presented in appendix 3. Additionally, appendix 4 categorises and quantifies the results of the assessments for the purposes of the statistical analyses of this study.

Table 5. Dimensions evaluated in the 25 dissertations reviewed and their linkage to key concepts (see appendix 4 for analysis results).

Analysis dimension	Explanation of dimension	Link to key concepts (see chapter 2)
Level of research problem	The levels of research problem and empirical evidence represent the interest areas of the researcher, as well as the approaches towards generalisability and ability to give normative advice.	These dimensions are mostly used descriptively. However, positivist tradition has a greater tendency to investigate phenomena on a higher level and aim towards generalisations. Pragmatic research is more inclined to solve a practical problem on a lower level.
Level of empirical evidence		
Named qualitative method	Methodical pluralism is the norm in logistics research and several methods are identified in the dissertations reviewed. In addition to the research topic, the choice of methods is also related to the researcher's inclination and skills and the school's traditions.	Chapter 2.5 discussed qualitative and quantitative methods. It was concluded that qualitative methods are more often (but not always) related to positivistic approach, while qualitative methods are related to hermeneutic approach.
Named quantitative method		
Openness of framework	This dimension is used to describe how a priori the research framework is. It can be clearly predefined, or it can be very open and allow for the identification of surprising findings in the empirical evidence.	This dimension is in the root of the discussion of positivist vs. hermeneutic tradition. Positivist tradition is clearly characterised by a priori set frameworks while hermeneutic tradition is clearly characterised by open-ended frameworks.
Contribution to theory testing	These dimensions are used to analyse the inclination of the research to contribute in either testing existing theoretical frameworks, generating new theories or hypotheses, or to solving a practical problem and provide normative advice.	Positivist tradition is characterised by hypothesis drawn from existing theory and tested by a priori frameworks, while hermeneutic tradition is characterised by a priori unorganised empirical research aiming to find some new theoretical characteristics (see chapter 2.6 for definition of theory). For the pragmatic approach the whole issue of theoretical contribution is often irrelevant, as practical results count most.
Contribution to theory building		
Pragmatism		
Main theory applied	This dimension captures the main theories that are identified in the dissertations analysed	Ch. 2.6. explained theories in a multitude of ways. A theory must be relatively "strong" In order to be identifiable in the dissertations analysed.
Research approach order	This dimension captures the order in which theory, methods and observation are presented in each analysed dissertation.	Positivist tradition is characterised by first presenting a theory, which is used to structure and analyse empirical evidence. Meanwhile, the hermeneutic tradition is more grounded and tries to develop theories based on what can be seen in empirical evidence.

The analysis dimensions presented in table 5 are explained below:

Level of a research problem and level of empirical evidence: the level of a research problem is evaluated according to the level of economy that the stated research problem or aim the research represents, categorised as nano, micro, meso and macro levels. Nano-level refers to research problems, which touch only a small part of an individual company; micro-level refers the entire company or a company and its immediate customers and/or suppliers; meso-level signifies an entire field of business or a chain or network of businesses; and macro-level indicates that the issues are of importance to the national or global economy or to the environment. Macro-level topics emphasise generic level matters, which are rarely normative and often aim for generalisable “higher level” results. On the other hand, micro- and nano-level topics are presumably more likely to have normative managerial implications, and it may be expected that such topics are more commonly investigated in co-operation with industries.

The level of empirical evidence indicates the level the researcher uses. Macro-level empirical data is typically public, while micro- and nano-level data requires tighter collaboration with specific companies or individuals. This dimension also provides a cross-check to see whether the researcher has tackled the research topic with empirical data of the same level, or whether the research has attempted either to deduce more general results, or to draw specific results from broader data by induction.

Similar classifications are also applied by Harland (1996) where supply chain management literature is divided into intra-organisational, dyadic, chain and network perspectives, and Gubi (2003), who added a functions perspective to Harland’s categorisation. However, these existing classifications were considered inaccurate for the purposes of this study, as they do not include all levels of investigation. In particular, the managerial emphasis in such fields as supply chain management may bring about a lack of interest in macroeconomic phenomena, or even in phenomena in a specific field of business. This may occur on account of the prolonged time that it takes to reap the rewards of such basic research, or because of the emphasis that managerially oriented and popular organisations such as CSCMP or the Supply Chain Council have on the field. As the study at hand is not limited to supply chain management topics, a more generic division to nano-, micro-, meso- and macro-levels was chosen to allow for the additional classification of such things as detailed optimisation topics, environmental topics and topics that are limited to the detailed operations or functions of a company.

The investigation of the research scale is relevant for understanding the logistics research approaches, as, according to Raunio (1999, 344-345), the scale relates to the methodological approach. Raunio argues that qualitative

methods make for a dynamic, and quantitative methods for a static view of society. According to Raunio, the static view is possible for a macro scale of society, while dynamic qualitative research is applicable on the micro-level of social intercourse. As logistics is applied research and often has pragmatic interests, it can be expected that the covering law type and typically macro-level type of research is not as common in logistics as in the sociological research that Raunio refers to. Logistics research can be expected to concentrate more on pragmatic micro-level investigation. However, as logistics research covers a wide variety of interests, the research scale investigation can bring a further element to the understanding of what each research task attempts to achieve.

In the empirical part of this study, the evaluation of the research levels is based on a subjective assessment, done during the in-depth analysis of each dissertation. It was not possible to define the dominant scale for all of the dissertations analysed, thus, in many dissertations, two scales were identified, as shown in appendix 4.

Named qualitative method and named quantitative method: this dimension relates to the hypothesis that the aim of the research determines the applied method (see Töttö 1999). Qualitative and quantitative methods are presented separately in two dimensions, as methodological pluralism characterises logistics research, causing the co-existence of both qualitative and quantitative methods in many dissertations. The relation of quantitative and qualitative methods and their relation to positivism and hermeneutics, as well as theory building, theory generation and pragmatism are discussed in detail in chapter 2.5. In the empirical part of this study, methods are described in the one-page summaries in appendix 3. For the purposes of the statistical analyses, the qualitative methods are categorised as multiple-case, single-case and “other” qualitative methods, and the quantitative methods are categorised as survey, statistical, models, simulation/optimisation and “other” quantitative methods.

Openness of the framework refers to how a priori predetermined the analysis framework of the research is. Allowing for surprises stemming from the empirical evidence, it might also be called “groundedness”, according to the grounded theory approach of Glaser and Strauss (1967). As discussed in chapter 2, the positivist approach is characterised by testing predetermined frameworks, while hermeneutic and pragmatic approaches tend to be open for unexpected findings. Presumably researchers should choose an open framework for theory-generating hermeneutic research, and a relatively non-open framework for theory-testing positivist research. In the empirical part of the study, this dimension received a value of 0, 1 or 2 (see appendix 4). A value of 0 is assigned if the framework is predetermined before collection of empirical evidence and is not open to change if empirical evidence provides

contradictory evidence. An example of such a framework would be a Likert scale survey. The openness –dimension receives a value of 2 if the framework and observations are not determined a priori, and are very open to change if empirical evidence requires it, that is if the researcher remains open to surprises.

Contribution to theory testing, contribution to theory building and pragmatism: the contribution approach means the orientation and rigour of the efforts of the research to serve disciplinary (academic) purposes or to provide managerial implications. The disciplinary contribution is further divided into theory-testing or theory-generating contributions. Theory testing means that an existing theory is applied to a new situation and its applicability is tested and validated or falsified. This approach typically requires a positivistic hypothesis-testing approach, thus the theory discussed in the theoretical framework of the research has to be strong enough for hypothesis formation. Meanwhile, theory generation refers to efforts to construct new models or tools applicable to specific situations. Theory-building approaches can take more liberties than theory testing, as typically several steps are needed in order to build a solid theory (see Weick 1995 and DiMaggio 1995 in chapter 2.6). Pragmatism refers to the approach that a research has towards serving practical and/or managerial purposes, as discussed previously in relation to pragmatism. The dissertations may be seen as highly pragmatic if the research process aims and achieves practical managerial applicability. On the other hand, research that does not attempt to benefit management directly is not considered pragmatic. This study is an example of the latter category, as it only serves other research, but has no managerial purposes to serve practitioners.

In the empirical part of this study, these three dimensions are discussed in the one-page summaries in appendix 3, and for statistical analysis purposes, each dimension was given a value of 0, 1 or 2, according to the orientation and rigour in serving these purposes. It should be separately noted here that this assessment is neither intended nor used to assess how “good” each dissertation is.

Main theory applied: the complexity of defining and identifying theories was discussed in chapter 2.6 and it is apparent that logistics does not post a general disciplinary and paradigmatic theory. Due to the lack of paradigmatic theory in logistics and the complexity in defining a theory, this dimension is the most difficult to assess. Attempts are made in this study to identify paradigmatically used theories in the individually reviewed dissertations. The identified theories can be considered as candidates for wider paradigmatic use over the entire discipline, or as potential demarcation lines if, in future, logistics research is divided into several paradigms, the latter alternative being

more likely to occur. The criterion for this evaluation is strict as the theory has to be identifiable as a theory of general applicability, not a mere construct or model of the researcher, even though such constructs are often called theories in the reviewed dissertations. In the empirical part of this study, the paradigmatic or covering theory, if any, of each dissertation is stated. The one-page summaries in appendix 3 discussing the main theories are summed up in appendix 4.

Research approach order: this dimension covers the progress of each research stage, i.e. the order in which theories (T), methods (M) and observations (O) appear in the research process of each thesis. For example, in a thesis applying a grounded approach, it is more likely that observations come first, then they may be embedded into a known theory and evaluated according to a certain method. In this case, the order would be O-T-M. Meanwhile, the positivist researcher typically first decides on theory and methods, and then finds a suitable empirical environment in which to test the setting. In this case, the order would be T-M-O. There is also the possibility that a researcher wishes to test or develop an existing method in a specific situation, in which case method (M) comes first. This dimension is used in combination with the openness and contribution dimensions, to identify research that is clearly positivistic or hermeneutic.

4.2 Method for understanding the personal and social levels

The social and personal levels of the research process were explained in chapter 3. This chapter explains the methods that were used for data gathering and analysis to assess the social and personal levels. The main method uses a survey and statistical analyses, which are explained in chapter 4.2.1. Additionally, the literature references of the dissertations are analysed, as they are an important indicator of the research groups to which the researcher relates. These methods are explained in chapter 4.2.2.

4.2.1 Survey method for assessing personal and social levels

A web-based survey was used to gather data for the assessment of the personal and social levels of the research process. Interviews with the authors were considered as an alternative method for gathering such data, but the survey was chosen for several reasons:

- The objectivity of survey responses is higher than that for interviews, which eventually requires the interviewer's interpretation of the

responses. As the methodological analysis section of this study is already based on the author's interpretation of the dissertations, this objectivity was welcomed.

- Time usage was important during the author's relatively short study leave from daily work. The most time-intensive phases of the survey are in the design phase, while the data collection phase is relatively automatic with only a few reminders needed. In comparison, interviews are much more time-consuming. Informal discussions with some of the respondents had hinted at a tendency to go into the details of their research, while the responses needed for this study are on a more general level using a predetermined framework.
- The possibility of using a web-based survey tool, which was well received by other researchers, facilitated the coding of the data. All quantitative questions were in a format that the analysis software (SPSS) required, and only the open-ended questions required interpretation and coding.
- Last but not the least, the author was very willing to experiment with surveys and quantitative analysis methods.

The disadvantages of the survey compared to interviews are:

- Interviews are likely to result in better response rates, which was an important consideration with a small sample size, as in this study. However, since the authors of dissertations are usually enthusiastic about their research, the risk of a small response rate was not considered significant. The resultant response rate to the survey was a very satisfactory 83%.
- The interview is more able to provide surprising and unexpected findings than the predefined survey. Although this was a lucrative possibility, it was rejected since the theoretical foundation of this study was considered solid enough to cover the chosen research areas.

The survey is structured around the research areas and question themes described in table 6. Screenshots of the web-based survey are presented in appendix 6.

Table 6. The research areas and themes of the survey

Research area	Question themes
Background	<ul style="list-style-type: none"> - Educational background - Work experience in academia and as practitioner
Reputational system (see chapter 3.1)	<ul style="list-style-type: none"> - Supervisors, pre-examiners and other influential academics - Influential practitioners - Funding sources - Perceived academic and practitioner strategic and functional influence and dependency - Perceived strategic and technical certainty
Motives and interests (see chapter 3.2)	<ul style="list-style-type: none"> - How was the research topic chosen - Attitudes of importance to contribute to discipline, practical applicability and self-development - Reasons for demotivation - Career aspirations in academia and practice - Interest in the various facets of the research process
Consequences	<ul style="list-style-type: none"> - Career consequences - Perceived significance of the dissertations project to various areas of professional competence
Methodological loyalty	<ul style="list-style-type: none"> - Activeness in post-doc research - Aspects of dissertation projects that have been actively maintained or abandoned in latter research

The survey was mainly quantitative, with 5-point Likert response scales. Some open-ended questions were also asked. The open-ended questions, such as those asking about causes of demotivation, were categorised and quantified. The dependency and certainty variables that relate to the reputational dependency (chapter 3.1) are a complex concept that was measured with several variables, and sum variables were calculated before analysis. The analysis of the survey responses is based on reasoning as well as supporting quantitative analysis. The main statistical analysis methods are simple cross-tabulations, and correlation matrices run in SPSS.

Furthermore, the methodological analysis variables that were assessed in the in-depth analysis (discussed in the previous chapter) were coded as dummy variables and inputted in SPSS. Quantitative experiments were conducted to see how the variables investigated in the survey relate to the methodological choices. These methods do not allow conclusions on causality, but instead they investigate the interrelation of various themes and may be used for confirmatory analysis in future research.

The statistical methods of this study are simple and the SPSS software provides easy-to-use tools for experimenting with the analysis. There are, however, some limitations and issues to bear in mind, in particular concerning the correlation analyses:

- The Likert scaling is profoundly ordinal, which limits its applicability to correlation analyses. Yet it is widely accepted practice in statistical analyses to treat it as interval, which was also the case in this study. (Diamantopoulos – Schlegelmilch 1997, 24)
- Several variables are coded in SPSS as dichotomous, i.e. they are given only two values – for example, a respondent either has practical work experience or not.
- Several open-ended questions were dummy-coded as dichotomous variables – for example, whether or not a respondent points out that the feeling of loneliness is demotivating.

The above-listed issues are significant when choosing analysis methods. Pearson's correlation is applicable for interval variables, while Sperman's rank-order correlation coefficient is applicable to categorical or dichotomous variables that are considered ordinal (Diamantopoulos and Schlegelmilch 1997, 201-202). The applied correlation method is expressed in the correlation tables in the analysis chapters.

4.2.2 Literature reference analysis

The literature reference analysis¹⁹ means that the literature reference lists of the dissertations were encoded and analysed. Although this is a very laborious task, it was considered important as literature has a detrimental role in the research process. Mentzer and Kahn (1995, 233-235) identify literature review as a major contributor to the research process. They state the purpose of the literature review as “to provide an historical perspective of the respective research area and an in-depth account of independent research endeavours.” As such, literature review is a form of logical induction helping the researcher to develop research questions and ideas for various ways of studying the phenomena. The literature review may be further divided into integrative, methodological and theoretical. The integrative literature review indicates potential research areas, the methodological review suggests various methods of studying the problem, and the theoretical develops testable hypotheses²⁰.

¹⁹ The literature reference analysis is to be considered as an auxiliary to this study. The generation of the literature reference database is a considerable effort and it is built in several projects over a long period of time. Therefore, the selection of the empirical evidence and some of the analyses are not totally aligned with the rest of this study, as the reference database includes additional dissertation from Norway and Denmark and also from a more extended time period. Although it would have been easy to exclude these from the analysis, it was considered more valuable to present the additional information than to leave some of the database out of analysis.

²⁰ Mentzer and Kahn (1995) define the term ‘methodological’ somewhat narrowly as ‘methods’, while this study has a much broader definition. Additionally, the application of theoretical literature review is defined in a very positivistic way: “develops testable hypotheses.” This definition is in

Additionally, the coherence of the literature reference base in the discipline is an indicator of strategic and functional dependence. Applying the same seminal literature and the emergence of a few frequently cited authors are indicators of a maturing discipline (Gammelgaard & Vafidis, 2006).

Initially, citation analysis was considered the best method of analysing the literature references. Citation analysis can be used to determine the relative importance of reference material in a certain discipline²¹. A citation index counts how many times each journal or individual is cited (Brown 1996). However, a citation index is mainly suitable for investigating the citation frequencies statistically through the investigation of a large range of reviewed papers over a long time period. A simplified version of this method was applied in Vafidis (2002) as the sample was relatively small and spanned only a five-year period. Furthermore, the intention of the literature reference analysis was rather to identify the individuals who have mainly affected Nordic logistics research than to make a statistical citation analysis of the most frequently cited authors. The emergence of dominant authors may be considered a sign of an emerging paradigm and strengthening dependency on the ideas of some dominant authors, or alternatively the citation of well-known authors or 'hot topics' may only be a short-term 'halo effect' (Brown 1985, 86-87 and 1996, 724).

A reference database of the listed dissertations was fed into an MS Access database in three separate efforts. The database used in Vafidis (2002) included the creation of the method, structure and tools for creating the database for the 25 dissertations that were in the scope of that study.²² Over 3,000 references of over 1,400 authors were fed into the database, covering the entire bibliography that was used in the dissertations published in 1994-1998. The references indicated in the main reference list of the dissertation were entered, or, in cases of article-based dissertations, the references for each article were entered, without duplicating the same reference if it was found in several articles in the same dissertation.

Most of the 1999-2003 sample was coded by a group of logistics students at the Turku School of Economics during as a separate project under the

accordance to what is used in this study to identify strong theories that are tested with a theory-testing approach.

²¹ Goh et al. (1996) used citation analysis to rank journals according to each journal's influence on production and operation management research. References from journals, books, and proceedings are fed into a database and the importance of each journal is determined by the number of citations made on articles published in the journal. See also Brown 1996, Cote et al. 1991, Jobber & Simpson 1988, for the use of citation analysis in various disciplines.

²² Special thanks go to Mikko Eerola, at that time a graduate student in the Turku School of Economics and Business Administration, for developing a programme that significantly facilitated the entering of bibliography lists. Thanks go also to the group of hard-working students who typed the reference lists into the database.

supervision of Professor Lauri Ojala, using the same tools and database as in Vafidis (2002). This effort was intended to become a separate publication in which the author of this study did not participate. The effort to publish these results was not eventually made, thus the results are reported in this study. As the author of this study did not participate in the selection of data for the second database nor its entering into the database, the selection criteria was altered slightly: the database included 45 dissertations, 20 of which would not have been selected for this study due to their year of publication, language or country of publication²³. Meanwhile, six dissertations that were in the scope of this study were not initially entered into the database, but were added separately in 2006, resulting in the bibliography for a total of 76 dissertations. Unfortunately, the project of 2003 suffered from documentation problems, and the none of the database was located until very late in the process of writing this study. When the database was found, it was decided to report the findings here. This version of the database was missing information from eight dissertations and their bibliography, which were separately entered in autumn 2006²⁴.

When considering whether the database should have been cleared of dissertations that are not in the scope of this study of the analysis of methodological approaches and social and personal perspectives, the decision was made to leave it in place, as it provides a larger sample for analysis and is in any case within the Nordic region.

Some authors or universities have a very strict approach, indicating only the most essential references such as journal articles, textbooks or conference proceedings, while others indicate all additional literature, even down to the user's guide for a pocket calculator or maps. As a rule, all references were fed into the database as they were listed, with the exception of some appendices, such as lists of letters, faxes, e-mail correspondence, telephone conversations and discussions and reference lists of appendices.

The styles for writing the reference list vary enormously between universities and some individual researchers are more precise than others. Some authors and universities favour giving only core information - the name of the authors, year of publication, title and publisher. Others include lengthy explanations of the contents of the references, indicating the number of pages or even the ISBN numbers.

The database consisted of the following information for each reference:

²³ Several dissertations that were fed into the database were published before 1994, some were published in Norway or Denmark and some were written in Swedish.

²⁴ Special thanks to Matti Takalokastari for typing the information into the database.

Main author, last name and one initial of the first name. It would have been clearer to feed in the entire name but most authors had given only the initials in their reference list. If the name of the author was unavailable or if only the name of the publishing organisation was indicated, then the name was typed as “None”, i.e. the authors had to be actual persons.

Additional authors were typed in separate fields in the order of their appearance in the respective reference. Up to four co-authors, in addition to the main author, were typed into the database for each reference.

Year of publication. This information was generally readily available, but some authors failed to indicate this in many of their references. Such references were ignored in calculations regarding the age and standard deviation of the age of references.

Name of publication, i.e. the heading of the book, article or other publication. For technical reasons, this was typed without articles such as a, an, the, en, ett, das, die or der.²⁵

Publisher, which could be a commercial publisher such as Prentice Hall, a university, the name of a journal, a company, a ministry or other governmental publisher, or the name of a conference.

The references were categorised and the *category* was entered for each reference in the database. Categories were academic journals (JOA), trade journals (JOT), textbooks (TEX), working papers (WOR), theses (THE), other published (OTP), and other unpublished (OTU). The categorisation work was somewhat ambiguous. There was a particularly fine line in distinguishing between *academic* and *trade journals*. The basic categorisation principle was to categorise refereed journals and/or journals that included reference lists, as *academic journals*, and other journals as *other journals*. Journal categories for academic and trade journals are presented in appendix 5.

It was also difficult to distinguish between theses and working papers. Thesis means any type of academic demonstration, i.e. doctoral, licentiate, masters, MBAreport, etc. Working papers were considered to include all other references where a university was stated as the publisher. In many cases, the reference line indicated that it was a thesis, but, in other cases, extensive enquiries within the national university library system, Linda, were needed. Linda specifically states when the publication in question is a thesis.

²⁵ Each database entry was assigned a primary code in the MS Access database. This consisted of the three first letters of the last name of the author, year of publication and the three first letters of the name of the publication. E.g. Ballou (1985) Business logistics management, form a primary code BAL1985BUS. Ignoring the articles from the beginning of the names of the publications significantly simplified the automatic assignment of primary codes. Even with this precaution, some codes appeared more than once, in which case a fourth letter was added to the latter part of the code, e.g. if BAL1985BUS had reappeared, then the next code would have been BAL1985BUSA, and the following BAL1985BUSB, etc.

Other categorisations were easier. Textbooks were usually recognisable because the publishing company was given. “Other published” included anything that had a publisher, but which did not fit into the other categories. This category also included any published material, which did not have a real person as the author. “Other unpublished” included all other material.

4.3 Selection of empirical evidence

The selection of the empirical evidence for this study is deeply influenced by the point of departure for the licentiate thesis, which was to discuss methodological tendencies and development in logistics research in the Nordic region. Very early in the research progress of this study, it was decided to approach the topic by analysing doctoral dissertations. The time period of the sample chosen for Vafidis (2002) was 1994-1998, and it quickly appeared that the Nordic dissertations that met selection criteria were Finnish and Swedish.

The research emphasis in this study has shifted from investigating the research approaches in the Nordic region to an investigation of the research process itself. Simultaneously the decision to use doctoral dissertations as empirical evidence was still considered the best approach. Alternative empirical evidence could have been other research papers, journal articles, and research papers written by professors and senior researchers who can influence the state of logistics research more significantly than doctorates. However, several factors supported the choice of doctoral dissertations as empirical evidence:

- 1) Doctoral dissertations are written according to certain rules, requiring the doctorates to discuss their methodological choices and approaches in detail. This research characteristic does not prevail so strongly and systematically in other research papers such as journal articles, which are a much more compact form of presentation.
- 2) Doctoral dissertations are easy to find as they are public. Requesting research reports from such sources as professors would probably have ended up in only a selective sample.
- 3) A doctoral dissertation is the result of a rigorously conducted research process over a time period of several years. It is a high-quality research report, complying with expected standards that are monitored by supervisors, external examiners and opponents before publication.
- 4) Doctoral dissertations are assumed also to reflect the approaches adopted by supervisors, and others who have an effect on completion of the thesis. Thus the theses are fairly representative of the approach of the university or faculty where they are prepared.

- 5) There are no logistics journals published in the Nordic region. Analysing journal articles written by Nordic researchers yet published in North America (as most journals are), would have heavily emphasised the preferences of the editors and reviewers.
- 6) The number of logistics doctoral dissertations is not astonishingly large in the Nordic region. This allowed for a thorough analysis of the complete sample.
- 7) Last but not least, this study was intended as a personal development work, helping the author to see different approaches to conducting logistics research and to solving its related problems.

The study at hand covers two samples of dissertations for which the methodological approaches were analysed. The two samples are:

- 1) Finnish and Swedish doctoral dissertations published in 1994-1998. A total of 25 dissertations, of which 11 were published in Sweden and 14 in Finland.
- 2) Finnish and Swedish doctoral dissertations published in 1999-2003. A total of 29 dissertations, of which 13 were published in Sweden and 16 in Finland.

Additionally the empirical evidence includes a survey that was sent to all authors that were found. In practice, the survey was sent to all but one author, whose contact information was not found (Christian Adjadjihou). The response rate to the survey was a very satisfactory 83 percent, i.e. 44 authors out of 53 authors who received the survey responded. The survey was web-based and was sent out in February 2006. One author preferred to answer by telephone interview and one preferred the survey in paper format. His request was complied with but no reply was received.

The selection of empirical evidence started by selecting the dissertations for the author's licentiate thesis in 1998 and 1999, and was based on the Nofoma 1997 list of participants. This conference is seen as the main logistics event in the Nordic countries, thus it was assumed that any organisations considered as important players in the field of logistics, would have had at least one participant at this conference. Gubi et al. (2003) and Arlbjørn et al. (2006) also use the Nofoma network to assist with their meta-analysis of the logistics discipline.

Nofoma 1997 attendees were sorted by university and one attendee (preferably a professor) from each university was contacted and asked to list doctoral dissertations in logistics from his/her university. For some Finnish universities, it was more convenient to check the "list of logistics experts", edited by Ojala (1999), in order to contact the professors of each university. Only dissertations in either English or Finnish were selected due to the requirement for complete understanding of the language in the in-depth

analysis of the dissertation – although only two of the dissertations were written in Finnish.

A reminder was sent to the contacted person if no reply was received within a few weeks. As a result, all universities contacted replied, although many of them answered that there were no doctorates in logistics. It soon became evident that doctoral dissertations meeting these criteria were found only in Finland and Sweden but not Denmark and Norway. Therefore, the scope of the licentiate thesis was limited to Finnish and Swedish dissertations.

The second sample consisted of Finnish and Swedish dissertations and the selection followed the same method. Finding theses for the second sample was facilitated by a research project at the Turku School of Economics (unpublished), in which most of the theses published between 1999 and 2003 had already been identified. Additional queries in library databases were prepared, and casual discussions with logistics colleagues at various events also revealed some additional theses to be added to the sample. Finally, at least one professor from each institute was asked to check a list of the dissertations that had been found at his/her university. The question was sent by e-mail and a reminder was sent to those who did not reply. Consequently, all except the Lappeenranta University of Technology replied, and the result was that several dissertations were added to the sample.

Table 7 shows the number of dissertations from each university. It can be seen from the table that the most productive universities were the Chalmers University of Technology and the Helsinki University of Technology, followed by Linköping, Lund and Lappeenranta. All the most productive universities were universities of technology, and the most productive business school was the Helsinki School of Economics followed by the Turku School of Economics. The remaining universities of Oulu, Vaasa, Hanken, Tampere and Turku have produced only one or two doctoral dissertations in logistics during the entire period 1994-2003.

Table 7. Number of dissertations analysed from each university

University	94-98	99-03	Total
Chalmers University of Technology	8	4	12
Helsinki University of Technology	2	7	9
Linköping University	2	4	6
Lund University	1	5	6
Lappeenranta University of Technology	4	2	6
Helsinki School of Economics	3	2	5
Turku School of Economics	2	1	3
Oulu University	1	0	2
Vaasa University	0	2	2
Swedish School of Economics (Hanken)	0	1	1
Tampere University	1	0	1
Turku University	1	0	1

The process for selecting the empirical evidence is rather mechanistic leaving as little room as possible for the delimitation problem of what is considered logistics research and what is not. As a rule of thumb, it was assumed that, if the contacted professors considered a thesis to be logistics-related, it was eligible for analysis. For instance, Gubi (2003) has investigated doctoral education in logistics and supply chain management, resulting in a list of dissertations that differs slightly from the sample that is analysed in the study at hand.

4.4 Research process

This research process commenced in 1999, resulted in the publication of a licentiate thesis in 2002, and in the publication of this doctoral thesis in 2007. Initially, the research project was intended as a brief look into the world of logistics research, but the interest that emerged in methodological questions and the philosophy of science resulted in a much more thorough and lengthy project. The major phases in the research project are illustrated in figure 13.

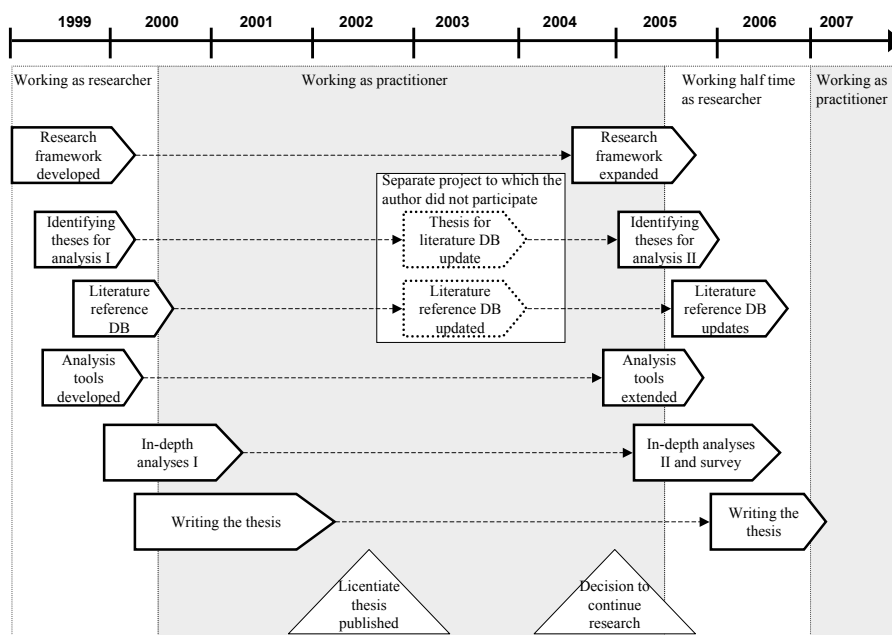


Figure 13. Main research project phases

As shown in figure 13, this research project has been conducted as two intensive projects with a lengthy time gap in between. The idea of the research started developing during post-graduate methodology courses in early 1999. These courses provided a good starting point for developing a basic understanding of the main concepts related to the philosophy of science, and introduced the Neilimo & Näsi and Arbnor & Bjerke frameworks. Soon, the need for more comprehensive analysis tools was realised, and the first versions of the synthesis typology (see chapter 4.2) were developed during the same year. Initial analyses of various research papers helped to develop the tool further, and the systematic search for gathering Nordic doctoral dissertations started during the preliminary stages of the project. The in-depth analyses were started in late 1999 and lasted for about one-and-a-half years. The idea for the literature reference database came from Professor Lauri Ojala, the supervisor of this thesis.

The research work was intensive until May 2000, when the author switched from full-time research work to a practical work. Obviously, the rather academic topic of the research was not related to his work in any way, and research continued in the evenings and at weekends. Consequently, the writing of the thesis took almost two years, and the licentiate thesis was finally published in May 2002. An interesting one-month period was taken at the Copenhagen Business School just before starting practical work in 2000.

During this period, Britta Gammelgaard indoctrinated the author in the world of reputational systems.

After the publication of the licentiate thesis in 2002, the decision was made not to continue active research for a period of time. However, the idea of a longitudinal analysis that would include a new set of empirical evidence had already been formed. The decision to continue the research project was made at the end of 2004. The in-depth analyses of the 1999-2003 dissertations were started immediately, as most of them had already been identified in a separate literature reference analysis project at the Turku School of Economics in 2003. 50% leave from work was organised between September 2005 and January 2007. This allowed sufficient time to complete the very time-intensive phases related to the in-depth analyses, to develop the framework and organise the survey for the analysis of the personal and social dimensions of the research process. The analyses had almost been completed by the end of June 2006. An exception to this was the literature database from the 2003 project, which was not as complete as expected and required a further update that was completed in September 2006. The writing of the first versions of this thesis started in early 2006, and reached an editing and fine-tuning phase in August/September 2006.

Overall, the research project progressed without severe problems related to scoping or direction. However, certain dead-ends in the project were faced. One of these was an approach to conduct a personality analysis, which was thoroughly investigated in 2005, but the idea was eventually abandoned due to added complexity in the survey.

4.5 Validity and reliability

The validity of research refers to whether or not it in fact measures what it is attempting to measure (Diamantopoulos & Schlegelmilch, 1997, 34). Yin (1994) further divides the validity of empirical social research into four tests:

- Reliability refers to the accurate repeatability of the same study, i.e. the study would give the same results when repeated.
- Construct validity²⁶ refers to whether the right measures are used for the concepts that are under investigation.
- Internal validity refers to how valid the causal relations are that are presented in the research.

²⁶ This may also be referred to as content validity, referring to a set of measurable items that reflect a construct (Dunn et al., 1994, 157).

- External validity refers to the generalisability of the findings to a wider context.

The above-listed criteria follow the ideals of positivist research tradition and are somewhat problematic for this study. Although this study is mainly analytical, many of the analyses are based on subjective evaluation, and the theoretical constructs that are applied are not causally deterministic. They are rather exploratory frameworks, developed for arranging the findings in a manner that facilitates analysis. None of the theory testing is done in a pure positivistic context, which would mean the testing of the explanatory power of the models. The measuring of the methodological approaches of the dissertations analysed is considered more mature than the measuring of the social and personal levels of the research process. As such, the measuring of the methodological approaches predominantly follows the positivist approach of testing existing frameworks in a specific situation.

For the social and personal levels of the research process, the main contribution of this study should be found in the first attempts to develop theoretical constructs for understanding and discussing ambiguous concepts. As such, these approaches are mainly theory-building or “theorising” (see DiMaggio, 1995), which is done in an untypical analytical and quantitative manner, but without an aim for causal explanation. In this case, the question of relevance is perhaps more important than that of measurable validity.

Furthermore, the reliability of the in-depth analysis of methodological approaches is profoundly different from the survey-based analysis of the social and personal dimensions of the research process. The in-depth analysis that was undertaken to analyse the methodological approaches was based on subjective assessment of the dissertations. Such an analysis is dependent on the researcher, which is a poor starting point for reliability, as it may come to pass that someone else must repeat the analysis. The analysis was performed in two projects, the first in 1999-2000 and the second in 2005-2006. The five-year period between the analyses is likely to have affected the author’s analysis criteria to some extent.

In conclusion, due to the more mature conceptual frameworks, the analysis of methodological approach has greater validity than the analysis of the social and personal dimension, which in turn can be seen as an opening to “theorising” for a framework for such measurement. Meanwhile, the survey methods used for the investigation of the social and personal dimensions of the research are more reliable than the subjective analysis methods of the analysis of methodological approaches. The literature reference analysis is the most methodically straightforward and is mainly descriptive, without theoretical constructs or concepts, thus its reliability and validity are both very good. A summary of the reliability and validity related to the different analyses of this

study are summarised in table 8, in which complexity and ambiguity increase towards the bottom of the table.

Table 8. Validity and reliability issues in the various analyses.

Level of analysis	Possible reasons for errors and ambiguity
Literature reference analysis	Reference lists and actual reference usage are not necessarily congruent. Theses are not always distinguishable from textbooks or working papers. Difference between academic and trade journals is not always evident. "Other published" category is relatively large. Several projects run by different individuals may bias the journal categorisation to some extent.
Neilimo & Näsi and Arbnor & Bjerke models	Categorisation is subjective even if clear characteristics for each category are presented in the work of Neilimo and Näsi framework. The Arbnor and Bjerke framework specifies the category characteristics less clearly than Neilimo and Näsi.
Synthesis framework of methodological approaches	Scaling of research problems, openness of framework, recognising of leading theory and evaluating the directions of contribution efforts are based on a purpose-built framework. Although the principles behind the evaluated characteristics are widely understood, they are not widely established for categorising and analysing the phenomena in this manner. Thus the category characteristics are immature and evaluation is subjective. The relatively large number of dissertations analysed is done by one person, which keeps the categorisation criteria of each dissertation relatively well under control.
Investigation of the personal and social dimension of the research process with the survey	The survey method as such is relatively straightforward and reliable. Reliability may be compromised due to asking respondents to remember things that happened a long time ago. Construct validity is the main concern as ambiguous concepts, such as social dependency or motivation, are measured with very simplified metrics.

The use of established categorisation models, such as of Neilimo & Näsi and Arbnor & Bjerke, allows the employment of well-defined and widely applied frameworks. These categorisations can thus be considered less ambiguous and more reliable than the categorisation made according to those dimensions that were developed specifically for this study. The

methodological analysis using the synthesis typology (see chapter 4.1.4) that was developed in Vafidis (2002) is subjective and not well established. However, the framework gives a relatively structured approach for categorising dissertations in relation to other dissertations. Simplifying the characteristics that were evaluated in each dissertation to a bare minimum reduced the measurement error. For example, openness of framework or contribution was given a value of 0, 1 or 2, which leaves little room for interpretation, compared to a scale of 1 to 5. This approach compromises measurement accuracy in order to improve reliability. It is believed that the individual assessments of the dissertations can be easily compared to each other, but if someone else did the same analyses, the subjective categorisation would probably be different in some cases.

For the dissertations analysed in Vafidis (2002), construct validity was checked by comparing the findings with assessments that the opponents of the Finnish dissertations have given to the doctorates²⁷. Since no such formality exists in Sweden, associated with the inspection of doctoral dissertations, only the Finnish dissertations were triangulated in this manner. The opponents' reports were read only after the analysis, so that they did not affect the analysis beforehand. In general, the opinions of the opponents were similar to the author's, although many of discussed methodological approaches only marginally. Therefore, this triangulation was not considered useful enough for repeating in the latter sample.

The reliability of a survey is typically much better than the reliability of a subjective analysis. The survey questions are mainly formulated using the Likert scale with reply options from one to five, ranging typically from strongly disagree to strongly agree. As is the case with the analysis for methodological approaches, the survey scales are also designed as a compromise between accuracy and reliability: utilising a scale of, say, one to seven would have given better accuracy but the scale that is applied now is more reliable. Some of the questions assume that the respondents will remember and be able to reflect on instances and topics that occurred during their dissertation project several years ago, which reduces reliability. Furthermore, some of the open-ended questions may be less reliable than the quantitatively-scaled questions.

The best reliability is in the literature reference analysis, which is based on a straightforward feeding of the literature references into a database. Some interpretation was required in the categorisation of the literature references,

²⁷ Finnish doctoral dissertations are formally evaluated and graded by two external reviewers. These reviewers write a publicly available evaluation of the dissertation. Additionally, the main reviewer also challenges the doctorate to a public debate before the dissertation is accepted.

but even this categorisation leaves relatively little room for interpretation. One dissertation in the first sample was rejected because of an ambiguous literature reference list but this problem did not repeat itself.

The construct validity of the literature reference analysis is very good, as the intention of this analysis is mainly to describe an overview of the literature usage. The construct validity for the other analyses in this study is much more problematic due to the abstract concepts that are measured. There are four main concepts that were measured: methodological approach, social level of the research process, personal level of the research process and finally the paradigmatic status of the discipline, which is a summary of the understanding of the other three concepts. It is obvious that there are no definitive metrics for any of these concepts. The construct validity for measuring the methodological approaches is the best defined of the four listed, as that was based on the established and widely applied frameworks of Neilimo and Näsi, Arbnor and Bjerke. The synthesis model from Vafidis (2002) is an attempt to complement the dimensions of the methodological analyses that are missing from the other two frameworks but the measurement is not established.

The construct validity of the survey suffers from highly complex concepts that the survey measured. Readily available tests with high construct validity for testing motivation are available in psychological research. The application of such a test was rejected as too lengthy for this study, as the motivation measurement with Academic Motivation Inventory would typically require more than 150 questions. Instead, the approach in the survey was to ask questions that could be measured directly and not to use projective-type tests or sum variables. As these questions are relatively straightforward, the construct validity is likely to be good but there may be problems in their interpretation, due to the time that has passed since the respondents worked on their theses.

The point at which the discipline approaches a paradigmatic state is ambiguous, since there is no absolute demarcation line. As logistics is very far from this point, it is safe to say that measurement is accurate enough to be able to categorise the discipline as clearly pre-paradigmatic.

Internal validity is not very central to this study as the intention was not to develop causal models between, say, motives and methodological choices, and no regression analyses were done. Some simple causality can be assumed due to the time-phasing of the research process, as the methodological choices come before research consequences, but such causalities are not exhaustively explained. Possibilities for causal analyses were carefully evaluated and some alternative models, ranging from simple regression analyses to structural equation modelling, were drafted in this study, but these initiatives were later rejected due to conceptual immaturity in the research area. Such an approach

of causal connection would, no doubt, have increased the understanding of the research processes even further. However, it was not expected that the independent variables of this study would be sufficient to explain the dependent variable. One of the main proposals of this study is that the logistics discipline is in a pre-paradigmatic stage with relatively high uncertainty. By definition, this means that the methodological choices and research processes behave somewhat unexpectedly and are heavily dependent on individual factors and a complex decision-making process. It is unlikely that such a process can be exhaustively explained with a causal model, even in a very mature discipline, let alone in the pre-paradigmatic field of logistics.

The external validity of the results of this study is limited to the logistics discipline and with some geographical limitation. The results provide a situational analysis of the logistics discipline in Finland and Sweden, and, potentially, the generalisability of the findings for other Nordic countries is expected to be good. Generalising the results beyond that should be approached with caution. In North America, the research approach seems to follow a more positivistic and quantitative path, and the typical research processes on social and personal levels are likely to differ significantly. The in-depth analysis of this dissertation took the approach of investigating the entire set of samples that fit the selection criteria instead of taking just one sample. As the delimitation of what is included in the analysis and what is not is not straightforward, the results may be applicable to a slightly wider disciplinary scope, encompassing fields such as operations analysis, production economics, economic geography and the IMP school of marketing. The external validity of the survey-based results for the entire sample is good, partly thanks to the excellent survey response rate (84%).

Instead of looking at the external validity of the findings and conclusions of this study, focus should be put on the general applicability of the developed analysis methods and the ways for understanding methodological approaches and research processes. These can be considered generally applicable to other disciplines in a pre-paradigmatic phase, especially when approaches from both natural sciences and behavioural sciences meet. For example, several disciplines in business, sociology and psychology might find the application of these frameworks interesting.

4.6 Assessment of the methodological approach of this study

Since this study analyses various aspects of doctoral dissertations and the research process, it is considered valid self-reflection to apply the methodological approach of this dissertation using the same methods. The

self-analysis of the personal and social dimensions is not done using the research tools of this study, since a survey method is used with statistical analyses for a group of researchers rather than for individuals.

First, looking at the research subject areas (see chapter 4.1.1), this research is meta-disciplinary rather than within the discipline of logistics itself. That is to say, the study investigates the discipline of logistics itself. It does not therefore match any of the identified mainstream subject areas and fall into the category of “other”.

Applying the Neilimo & Näsi and Arbnor & Bjerke frameworks (chapters 4.1.2 and 4.1.3) to this study indicates that it is rather positivistic. In the Neilimo & Näsi framework, this study can be categorised as clearly empirical, rather than the contrasting theoretical; and mostly descriptive, rather than normative. Thus, the study falls into the nomothetical corner of the framework. In the Arbnor & Bjerke framework, the study applies both qualitative and quantitative methods and follows the analytical approach. The approach of combining both qualitative and quantitative methods in a study that is categorised as nomothetical and analytical is not common in Nordic logistics research, but, as was pointed out previously, the study is meta-disciplinary, investigating the research process, methodologies and disciplinary approaches themselves, which makes direct comparison to disciplinary logistics research troublesome.

A summary of applying the synthesis typology (chapter 4.1.4) to analysing this study is shown in table 9.

Table 9. Assessment of this study by applying the synthesis typology

Level of research problem	Level of empirical evidence	Qualitative methods	Quantitative methods	Openness of framework
Meso	Micro	Multiple case	Survey	0
Contribution to theory testing	Contribution to theory generation	Pragmatism	Main theory applied	Research approach order
1	1	0	none	T-M-O

As shown in the above table, this study investigates a meso-level research problem – i.e. the field of logistics doctoral research in a limited geographical area. Empirical evidence is micro-level – i.e. doctoral dissertations and research processes. The qualitative methods for the investigation are analogous to multiple case research, as each analysed dissertation is subject to

an in-depth analysis. Furthermore, a survey method and related quantitative analysis methods are used in the investigation of the social and personal perspectives. The theoretical framework of this study is not open (i.e. 0 on a scale of 0 to 2) to surprising findings, but rather the variables that are subject to investigation are predetermined. This choice was based on what the analytical approach finds necessary in order to be able to conduct meaningful analyses instead of simple descriptions. Interestingly, this research also includes an element of openness in the interpretation of such things as the summaries of the dissertations, but still the framework is not considered as open, because the interpretative sections of the study serve the purpose of refining and filtering information for the predetermined analytical framework.

Contribution to theory testing indicates the level of rigour at which existing theories are tested, which is typical for positivistic research. Such contribution exists but is not very strong (1 on a scale of 0 to 2). Although the analysis frameworks are predetermined, the concepts are relatively vague and by no means deterministically presented, which makes the formation of testable hypotheses not applicable to this study. That is to say, the theory testing is more in the proving of the applicability of such things as the Neiliom & Näsi framework or the concepts of social dependency in the field of logistics research, but not in testing whether deterministic theories are valid for the empirical surroundings of this study. If a causal framework was to be built in the form of, say, structural equation analysis, the value for this variable would have been 2.

Contribution to theory generation indicates the rigour to develop theoretical frameworks and theories. This contribution is quite strong in this research. The created frameworks are not yet solid enough to be called theories, but they are solid enough to be used for drawing testable hypotheses, at the same time as suggesting some explanation for, say, what factors contribute to researchers feeling that their work has had a significant impact to their careers. Thus they can be used to develop testable causal models and hypotheses in future research. However, this dimension was given a value of 1 on a scale of 0 to 2, because, regardless of the possibility of developing testable models based on “theorising” in this study, the main aim of the frameworks is to serve as descriptive frameworks rather than to develop into theories over time. This approach is significantly affected by the topic, which is so complex that the understanding of causality in the research process is more likely to be developed into some rules of thumb than deterministic theories.

Although the contribution to theory generation is more typically related to the hermeneutics approach, this study is rather clearly a positivistic piece of research with a predetermined framework and attempts to provide objective measurement of the variables. This is also visible in the “research approach

order” –field in table 9, which indicates that the order was theory-methods-observation. However, many of the variables require a fair amount of interpretation, thus the measurements are not completely objective. From the positivistic point of view, this study also has a weakness in that the predetermined framework is not based on theories with explanatory power, which would allow for well-argued hypotheses. Rather, this study investigates how relatively loosely and also controversially-expressed ideas that are discussed in the philosophy of science apply to logistics doctoral research. Due to this lack of explanatory power, much of this research appears in some places to be exploratory, in the sense that a follow-up study would be more able to form testable hypotheses.

Pragmatic contribution is most difficult to estimate in a study like this. It is expected that this study may prove some practically useful rules of thumb for future research, and that it might even be a good reading experience, giving practical hints for anyone in the early stages of a doctoral dissertation in logistics. However, the results are presented in a relatively descriptive manner, merely pushing certain alternatives and traits into the knowledge creation process, rather than attempting to provide normative advice or suggestions for how the discipline should develop. There is a simple reason for the avoidance of being normative: logistics research is an immature and diverse field with numerous interesting alternatives for conducting valuable research. Thus, each piece of research is different, and the individual researcher should carefully consider his/her own aspirations and environment. Giving normative advice on such a complex process must remain situational, and is mainly the responsibility of the supervising professor, yet each researcher must remain responsible for his/her choices. Thus pragmatic contribution is estimated at 0 (on a scale of 0 to 2).

There are no theories in this study that would meet the strict criteria set for this variable. Theories that are reported in this field are required to have predictive power and to have the capacity to be applied widely enough to be clearly recognisable, thus the “main theory applied” field in table 9 is indicated as “none”.

5 ASSESSMENT OF METHODOLOGICAL APPROACHES IN KNOWLEDGE AND APPLICATION CREATION

This chapter describes and analyses the empirical findings. The methods for each analysis are explained in chapter 4.1. In addition to an analysis of the entire sample of dissertations, a longitudinal analysis is made when applicable, and the findings of the differences between the two five-year samples are discussed.

5.1 Research subject areas

The subject areas of the dissertations analysed are diverse, something only to be expected from a fragmented and pre-paradigmatic discipline. The two samples, 1994–1998 and 1999–2003, were analysed both separately and in combination. The subject areas in the dissertations reviewed were compared to a sample collected by Stock & Luhrsen (1993), which evaluated the subject areas of 442 journal articles in logistics published between 1987 and 1991²⁸. Applying such a comparison extends the length of the time period of the longitudinal analysis, when investigating how logistics research subjects have evolved, although the differences between the two samples have to be taken into account. As described in chapter 4.1.1, the classification of Stock & Luhrsen (1993) was partially revised to accommodate the emerging subject areas in logistics research. Figure 14 illustrates the results of the analysis.

²⁸ The research of Stock & Luhrsen (1993) was revised in 2001 (Stock 2001) and again in 2006 (Stock & Broadus 2006).

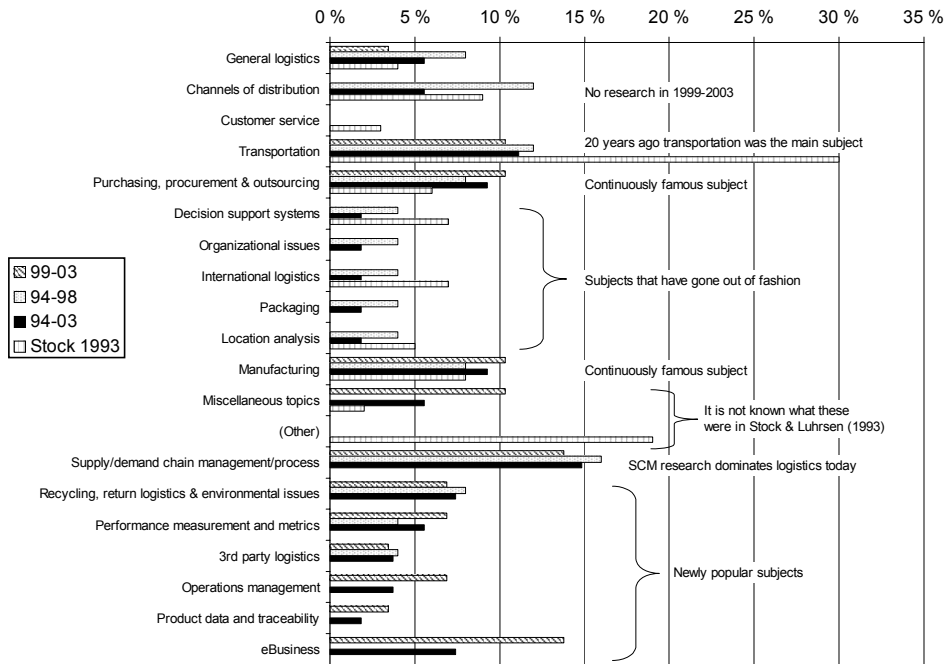


Figure 14. Subject areas of the dissertations analysed compared to Stock (1993)

Several interesting observations can be made from the subject area analysis:

- Research in transportation has lost ground significantly, while supply chain management research has become dominant. A similar observation was made by Arlbjørn et al (2006), stating that SCM research with case study methodology is the most popular research topic in Nordic countries. This hints that the whole discipline of logistics has shifted focus over the years towards supply chain research. Furthermore, Stock (2001, 132-133) has noticed that transportation-related topics have reduced in significance, and he assumes that this is mainly due to the fact that deregulation of the transportation industry has now been completed and many academic institutes have shifted away from transportation and towards more supply chain-related research. However, transportation research is still far from extinct, as it remains the second most popular subject.
- Topics that have lost ground are decision-support systems, organisational issues, international logistics, packaging and location

analysis. Meanwhile, there are new niche topics in recycling, return logistics & environmental issues, performance measurement & metrics, third party logistics, operations management (although this can also be seen as a separate discipline), and product data & traceability. Interestingly, IT systems are not on the list of emerging topics, which is surprising.

- Manufacturing as well as purchasing & procurement-related topics seem to have held their positions over time.
- The most recent sample (1999-2003) includes no research into channels of distribution, but it is too early to draw any conclusions from this.
- The categories on “other”, and “miscellaneous topics” in Stock & Luhrsen (1993) are not known in detail. It is likely that many of the niche topics that were added to the list already existed at the time of the original categorisation, but were not considered significant enough to form their own category. Demand/supply chain management subjects in particular, the best-known research areas in the dissertations, are important yet very generic subject areas. Stock (2002) points out that the categorisation of Sock (1993) did not include this topic, as supply chain management did not appear in dissertations until in the 1990s.
- The suddenly extinct interest in channels of distribution in the latter sample (1999-2003) is an interesting phenomenon without an apparent clear explanation. Possibly the same factors that have reduced the popularity of transportation subjects have also affected channels of distribution. This may indicate that the mainstream of research interest has permanently shifted from functions such as transportation and warehousing to more holistic systems such as supply chains.
- Only one group research effort was identifiable amongst the dissertations analysed: three out of four eBusiness-related dissertations were prepared at the Helsinki University of Technology for the same project and during the same time period.

A comparison to Stock & Luhrsen (1993) cannot define with certainty to what extent the differences are due to time and geographical differences between the samples. However, the findings made here reinforce the findings of Vafidis (2002) that transportation topics at least have become of less interest on account of the passage of time, and it seems that channels of distribution may be facing the same fate. Meanwhile, logistics has extended to a wider context of developing business processes in a system context, and has generally adopted a more holistic approach. Stock & Broadus (2006) in their follow-up research to Stock & Luhrsen (1993) conclude that *decision support systems, inventory, miscellaneous transportation and supply chain management are the dominant topics being investigated in the current*

dissertation research. Furthermore, they conclude that *transportation, warehousing and storage, DRP, JIT, Kanban and MRP have experienced a downturn in terms of the number of doctoral dissertations published. Engineering logistics, human resources, location analysis, order processing and information systems, packaging and TQM continue to be researched infrequently.* As such, it appears that at least the increasing popularity of supply chain management and the decreasing interest in transportation depends on time rather than geographical location. Decision support systems and inventory-related matters appear popular in North America but not in the sample of this study. Additionally, there are several topics presented in the lower part of figure 14 that appear popular in the sample of this study, but are not considered as separate topics in Stock & Broadus (2006).

Also Gubi et. Al (2003) have presented a useful alternative categorisation of research topics into eight categories, upon analysing the topics of 71 Nordic dissertations. Although these categories are not directly comparable with the ones used in this study, Gubi et al. (2003) make interesting observations of topics that had not been addressed at all: customer demand, strategic sourcing, organisational development of networks, leanness and agility, environment/sustainability, design for supply chain, e-commerce, information systems/integration enablers and virtual logistics. Comparing this shortlist to the sample of this study, shows that the topics of strategic sourcing, e-commerce, information systems/integration enablers and environment/sustainability have been addressed by the dissertations analysed for this study.

A description of which topics are researched in each university is shown in table 10, indicating the frequency of appearance of each topic in each university. Due to the small sample size, a statistical analysis is not feasible, but there are some hints that may indicate specialisation:

- 1) Chalmers has a significant number of dissertations prepared on transportation, which is a rather unpopular topic in other universities with only one dissertation from Linköping University.
- 2) Chalmers also has several dissertations on manufacturing, and both the dissertations from Vaasa are on manufacturing.
- 3) The Helsinki University of Technology (HUT) had a group of three eBusiness-related dissertations. This was made possible by a common research programme of the Finnish Technology Agency. Apart from this, HUT does not see itself as in any way specialising in eBusiness research, and there are no further dissertations in the pipeline on this topic (Tanskanen 22.2.2006).
- 4) Both dissertations on third party logistics are from Linköping University. This is a topic that has not been researched at doctoral level at any other universities. As Linköping University also has

dissertations on channels of distribution and transportation, a cautious conclusion may be drawn that the university is successful with traditional transportation- and warehousing-related topics, although other topics are also present.

- 5) In this sample, operations management was a topic of two dissertations from Lund University, and this topic has not been investigated at doctoral level at any of the other universities.

Table 10. Topics researched at each university

	Cha.	HUT	Lin.	Lund	LUT	HSE	TSE	Oulu	Vaasa	Hank.	Tamp.	Turku
General logistics				1			1					1
Channels of distribution			1		1	1						
Customer service												
Transportation	5		1									
Purch., proc. & outsourcing		1			2		1	1				
Decision support systems					1							
Organisational issues							1					
International logistics								1				
Packaging				1								
Location analysis		1										
Manufacturing	3								2			
Miscellaneous topics	1	1										
(Other)						1						
SCM/process	1	2	1		1	1				1	1	
Recycle, return & environment.	2		1		1							
Performance measurement				2		1						
3rd party logistics			2									
Operations management				2								
Product data & traceability		1										
eBusiness						1						

Although some hints of specialisation were identified, the overall conclusion from table 10 is that universities do not specialise to any great extent. In conclusion, it seems that universities do not create significant strategic dependency on doctoral students when it comes to choosing subject areas of research, and the researchers enjoy great freedom in choosing their subject areas.

The variety of subject areas is broad and the specialisation of universities undeveloped, so what determines the authors' selection of research topic? The survey respondents were asked to explain how and why they chose their topic. 39 of the 44 respondents replied to this open-ended question and table 11 summarises the findings to 10 reply themes.

Table 11. Reasons for selection of topic

Reason for choosing topic	Responses	Reason for choosing topic	Responses
Personal interest in subject	14	Availability of funding	6
Theoretical/academic/disciplinary need was evident	8	Continuation of previous research of others	3
Practical need was evident/own work as practitioner	8	Supervisor's interest	3
Continuation of previous own research	7	Career improvement opportunity	2
Interesting company/project offered opportunity	7	By chance	1

As shown in table 11, personal interest is the most frequently given reason for choosing a research topic. This is followed by reasoning that the research topic is relevant and interesting from either academic or practical perspectives, which accumulated an equal number of votes. The following three categories, continuation of own research, an opportunity arising in a project and availability of funding are seen rather as chance opportunities than the active choice of the researcher. The role of the supervisor and university may be significant in these cases, but this was not investigated. The following two topics – continuation of research of others and supervisor's interest – are reasons that are highly related to the social framework of the researcher. 'Career improvement opportunities' is a highly instrumental reason. As it is mentioned only once, it appears that doctoral research is not often initiated for instrumental reasons.

5.2 Application of the Neilimo & Näsi categorisation

The 54 dissertations analysed were positioned in the framework of Neilimo and Näsi, which is explained in chapter 4.1.2. The dissertations published in 1994-1998 are presented in figure 15 and the dissertations published in 1999-2003 in figure 16. In most cases, it was impossible to categorise a thesis strictly within one category, in which case a secondary category was given, and is shown in parentheses.

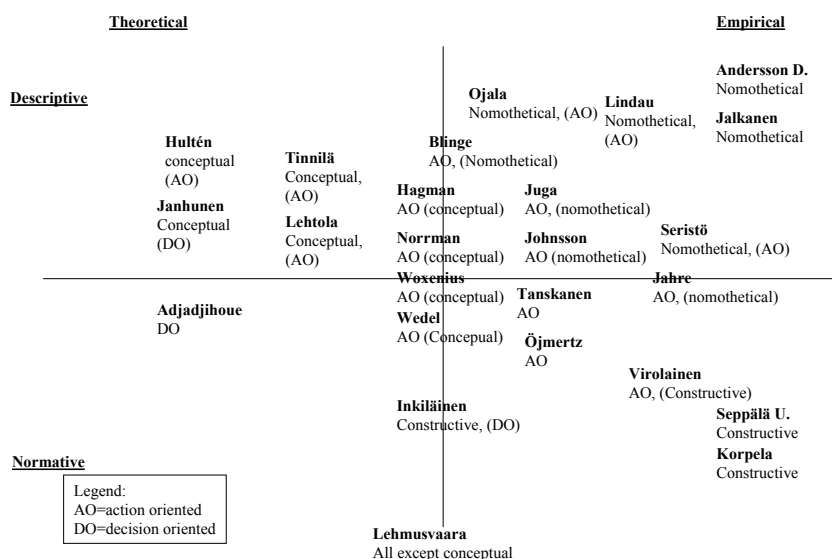


Figure 15. The theses of 1994-1998 categorised according to the Neilimo and Näsi framework

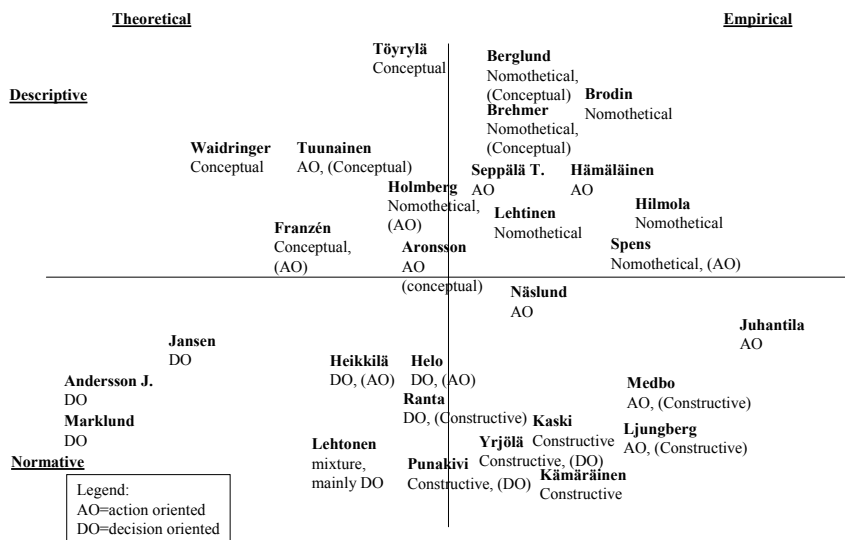


Figure 16. The theses of 1994-1999 categorised according to the Neilimo and Näsi framework.

Figures 15 and 16 give a quick graphical overview of how the dissertations are positioned. All the approaches are used in significant numbers and characteristics of each approach were clearly identifiable in the dissertations. However, a more structured table format helps in analysing and drawing conclusions concerning the findings. Tables 12 presents the number and proportional shares of the dominant methodological approaches, and table 13 presents the number and proportional shares of the methodological approaches when secondary approaches are also counted.

Table 12. Number and percentage of dominant approaches.²⁹

	1994-1998 ³⁰	1999-2003	1994-2003
Conceptual	4 (16%)	3 (10%)	7 (13%)
Nomothetical	5 (20%)	7 (24%)	12 (22%)
Action oriented	11 (44%)	8 (28%)	19 (35%)
Decision oriented	1 (4%)	7 (24%)	8 (15%)
Constructive	3 (12%)	4 (14%)	7 (13%)

Table 13. Number and percentage of dominant and secondary approaches combined.

	1994-1998	1999-2003	1994-2003
Conceptual	8 (32%)	7 (24%)	15 (28%)
Nomothetical	10 (40%)	8 (28%)	18 (33%)
Action oriented	18 (72%)	13 (45%)	31 (57%)
Decision oriented	4 (16%)	8 (28%)	12 (22%)
Constructive	5 (20%)	7 (24%)	12 (22%)

The following interesting observations can be made from tables 12 and 13:

- Action oriented research is clearly the most dominant approach, which is typical for case study dissertations researching company-level topics.
- The constructive approach appears to be ideal for several authors. However, the requirements set by Kasanen et al. (1993) are very strict, and many dissertations that attempt to apply a constructive approach are categorised as action oriented instead, thus the constructive approach is successfully applied in only a few dissertations.
- The decision oriented approach seems to have gained popularity as it is much more popular in the later sample. This is partly due to there being some dissertations on operations research in the 1999-2003 sample. Interestingly, as is explained in chapter 5.4, quantitative methods are at the same time losing popularity. Since decision oriented research is strongly inclined towards quantitative methods and has increased proportionally in the second sample, a conclusion can be drawn that the

²⁹ The dissertation of Lehmusvaara was not included in any approach in table 12. As this dissertation deliberately takes an approach of experimenting with various methodological approaches, a dominant approach cannot be identified.

³⁰ The total is 24 as it was not possible to say what the dominant approach of Lehmusvaara (1998) is, a dissertations that purposely applied a large number of methods.

popularity of quantitative methods is losing ground even more rapidly in research areas other than decision oriented. This finding is analysed in more detail in table 14, which links Neilimo and Näsi categories with quantitative and qualitative methods.

Table 14. Linking the dominant research method to Neilimo and Näsi categories.³¹

	Quantitative	Qualitative	Both
Conceptual	2	12	1
Nomothetical	9	6	3
Action oriented	7	20	4
Decision oriented	9	0	2
Constructive	8	3	1

As seen from table 14, the methods applied in the dissertations are linked to the research approach. For individual dissertations, see appendix 4. The following conclusions can be drawn from the data:

- None of the decision oriented theses was primarily qualitative, a finding that could have been expected due to the profoundly quantitative nature of this positivistic approach.³²
- The nomothetical approach, which is also positivistic, is slightly dominated by quantitative theses, but, interestingly, a significant number of predominantly qualitative theses also fit this category. In particular, Linköping, TSE and Chalmers have produced several dissertations that are nomothetical but not primarily quantitative. This means that a positivistic approach does not at the same time need to be quantitative, which appears to be a common misconception in discussions on methodological issues.
- The conceptual and action oriented approaches are predominantly approached by qualitative methods. The action oriented approach in particular seems to have become the de facto approach for logistics research.
- The constructive approach is often used at the Helsinki and Lappeenranta universities of technology, both being institutions in which quantitative approaches and practical orientation of the research

³¹ Note that secondary Neilimo and Näsi categories are also counted in this table.

³² Two decision oriented dissertations (Heikkilä 2000 and Yrjölä 2003) apply additionally qualitative methods. Neither one of these is purely decision oriented, and both use qualitative methods to get a better insight into business practices.

are highly valued. It appears that quantitative methods are better suited to constructive research, providing a pragmatic contribution. Meanwhile, action oriented research plays an observatory and descriptive role by applying qualitative methods.

Table 15 links the methodological categories of Neilimo and Näsi to the dissertations published by each university. Note that the universities that have published less than five theses are shown with a grey background in the table.

Table 15. Inclination of universities to apply various Neilimo and Näsi approaches

	Conceptual	Nomothetical	Action oriented	Decision oriented	Constructive	Theses from university
Chalmers	50 %	25 %	83 %	8 %	8 %	12
HUT	11 %	11 %	22 %	33 %	56 %	9
Linköping	67 %	67 %	33 %	0 %	0 %	6
Lund	0 %	33 %	67 %	33 %	17 %	6
LUT	17 %	17 %	50 %	50 %	67 %	6
HSE	40 %	20 %	80 %	20 %	20 %	5
TSE	0 %	67 %	100 %	0 %	0 %	3
Oulu	0 %	50 %	0 %	50 %	0 %	2
Vaasa	0 %	50 %	50 %	50 %	0 %	2
Tampere	100 %	0 %	100 %	0 %	0 %	1
Turku	0 %	100 %	0 %	0 %	0 %	1
Hanken	0 %	100 %	100 %	0 %	0 %	1

As can be seen from table 15, some universities have focused more clearly on certain approaches, whilst others tend to experiment more. High strategic and technical dependency is expected to correlate with a clear predominance of certain approaches. Excluding the universities that have produced less than five dissertations, the following can be concluded:

- Chalmers has a strong focus on action oriented research and a conceptual approach is found in 50% of its dissertations. Regardless of this finding, it appears that the identity of Chalmers lies not so much in action research but in pioneering systems research, which is discussed further in the next chapter.
- The Helsinki School of Economics has applied action oriented research in all but one of its dissertations, while the other approaches are also experimented with.
- The Helsinki University of Technology and the Lappeenranta University of Technology often focus on practical relevance, thus the

constructive approach is found significantly more frequently than in theses from other universities. Meanwhile, conceptual and nomothetical research has a low representation at these places. Both universities also apply quantitative methods. HUT is clearly the most coherent university in the sense that its theses rarely mix approaches.

- Linköping, although a technical university like HUT and LUT, takes a very different approach, and conceptual and nomothetical research approaches prevail. A general perception is that HUT and LUT focus on solving practical problems and giving normative advice, while Linköping takes a more positivistic, analytical and observatory approach, providing more generic practical solutions than the situational research of HUT and LUT. Linköping can be seen as the most positivistic of the universities, although, at the same time, both quantitative and qualitative approaches are utilised. Additionally, research conducted at Linköping is also highly practical without being as normative and company-specific as research at HUT and LUT.
- Lund is represented by dissertations from two clearly separate schools of thought. Two of the dissertations are distinctly decision oriented and rooted in operations analysis, while the rest of the dissertations are action oriented and often complemented by a second approach.

5.3 Application of the Arbnor and Bjerke categorisation

Similarly to the analyses in the previous chapter, the dissertations were also categorised using the Arbnor and Bjerke model. The Arbnor and Bjerke analysis was also revisited for the 1994-1998 sample, for two reasons:

- Adding the possibility to use both methods meant that the original categorisation would not have been comparable with the new categorisation.
- The original categorisation was largely done as a joint effort at a doctoral workshop in Copenhagen in January 2000. This procedure was not sufficiently documented, and since a categorisation of this type includes a significant subjective element, there was a danger that the author's judgement related to the second sample would differ from the group's judgment made for the first sample.

The effort to reanalyse the first sample is relatively superficial and based on reading notes and scan-reading the dissertations. A thorough analysis would have meant complete re-reading of the theses, which was not worthwhile considering the required investment in time. The most profound difference between the analyses of the two samples is that the second sample was

analysed more rigorously, in which case theses that had traces of more than one approach were placed into more than one category, while, in the first sample, only the most obvious approach was considered. Therefore, a direct longitudinal comparison between the samples should be approached with caution. Figure 17 provides an overview to the analysis.

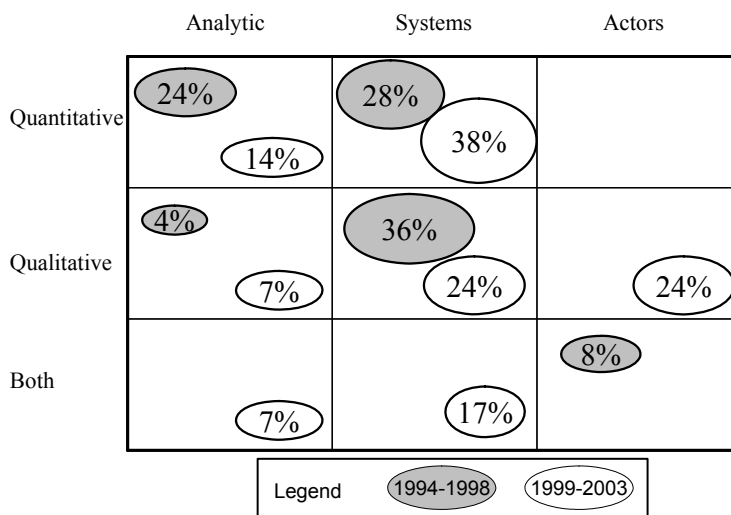


Figure 17. The dissertations categorised according to the Arbnor and Bjerke model

The most significant conclusion that can be drawn from figure 17 is that the systems approach is clearly dominant, and that both qualitative and quantitative approaches are widely applied. Additionally, it appears that the latter sample includes a reasonably large number of theses that also apply the actors' approach. Although the general tendency is to use the actors' approach with qualitative methods and the analytical approach with quantitative methods, it seems that both methods can be used for any of the approaches.

The next question to ask is whether there are distinguishable groups that apply one approach or another. The methodological approaches of the theses published in each university are shown in table 16. Note that the universities that have published fewer than five theses are shown with a grey background in the table.

Table 16. Arbno and Bjerke categorisation by university.

University	Analytic	Systems	Actors	Theses from university
Chalmers	8 %	92 %	8 %	12
HUT	22 %	78 %	11 %	9
Linköping	50 %	83 %	0 %	6
Lund	33 %	33 %	50 %	6
LUT	33 %	50 %	17 %	6
HSE	20 %	80 %	20 %	5
TSE	33 %	67 %	33 %	3
Oulu	50 %	50 %	0 %	2
Vaasa	100 %	100 %	0 %	2
Tampere	0 %	100 %	0 %	1
Turku	100 %	0 %	0 %	1
Hanken	0 %	100 %	0 %	1

Table 16 reveals significant differences between the approaches applied in different universities. Omitting from the analysis the universities that produced fewer than five theses leaves Chalmers, the Helsinki University of Technology (HUT), Linköping, Lund, Lappeenranta (LUT) and the Helsinki School of Economics (HSE). The systems approach is clearly dominant at Chalmers, and Linköping, HSE and HUT, and LUT also seem commonly to apply the systems approach. In particular, Chalmers has a clear identity in applying the systems approach, as its application of the analytic and actors' approaches are only single occurrences. Interestingly, theses from Lund have applied the systems approach less than the other universities, and the actors' approach seems the most dominant approach there.³³

Other interesting conclusions from table 16 are that Linköping, although applying the systems approach, seems to do so in a more analytical way than the others. Furthermore, the actors' approach is absent from Linköping theses. In combination with the conclusions drawn from the previous chapter, it is clear that Linköping is the most positivistic of the universities. In addition, the other universities except Lund, limit the application of the actors' approach to single occurrences. Thus Lund is the university with the most hermeneutical tradition.

³³ There are also two theses from Lund (Andersson and Markulund), which are clearly analytical, applying very mathematical modeling and simulation approaches. These two theses are produced in different departments, thus there are actually two different traditions at Lund.

5.4 Application of the synthesis typology

Chapter 4.1.4 explains the synthesis typology as an attempt to build a tool that provides a more comprehensive view of the methodological approaches in logistics research than can be achieved using the readily available Neilimo & Näsi and Arbnor & Bjerke models. The analysis results of the dissertations reviewed are discussed in the following sub-chapters:

- Chapter 5.4.1: Level of research problems and empirical evidence
- Chapter 5.4.2: Usage of qualitative and quantitative methods
- Chapter 5.4.3: Openness of framework and contribution of research
- Chapter 5.4.4: Main theories and research approach order

5.4.1 Level of research problems and empirical evidence

The levels of research problems and empirical evidence represent the interest areas of the researcher as well as the approaches towards generalisability and the ability to give normative advice. The positivist tradition has a greater tendency to investigate problems of higher scale and aims towards generalisations. Pragmatic research is more inclined to solve practical problems on a micro- (company) or meso- (chain) level. However, nano-level research is also often highly analytical, for example in the optimisation or simulation of specific situations. The research problems and empirical evidence of the dissertations analysed were categorised into nano-, micro-, meso- and macro-levels. Comparing the level of empirical evidence provides some indication as to whether the researchers tend to apply an analytic approach and to generalise from lower scale evidence, or to create a holistic understanding and situational conclusions from higher scale evidence. Table 17 summarises the levels of the research problems, and table 18 the levels of empirical evidence. The assessments for each individual dissertation can be found in appendix 4.

Table 17. Level of research problems

	Nano	Micro	Meso	Macro
1994-1998	24 %	38 %	31 %	7 %
1999-2003	15 %	26 %	56 %	3 %
1994-2003	19 %	32 %	44 %	5 %

Table 18. Level of empirical evidence

	Nano	Micro	Meso	Macro
1994-1998	28 %	38 %	25 %	9 %
1999-2003	21 %	44 %	35 %	0 %
1994-2003	24 %	41 %	30 %	5 %

Several interesting observations can be made from the analysis of research scales and problems:

- 1) The majority of logistics research topics focus on meso- and micro-levels. Nano-level problems are also investigated in significant numbers, while macro-level research is marginal amongst doctoral dissertations on logistics. As such, it seems that the CSCMP/CLM definition for logistics comes quite close to the mainstream of Finnish and Swedish logistics research.
- 2) The majority of individual dissertations investigate empirical evidence on the same level as the research problem. However, on average the empirical evidence is on a lower level than the research problem. This enforces the finding that was made in Vafidis (2002), and it can be considered an indicator of researchers tending to break large problems into more absorbable units. This is not surprising and is a good sign of researchers' skill in analysing complex problems analytically, which is in accordance with the positivist virtues of conducting research. In some cases, empirical evidence is collected from several levels, e.g. national trade statistics and individual company operations, and then summarised in order to answer the research problem.
- 3) Nano- and micro-level topics and nano-level empirical evidence have been used less extensively in the latter sample. Meanwhile, meso-level topics have increased significantly. This may be due to an increase in the popularity of supply chain topics, and also due to increasing pressures towards conducting more generally applicable research than mere problem-solving for case companies. This argument is supported by the observation that meso-level problems are often approached by also using micro- or nano-level empirical evidence in the latter sample.

That is to say that the authors tend to attempt to generalise micro-level findings into higher-level covering principles. Meso-level problems are particularly prevalent amongst Finnish dissertations.

It must be borne in mind that the analysis of the research levels has several weaknesses and conclusions must be drawn carefully. That is to say that the analysis is based on subjective estimation; it is highly abstract and conducted over a long period of time. Although there are significant differences between the approach of individual dissertations, the average figures in both this study and Vafidis (2002) show that logistics research applies some positivist virtues and also attempts to generalise findings into a higher level than the investigated empirical evidence. This tendency seems to have increased in the latter sample.

5.4.2 Usage of qualitative and quantitative methods

This chapter discusses and analyses the methods usage in the dissertations analysed. More detailed information is presented in appendix 3, which explains what analysis methods and data collection procedures were used in each individual dissertation, and in appendix 4, which summarises the findings of all dissertations in a simple table indicating the qualitative and quantitative methods used in each dissertation.

Logistics research is rich in methods, and methodological pluralism characterises the field. Accordingly, many of the dissertations analysed use multiple methods, especially when the dissertation is a collection of journal and/or conference papers. The two samples of dissertations analysed were investigated separately. Table 19 shows the dominant method of each dissertation from the period 1994-1998, and table 20 shows the same information for the 1999-2003 sample. Note that because some dissertations used both qualitative and quantitative methods, it was sometimes impossible to say which one was dominant and the method usage is categorised as “both”.

It can be seen from table 19 that qualitative methods were dominant in 12 (44%) and quantitative methods in 15 (56%) dissertations³⁴. Similarly, it can be seen from table 20 that qualitative methods were dominant in 19 (56%) and quantitative methods in 15 (44%). A clear shift from quantitative towards qualitative is identifiable and more dissertations apply both methods.

³⁴ Note that, due to the fact that some dissertations use both qualitative and quantitative methods, the total number of methods (12+15=27) is larger than the total number of dissertations (25). The same applies to the 1999-2003 sample.

Table 19. Dominant methods in the 1994-1998 sample

Author	Method	Author	Method
Adjadjihoue, Christian	Quantitative	Lehtola, Richard	Quantitative
Andersson, Dan	Quantitative	Lindau, Roger	Quantitative
Blinge, Magnus	Quantitative	Norrman, Andreas	Qualitative
Hagman, Thore	Qualitative	Ojala, Lauri	Qualitative
Hultén, Lars	Qualitative	Seppälä, Ulla	Quantitative
Inkiläinen, Aimo	Quantitative	Seristö, Hannu	Quantitative
Jahre, Marianne	Quantitative	Tanskanen, Kari	Qualitative
Jalkanen, Kari	Quantitative	Tinnilä, Markku	Qualitative
Janhunen, Antero	Quantitative	Wedel, John	Qualitative
Johnsson, Mats	Both	Virolainen, Veli-Matti	Qualitative
Juga, Jari	Qualitative	Woxenius, Johan	Qualitative
Korpela, Jukka	Quantitative	Öjmertz, Birgitta	Both
Lehmusvaara, Antti	Quantitative		

Table 20. Dominant methods in the 1999-2003 sample

Author	Method	Author	Method
Andersson, Jonas	Quantitative	Lehtinen, Ulla	Qualitative
Aronsson, Håkan	Qualitative	Lehtonen, Juha-Matti	Quantitative
Berglund, Magnus	Qualitative	Ljungberg, Anders	Qualitative
Brehmer, Per-Olof	Qualitative	Marklund, Johan	Quantitative
Brodin, Maria, Hüge	Both	Medbo, Lars	Qualitative
Franzén, Stig	Qualitative	Näslund, Dag	Qualitative
Heikkilä, Jussi	Both	Punakivi, Mikko	Quantitative
Helo, Petri	Quantitative	Ranta, Tapio	Quantitative
Hilmola, Olli-Pekka	Quantitative	Seppälä, Tero	Qualitative
Holmberg, Stefan	Qualitative	Spens, Karen	Both
Hämäläinen, Erkki	Qualitative	Tuunainen, Virpi	Qualitative
Jansen, Karl	Quantitative	Töyrylä, Ilkka	Qualitative
Juhantila, Olli-Pekka	Qualitative	Waidringer, Jonas	Both
Kaski, Timo	Quantitative	Yrjölä, Hannu	Both
Kämäräinen, Vesa	Quantitative		

The next question to ask is whether research from different universities differs in method usage. Table 21 illustrates the dominant methods by university. Note that the universities that have published fewer than five theses are shown with a grey background in the table.

Table 21. Dominant methods of dissertations published at each university

	Quantitative	Qualitative	Both	Theses from university
Chalmers	33 %	50 %	17 %	12
HUT	56 %	22 %	22 %	9
Linköping	17 %	67 %	17 %	6
Lund	17 %	50 %	33 %	6
LUT	67 %	67 %	0 %	6
HSE	40 %	60 %	0 %	5
TSE	0 %	100 %	0 %	3
Oulu	50 %	50 %	0 %	2
Vaasa	100 %	0 %	0 %	2
Tampere	100 %	0 %	0 %	1
Turku	100 %	0 %	0 %	1
Hanken	0 %	0 %	100 %	1

Table 21 shows that there are differences in the methods preferences of different universities, although the small sample size does not allow for a statistical analysis on the significance of these differences. Omitting the universities that produced fewer than five theses, the main findings are that:

- Finnish universities of technology (HUT, LUT) tend to favour quantitative methods. Moreover, the few dissertations published at the technology faculties at the universities of Vaasa and Tampere are quantitative. Interestingly, HUT and LUT are also the most practitioner oriented universities, as was concluded in chapter 4.1.2.
- The Swedish universities of technology and engineering (Linköping, Chalmers, Lund) tend to favour qualitative approaches.
- The only business school with more than five published dissertations is the Helsinki School of Economics, where both approaches are used with one instance more at the qualitative end.

In addition to assessing what the dominant method on the quantitative-qualitative level is, a separate analysis is presented to show the identified methods in more detail. These results are presented in table 22 for the total sample 1994-2003. Comparisons between the two samples can be easily made by comparing tables 23 (1994-1998 sample) and table 24 (1999-2003 sample).

Table 22. The number and percentage of dissertations applying each method in the dissertations published 1994-2003

The number of dissertations in which each qualitative method was found			The number of dissertations in which each quantitative method was found			
Single case	Multiple case	Other	Survey	Statistics	Model, simulation, optimisation	Other
9	31	5	9	6	21	6
17 %	57 %	9 %	17 %	11 %	39 %	11 %
42 dissertations (78%) apply qualitative methods			37 dissertations (69%) apply quantitative methods			
25 dissertations (42%) apply both qualitative and quantitative methods						

Table 23. The number and percentage of dissertations applying each method in the dissertations published 1994-1998

The number of dissertations in which each qualitative method was found			The number of dissertations in which each quantitative method was found			
Single case	Multiple case	Other	Survey	Statistics	Model, simulation, optimisation	Other
5	13	2	5	4	10	5
20 %	52 %	8 %	20 %	16 %	40 %	20 %
19 dissertations (76%) apply qualitative methods			19 dissertations (76%) apply quantitative methods			
13 dissertations (52%) apply both quantitative and qualitative methods.						

Table 24. The number and percentage of dissertations applying each method in the dissertations published 1999-2003

The number of dissertations in which each qualitative method was found			The number of dissertations in which each quantitative method was found			
Single case	Multiple case	Other	Survey	Statistics	Model, simulation, optimisation	Other
4	18	3	4	2	11	1
14 %	62 %	10 %	14 %	7 %	38 %	3 %
23 dissertations (79%) apply qualitative methods			18 dissertations (62%) apply quantitative methods			
12 dissertations (41%) apply both quantitative and qualitative methods						

The overall sample in table 22 indicates that both quantitative and qualitative methods are widely applied in logistics research. This finding reinforces the findings made in Vafidis (2002).³⁵ Additionally, 25 of the 59 dissertations apply both methods. Although this tendency was weaker in the latter sample, it is a clear indicator that the discussion of which methods to use is not as important a decision criterion as it is in North American research (Mentzer – Kahn 1995).

Another interesting finding is the reduction in popularity of quantitative methods (from 76% for the first sample to 62% for the second sample), while the popularity of qualitative methods has remained practically the same (76% for the first sample and 79% in the second sample). A similar trend in the reduction of popularity for quantitative methods is also identifiable when only the dominant methods are investigated (see tables 19 and 20). As such, more theses are qualitatively oriented, and primarily quantitative theses also apply additional qualitative methods.

It is also interesting to investigate how the level of research problems related to the methods. Table 25 illustrates this relation.

Table 25. Dominant methods for the various research topic levels

1994-2003	Qualitative	Quantitative	Number of theses
Nano	36 %	64 %	12
Micro	64 %	36 %	20
Meso	50 %	50 %	28
Macro	67 %	33 %	3
1994-1998			
Nano	33 %	67 %	7
Micro	58 %	42 %	11
Meso	33 %	67 %	9
Macro	50 %	50 %	2
1999-2003			
Nano	40 %	60 %	5
Micro	70 %	30 %	9
Meso	57 %	43 %	19
Macro	100 %	0 %	1

³⁵ Two dissertations using AHP and heuristics methods were re-classified after the publication of Vafidis (2002). Based on discussions with the authors, the methods are considered primarily quantitative.

As can be seen from table 25, nano-level research problems are predominantly investigated with quantitative methods, which is not surprising as this type of research is often rooted in operations management. Micro-problems are predominantly investigated with qualitative methods, typically applying case study methods. Micro-level research has shifted towards more qualitative research (from 58% to 70%) between the two samples. There is also a significant shift in methods usage in meso-level research, indicating that qualitative methods have become more dominant in the 1999-2003 sample: in the 1994-1998 sample, 33% of meso-level research was qualitative and in the 1999-2003 sample, 57% of meso-level research was qualitative. This is a significant finding, bearing in mind the rising popularity of meso-level research. No conclusions can be drawn from macro-level research methods due to the small sample size.

Another interesting conclusion can be made in the light of what is concluded in chapter 5.2, which finds that nomothetical and decision oriented research has a higher representation in the second sample. Since both of these approaches are dominated by quantitative methods, it is obvious that the other theses have shifted very significantly towards qualitative methods.

5.4.3 Openness of frameworks and contribution of research

Chapter 2 compared the background and characteristics of positivist and hermeneutic traditions, and additionally discussed the emergence of the pragmatic systems approach as an emerging tradition. It was concluded that positivistic research is dominated by quantitative methods and a predetermined framework. Positivistic research typically strives to test theories and hypotheses that are extracted from theories through a causal analysis. Thus, the positivistic tradition assumes that theories possess the ability to predict behaviour. The hermeneutic tradition was considered more open to surprising findings stemming from empirical evidence, suiting those seeking to generate new theories and ideas that may lead to theories and hypotheses. Thus, the hermeneutic tradition is more open for surprising findings, but it is limited in its ability to make deterministic conclusions of causality. The pragmatic approach is considered to be less interested in developing covering laws or in generating new testable ideas per se. Instead it is seen to emphasise the practical contribution and the generation of solutions that work in practice.

Appendix 4 summarises the approach of each thesis in the following dimensions: openness of framework, contribution to theory testing, contribution to theory generation and pragmatic contribution. The openness of

the framework was ranked from 0 to 2, 0 meaning a predetermined framework and 2 an open-ended framework. Similarly, the contribution approach of the theses was ranked for theory testing, theory generation and pragmatic contribution from 0 to 2. As discussed in chapter 4.1.4, the value given does not indicate how “good” the theses are, but is rather indicative of the approach and rigour put to each contribution type.

According to the discussion above, it is expected that open-ended frameworks in logistics research are good in generating new hypotheses and theory, while predetermined positivistic frameworks are good in testing hypothesis and theories. Grounded research principles also suggest that research should be open, in order not to limit the practical, yet a priori unknown, aspects of the research. As such, expectations would be that open frameworks should be able to contribute to practice more than deterministic (predetermined framework) research. Few doctorates have found it necessary to limit their research as clearly theory-testing and deterministic, or as open-ended theory generation. Looking at the dissertations reviewed (see appendix 4, column “openness of framework”), 28% of the dissertations apply a very predetermined (positivistic) framework, and 22% a very open (hermeneutic) framework. The remaining 50% apply a semi-predetermined framework. Four dissertations apply frameworks of varying openness in the different papers, and the findings for these were averaged for analysis. Table 26 illustrates the correlations of the openness of the research framework, and the contributions to theory testing, theory generation and pragmatic contribution. Significant correlations are in bold.

Table 26. Correlation of framework openness and contribution

		Contribution approach		
		Theory testing	Theory building	Pragmatic
Openness of framework	Correlation Coefficient	-0,569	-0,088	0,284
	Sig. (2-tailed)	0,000	0,526	0,037

Theory-testing contribution correlates negatively and significantly with the openness of the framework. This indicates that positivistic research in logistics, i.e. theory-testing research with a predetermined framework, is characterised by predetermined frameworks, just as literature on the philosophy of science predicts. On the other hand, the expectation that open-ended research is stronger in theory generation must be rejected in logistics research – i.e. a grounded research approach does not produce the expected

results for theory generation capability. Instead it appears that open-ended frameworks correlate positively and significantly with pragmatic contribution. In conclusion, positivistic research produces expected theory-testing contribution. Applications of open-ended frameworks include more contribution-related risks, but may still be worth considering, depending on the researcher's motives. Although the approach for having an open-ended framework seems counterproductive when it comes to theoretical contribution, it may play a role in pragmatic research. However, it may be worthwhile to ask the question of whether academic research is the most effective and efficient way to bring about pragmatic contribution, or is it a mere stepping-stone for the young professional to generate personal skills, knowledge and credibility for a practical career. For those that value theoretical contribution, a positivistic approach seems the most secure.

An analysis was made to investigate the relation of the research methods (see previous chapter) with the openness of framework and contribution. Table 27 shows this correlation matrix with the significant correlations in bold.

Table 27. Methods linked to openness and contribution

Method		Openness	Theory testing	Theory building	Pragmatic
Quantitative	Correlation Coefficient	-0,344	0,338	0,124	-0,004
	Sig. (2-tailed)	0,011	0,012	0,372	0,977
Qualitative	Correlation Coefficient	0,420	-0,301	-0,005	0,016
	Sig. (2-tailed)	0,002	0,027	0,970	0,908

Table 27 reveals that quantitative methods are used in conjunction with predetermined frameworks, and they are used more in the theory testing approach. This finding was expected, as all these characteristics are used to describe positivistic research, and researchers who wish to do such research, typically choose quantitative methods. Qualitative methods, in turn, are related to relatively open-ended frameworks, and correlate negatively with the theory-testing approach, which was also expected according to the principles of hermeneutic tradition. Meanwhile, there are no significant links between either method with a theory-building or pragmatic-contribution approach. As such, researchers who wish to conduct such research appear relatively uncertain of which method to choose. In conclusion, quantitative methods are likely to

provide theory-testing contribution, while the usage of qualitative methods is only likely to avoid theory-testing contribution, but is not statistically likely to produce any other contribution.

It is also interesting to investigate the direction that logistics research is taking in terms of framework openness and contribution. Table 28 illustrates the average values between the two samples. The averages are provided separately for the two analysed samples, and the difference between the averages is calculated in the Δ row to illustrate the development between the two samples.

Table 28. Comparing the two samples for openness of framework and contribution – averages³⁶

Sample	Openness	Theory testing	Theory building	Pragmatic
1994-1998	0,93	0,96	1,20	1,04
1999-2003	0,93	0,86	1,24	1,17
Δ	0	-0,10	+0,04	+0,13

As table 28 is based on a subjective assessment of the dissertations, no conclusions can be drawn from the absolute value, since no other samples are available for reference. Instead, the differences between the two samples points out interesting findings. First, the level of openness between the two samples remains exactly the same. Simultaneously, pragmatic contribution shows a substantial increase while theory-testing contribution shows a substantial decrease. This indicates that logistics research has moved in a pragmatic direction, and traditional theory-testing positivist research is on a downward trend. Interestingly, the increase in pragmatic contribution is achieved without an increase in the openness of framework, even though table 26 shows that pragmatic research is somewhat correlated with openness. This indicates that the theoretical base that can be applied to building a framework is developing, the strategic uncertainty of the research is decreasing, and the pragmatic research in the latter sample is conducted with less open frameworks than in the first sample. In non-applied sciences, development of the discipline would typically mean an increase in theory-testing research, making the theoretical basis continuously more robust. In the applied science of logistics, the trend is to apply the improved knowledge to practical

³⁶ Each thesis was given a value of 0, 1 or 2, 0 standing for an entirely predetermined framework or low contribution effort and 2 standing for a very open framework or high contribution effort.

solutions instead. It seems more likely that logistics will continue to borrow theories from other disciplines and to apply these to practical problems, rather than to develop a theoretical base of its own. Considering that predetermined frameworks in combination with quantitative methods are best for overall theoretical contribution (see tables 26 and 27), and the popularity of quantitative methods (tables 22 to 24) is simultaneously decreasing, it appears that the logistics discipline is deteriorating in its ability to make a theoretical contribution, and is focusing increasingly on pragmatic contribution.

Regardless of the general findings and trends that were described above, there are important differences between universities. Table 29 illustrates these. The values in the table are the average of the theses published in each university. Universities with fewer than five theses are shown with a grey background in table 26 and omitted from analysis. The approach of individual theses is presented in appendix 4.

Table 29. The approach of theses by university regarding openness of framework and contribution approach (most interesting findings are in bold)

	Openness	Theory testing	Theory generation	Pragmatic	Theses from university
All universities	0,98	0,91	1,22	1,11	54
Chalmers	1,17	1	1,5	0,83	12
HUT	1,11	0,89	1	1,56	9
Linköping	1	0,83	1,67	1	6
Lund	1,67	0,5	1,67	0,83	6
LUT	1	0,5	0,5	1,5	6
HSE	0,8	1	1,2	1,4	5
TSE	1	1,33	0,67	1	3
Oulu	0,5	0,5	1,5	1	2
Vaasa	0	2	1	1	2
Tampere	1	1	2	1	1
Turku	1	1	0	0	1
Hanken	0	2	1	1	1

Table 29 shows that there are significant differences between the average approaches:

- Theses from Chalmers are noticeably focused on theoretical contribution and not on pragmatic contribution. Although the theory testing approach is strongest in Chalmers, it is concluded

that theory testing is not a strong approach in any of the universities. This is partly due to the strict definitions of theory.

- Theses from Lund are very open-ended. These theses focus noticeably on theory generation and relatively little on theory testing and pragmatic contribution. These findings support the previously presented finding that Lund is a pioneer in actors' approach research, and that the approach of Lund theses represents the most hermeneutic of the universities.³⁷
- The theory-generation approach is also prevalent at Linköping. Interestingly, authors from Linköping and Lund have chosen very different means of achieving theory generation: Lund is characterised by open-ended actors-approach research, while Linköping is relatively nomothetical, as was found in chapter 5.2.
- The Finnish technical universities, HUT and LUT, focus very strongly on pragmatic contribution. In the case of LUT, the pragmatic contribution is pursued at the cost of theoretical contribution, while, in the case of HUT, theory testing and generating contribution are close to the average of all the universities.

It appears from the discussion above that the contribution dimensions are linked to the Neilimo & Näsi categories, and a more thorough analysis of the investigation of this relation has been conducted. Table 30 shows the percentage of dissertations that fall into each contribution category. For easier interpretation, values over 40% and less than 15% are highlighted in bold.

³⁷ As also noted previously, the theses from Andersson and Marklund were produced in different departments at Lund, and these theses have a significantly more positivistic approach than the other theses from Lund. If these had been omitted from the analysis, the results from Lund would have shown an even stronger inclination to applying open-ended research (1,75), a very low inclination to theory testing (0,25), a slightly lower inclination to theory generation (1,5) and a higher inclination to pragmatism (1,25)

Table 30. The connection between the Neilimo & Näsi approach and contribution to theory testing, theory generation and pragmatism.

	Openness			Theory testing		
Strength	0	1	2	0	1	2
Conceptual	13 %	60 %	27 %	42 %	50 %	8 %
Nomothetical	28 %	61 %	11 %	13 %	33 %	53 %
Action oriented	16 %	58 %	26 %	32 %	36 %	32 %
Decision oriented	67 %	17 %	17 %	11 %	78 %	11 %
Constructive	25 %	33 %	42 %	50 %	38 %	13 %
	Theory building			Pragmatic		
Strength	0	1	2	0	1	2
Conceptual	0 %	50 %	50 %	25 %	75 %	0 %
Nomothetical	27 %	40 %	33 %	27 %	67 %	7 %
Action oriented	16 %	52 %	32 %	12 %	68 %	20 %
Decision oriented	0 %	56 %	44 %	33 %	22 %	44 %
Constructive	13 %	50 %	38 %	0 %	13 %	88 %

The following conclusions can be drawn from the connection between the Neilimo and Näsi approach and the contribution of the theses:

- The conceptual approach is seldom related to a strongly predetermined framework. Rather it appears that a semi-open framework is the norm for this approach. The approach is good for theory building, but provides typically less potential for theory testing. The approach is also used surprisingly much for providing some pragmatic contribution, although this contribution was not very strong in any of the dissertations investigated.
- As could be expected, the nomothetical approach rarely applies a very open-ended framework, but the finding that very predetermined frameworks are less common than expected is somewhat surprising. This approach is very much a positivistic approach used for theory testing. However, logistics obviously lacks strong theories, in which case the approach is often also geared towards theory generation when researchers need to build their own “theorising” or models. In fact, theory testing and theory building are not in any way conflicting goals, and it may be that researchers who prefer this approach do not consider that there are strong enough theories to be tested with a predetermined framework. Additionally, the nomothetical approach frequently investigates issues of practical applicability, but they rarely attempt to

have a direct and active pragmatic impact, choosing a more objective and distant role instead.

- The action oriented approach, although the most popular of the approaches, is the surprise package of logistics research, as it can be linked strongly with any of the contributions. The approach seems slightly more inclined towards theory generation than testing, but so is logistics research in general, so no conclusions can be drawn from that. Additionally, the action oriented approach is often linked to a practical situation in a company, and the understanding generated by this approach has practical applicability. Even this, however, is not the strong point of this approach, as its practical applicability often remains in value 1.
- The decision oriented approach often has roots in operations analysis, is strongly quantitative and typically applies a very predetermined framework. The approach seems capable of building theories, which is natural as the approach is characterised by a model of some form. Meanwhile, it is not so capable in significant theory testing, which is partly due to the strict definition of a testable theory.³⁸ Surprisingly, the decision oriented approach is often strongly pragmatic in solving a specific practical problem. The complex mathematical models may limit the practical applicability of the developed models in a wider practical context, but nevertheless provide significant inputs for a situation at hand.
- The constructive approach is typically characterised by an open-ended framework. This approach is clearly pragmatic and often lacks theoretical foundation, as can be seen by the low contribution for theory testing. Constructive research is expected to build some theory in the form of the construct. However, theses from LUT in particular were so much geared towards practical problems that the construct could not be considered theoretical. As such, there is a trade-off in the analysed sample between being constructive and contributing to theory generation, but when successful, constructive research is capable of contributing significantly on both pragmatic and theory generation fronts.

The Arbnor and Bjerke categorisation of the dissertations reviewed was investigated against the approach that the dissertations had towards contributing to theory testing, theory generation and pragmatic situations. This

³⁸ Strong theory is defined in chapter 2.6 in a paradigmatic way, meaning that the models and construct of the researchers are often not considered as theories, but rather as “theorising”, which is a significant step towards improving a theory and/or generating a new theory, but is often not strong enough for theory testing.

analysis is presented in table 31. For easier interpretation, values over 40% and less than 15% are highlighted in bold.

Table 31. The connection between the Arbnor and Bjerke approach and contribution to theory testing, theory generation and pragmatism.

	Openness			Theory testing		
Strength	0	1	2	0	1	2
Analytical	56 %	44 %	0 %	0 %	67 %	33 %
Systems	21 %	56 %	23 %	32 %	39 %	29 %
Actors	0 %	56 %	44 %	57 %	29 %	14 %
	Theory building			Pragmatic		
Strength	0	1	2	0	1	2
Analytical	7 %	47 %	47 %	33 %	47 %	20 %
Systems	16 %	52 %	32 %	13 %	61 %	26 %
Actors	29 %	43 %	29 %	0 %	57 %	43 %

The following conclusions can be drawn from the connection between the Arbnor and Bjerke approach and the contribution of the theses:

- The analytical approach is mostly associated with a predetermined framework and is never very open-ended. This approach is also always to some extent linked to theory testing, but its real strength is in its ability to generate theory, which is based on systematic analysis. The analytical approach may also be used to solve pragmatic problems, but this seems not to be the focus area of the approach, but is rather a secondary contribution.
- The systems approach is used in a multitude of ways without excelling in any particular type of contribution. As such, this approach seems a good overall choice when the contribution endeavours of the research are not strongly geared to any particular type.
- The actors' approach is never strongly predetermined. It is mainly used for producing pragmatic contribution, although it is also used as a typically grounded approach for theory building. This approach is not very good in theory testing, as it is not characterised by strong testable hypotheses and a priori frameworks.

5.4.4 Main theories and research order approach order

One of the intentions in Vafidis (2002) was to identify the leading theories applied in the dissertations. After reading only a few of the dissertations reviewed, it became evident that the definition of the word ‘theory’ varies greatly between researchers. In many cases, any mental construct that somehow helps in the organisation of thoughts or observations is called ‘theory’. Using such a loose definition would result in a long list of applied theories for each of the dissertations analysed. Additionally, it would be impossible to identify theories in any way, as the only feasible approach would be to accept any construct that the authors have designated as theory and to identify it as such. This is not very useful, as the authors of the dissertations have different ideas as to what theories are. For instance, Bothamley (1993) identifies hundreds of theories in the *Dictionary of Theories*, yet many of the theories that the authors of the 25 dissertations identify as theories are not presented as such.

It was explained in chapter 2.6 that paradigms are characterised by one main theory, while logistics is considered pre-paradigmatic. As such, it is understandable that logistics research applies various theories, but that not all of them are mature enough to be identifiable. Mentzer and Kahn (1995, 232) suggest that logistics research has been influenced mainly by economic, and to some extent behavioural approaches, which suggests that it should be possible to identify logistics theories originating from both approaches. Stock (1995 181-185) investigated four major logistics-related publications³⁹ and identified more than 50 theories⁴⁰ from various disciplines as potentially applicable to logistics. Due to the overwhelmingly fragmented definition of what theories are, this study adopts criteria for identifying the theories in the dissertations analysed simply as a framework for organising thoughts, concepts, observation and analysis, which is likely to be known to and applied by groups of researchers in any discipline. In other words, the theories that are listed do

³⁹ The publications investigated were 1) The International Journal of Logistics Management, 2) International Journal of Physical Distribution and Logistics Management, 3) Journal of Business Logistics, 4) Transportation Journal.

⁴⁰ Stock (1995, 182) defines theories very broadly as “systematically organised knowledge applicable in a relatively wide variety of circumstances, especially a system of assumptions, accepted principles, and rules of procedure devices to analyse, predict, or otherwise explain the nature or behaviour of a specified set of phenomena.” In addition to using such a broad definition of theories, Stock relies on Bothamley (1993) for identification of theories. If a theory is not in Bothamley (1993), then Stock does not include a theory for discussion. The weakness of this approach is that Bothamley includes not only theories but also principles, hypotheses, rules, paradoxes, laws principles and various “isms”, “ologies”, and “sis’s.” It includes several hundred entries but only three entries under the heading of business. It includes over 200 entries for economics but central theories in logistics research, such as transaction cost theory, are missing. On account of these weaknesses, Bothamley’s *Dictionary of Theories* is not used in this study to identify theories.

not need to have causal explanatory power and to be strong in the positivistic sense, but they must reach beyond the specific situational research context of the dissertations analysed.

The results of the observations of theories for individual dissertations are discussed in appendix 3 and summarised in appendix 4. The results of the dominant theories for the entire sample are summarised in 32.

Table 32. Emergence of dominant theories

Theory	Frequency	Percent
Not identified	25	46 %
Systems	11	20 %
TCA	5	9 %
Network	3	6 %
Other	10	19 %
Total	54	100 %

As shown in table 32, almost half the dissertations did not have an identifiable theory. Often the theoretical framework was covered by a discussion of concepts that linked the research to other research, and formed a framework for positioning the gathering and analysis of the research, but did not refer to established concepts or the broader applicability of the frameworks.

Systems theory is found in 11 dissertations, is the most widely applied theory, and is more an approach for organising research than a theory of causal explanatory power. It offers a clearly distinguishable way of organising research holistically. This theory assumes that phenomena can only be explained as part of the whole system and context, which makes this approach an alternative to positivistic atomistic theories. The systems theory is probably the strongest competing paradigmatic approach to positivistic theories.

TCA (transaction cost theory) is found in five dissertations. TCA is a positivistic theory with predictive power, and is based on economics (see Coase 1937, Williamson 1975). TCA assumes that the economic relations between two parties follow predictable patterns, resulting in attempts to optimise the economic benefits of each party in the relationship. As such, this theory bears similarities to the well-known game theory. TCA theory is especially suitable for the investigation of the costs of building deep relationships and the infrastructure that they require, as compared to ad hoc-based business between two parties.

It seems that only the systems and TCA theories have the potential to strive for paradigmatic status in logistics research, as the following theories

identified are the network theory with three occurrences, and a group of single occurrences of other theoretical traces (see appendix 4 for details). The network theory is mainly a descriptive approach, related to the Nordic IMP (Industrial Marketing and Purchasing) approach, in which complex relationship networks are investigated with typically open-ended frameworks. The network theory has the potential to complement TCA research in describing extensive organisational networks, which can then be investigated in more detail and structure with the TCA approach.

In addition to the dominant theories, several dissertations also showed traces of secondary and tertiary theories. These are listed in table 33. In conclusion, logistics research lacks a theoretical hard core. The systems approach and TCA approach are the most serious widespread attempts to form such a hard core, but they do not seem capable of covering the entire discipline as they do today. A typical logistics dissertation does not appear concerned about strong theoretical foundation, but a diverse group of concepts, sentiments and frameworks are applied instead.

Table 33. Secondary and tertiary theories

Secondary & tertiary theories	Frequency	Percent
Combinatorial models	2	7 %
Contingency	1	4 %
Cybernetics	1	4 %
Evolutionary model	1	4 %
Geographical theories	1	4 %
Heuristics	1	4 %
industrial eng approach	1	4 %
Network	1	4 %
Operations research	3	11 %
Principal-agent theory	1	4 %
product structure models	1	4 %
Relationship marketing	1	4 %
strategic core theory	1	4 %
Systems	4	14 %
TCA	2	7 %
Theory of constraints	1	4 %
Control theory	1	4 %
Cost management	1	4 %
Network	2	7 %
Throughput accounting	1	4 %

The identifiability of theories is related to the research order approach of the theses. It was explained in chapter 2 that the positivist approach tends to start with some theory-laden assumptions (i.e. hypotheses), which are then tested with a chosen method using selected observations. Meanwhile, the grounded approach, i.e. the hermeneutic approach in its extreme form, tends to start with as few assumptions as possible, and to observe the environment, in the hope of being able to make some inductive conclusion and to formalise either generalisable or situational behaviour patterns. The research order approach and the methodological tradition that the order resembles is presented in Table 34 for each dissertation. The symbols in the 'order' column are T, M, and O, meaning Theory, Method and Observation. The order of these symbols from left to right indicates the order in which theory, method and observations come into the picture in each of the dissertations. Typically, positivistic research starts with theory and ends with observations, and therefore the typical positivistic approach is indicated as T-M-O. Meanwhile the typical grounded approach is indicated as O-M-T or O-T-M. Sometimes, the symbol is shown in parentheses, indicating that the presence of observation, method or theory is weak.

Table 34. Research order approaches

Author	Order	Methodological tradition that the research order follows
Inkiläinen, Aimo	(T)-M-O	Positivistic
Ljungberg, Anders	O-M	
Antero Janhunen	M-O	
Antti Lehmusvaara	Many	
Andreas Norrman	O-T-M	Hermeneutic
Birgitta Öjmertz	O-M-T	Hermeneutic
Christian Adjadjihoue	(T)-M-O	Positivistic
Dag Naslund	O-M	
Dan Andersson	T-M-O	Positivistic
Erkki Hämäläinen	(T)-(M)-O	Somewhat positivistic
Hannu Seristö	(T)-M-O	Positivistic
Yrjölä, Hannu	(T)-M-O	Positivistic
Aronsson, Håkan	(T)-M-O	Positivistic
Töyrylä, Ilkka	O-T	
Juga, Jari	(T)-O-M	
Marklund, Johan	T-M-O	Positivistic
Woxenius, Johan	O-(T)-M	
Wedel, John	(O)-T-M-O	
Andersson, Jonas	T-M-O	Positivistic
Waidringer, Jonas	T-M-O	Positivistic
Lehtonen, Juha-Matti	T-M-O	Positivistic
Korpela, Jukka	M-O	
Heikkilä, Jussi	(O)-M-O-T	Hermeneutic
Spens, Karen	(O)-T-M-O	
Jalkanen, Kari	(T)-M-O	Positivistic
Tanskanen, Kari	T-O-(M)	
Jansen, Karl	T-M-O	Positivistic
Hultén, Lars	O-M-(T)	Hermeneutic
Medbo, Lars	O-M	
Ojala, Lauri	T-O-M	Positivistic
Berglund, Magnus	T-M-O-T	Positivistic
Blinge, Magnus	T-M-O	Positivistic
Brodin, Maria Hüge	O-M-T	Positivistic
Jahre, Marianne	T-M-O-(T)	Positivistic
Tinnilä, Markku	O-M-T	Hermeneutic
Johnsson, Mats	M-O-T	
Punakivi, Mikko	M-O	
Hilmola, Olli-Pekka	T-M-O	Positivistic
Juhantila, Olli-Pekka	O-M	
Brehmer, Per-Olof	(O)-(T)-M-O-T	Positivistic
Helo, Petri	(T)-M-O	Somewhat positivistic
Lehtola, Richard	T-M-O-T	Positivistic
Lindau, Roger	T-M-O	Positivistic
Holmber, Stefan	O-M-T	Hermeneutic
Franzén, Stig	T-M-O	Positivistic
Ranta, Tapio	M-O-T	
Seppälä, Tero	T-M-O	Positivistic
Hagman, Thore	(T)-O	
Kaski, Timo	(T)-M-O	Somewhat positivistic
Lehtinen, Ulla	T-M-O	Positivistic
Tapaninen, Ulla	T-M-O	Positivistic
Virolainen, Veli-Matti	T-O-M	
Kämäräinen, Vesa	O-(T)-M-(T)	
Tuunainen, Virpi	(T)-M-O-T	Somewhat positivistic

In total, there are 25 theses that follow a positivistic research order approach, and an additional 4 which are somewhat positivistic, which refers to theses with a basically positivistic approach but where the theoretical discussion is based on weak theory that does not give clear structure to the steps in the research. There are only 6 theses that follow a hermeneutic approach, starting with observations and creating theory based on those observations. Additionally, 19 theses cannot be categorised as positivistic or hermeneutic, and the main reason for this is the lack of theory. Such theses are typically methods-driven or descriptive, without theoretical content, or, in some cases, they are very practically oriented, starting with observations that introduce some theorising and attempting to present this as a methodically systematic process.

6 ASSESSMENT OF SOCIAL AND PERSONAL DIMENSIONS IN KNOWLEDGE AND APPLICATION CREATION

The assessment of social and personal dimensions is based on the framework explained in chapter 3, and the survey methods, which are explained in chapter 4.2. The tables in this chapter often refer to individual survey questions, in which case the number of the questions is shown in parentheses and the questions can be seen in appendix 6. The information in this chapter is mainly presented anonymously on the level of the entire sample, and descriptive results for the individual survey questions are presented in appendix 7.

6.1 Personal dimensions in knowledge and application creation

6.1.1 Backgrounds of the respondents

The survey asked about the educational and working backgrounds of the researchers. These backgrounds are considered important, as people have a tendency to relate to their history, reference groups and previous knowledge when making research choices. The educational backgrounds of the respondents (question 3 in the survey) are summarised in table 35.

Table 35. Educational backgrounds of the authors

Education	Percentage
Bachelor of business / economics	4,5 %
Bachelor of technology	0%
Master of business / economics	15,9 %
Master of technology	29,5 %
Licentiate of business / economics	20,5 %
Licentiate of technology	34,1 %
Other	2,3 %

Looking at the disciplinary backgrounds, 41% had a business or economics background and 64% had a technology background, while only one had a background from outside these disciplines, in this case a Bachelors degree in

learning psychology. Even this author, however, had then shifted to the traditional strongholds of logistics and taken a licentiate in technology as an interim step. There is some cross-movement between technology and business/economics background education, as three authors had a lower-level academic degree in business/economics but had completed their higher-level degree in technology. On the other hand, three authors had a lower-level degree in technology but had completed their higher-level degree in business/economics. In conclusion, doctoral research in logistics is totally dominated by two disciplines, and logisticians do not have a broad education background. This does not facilitate the “borrowing of theories from other disciplines”, which Stock (1995) calls for.

The division in business/economics and technology backgrounds is roughly similar between the two five-year samples.⁴¹ There is a noticeable shift, however, in the highest academic degree that the authors had prior to commencing their doctoral studies: in the 1994-1998 sample, 80% had a Licentiate degree, the rest 20% having a Masters, and, in the 1999-2003 sample, only 38% had a Licentiate degree and 62% a Masters. This may be an indication that the doctoral research process is becoming more straightforward, which is a statement also supported by looking at the time that it takes to complete a thesis. In the 1994-1998 sample, the average time between the year when the research started and the publication year is 5.1 years (median 5 years), and, in the 1999-2003 sample, the average time is 4.5 years (median 4 years)⁴².

In addition to the educational background discipline, the major subject of the first degrees was also a target of the survey (question 4). Results are summarised in table 36.

⁴¹ The 1994-1998 sample has 40% business/economics and 65% technology backgrounds and the 1999-2003 sample has 43% business/economics and 71% technology backgrounds.

⁴² This calculation is cleaned from exceptionally long breaks in the research, which were indicated by the authors in the survey.

Table 36. Major subjects of the authors

Major subject	Responses
Logistics	17
Production / industrial management	14
Information systems	3
Other engineering	3
Economic geography	2
Mathematics	1
International marketing and shipping economics	1
Accounting	1
Marketing	1
Building economics	1
International business	1
Operations research	1

As shown in table 36, the respondents are predominantly logisticians and engineers from a production and industrial management background. Together these two majors cover over 80% of the respondents. Some of the respondents come from closely related disciplines such as other engineering, information systems and economic geography. Meanwhile, there are surprisingly few respondents with mathematical or operations analysis backgrounds and business backgrounds other than logistics.

On the work background perspective (survey question 9a), 20 (45%) of the doctorates had worked outside the university for at least one year before initiating their research project. The median work experience was 6 years, the average was 9 years, and five respondents had over 20 years of practical work experience. The research of 14 of the 20 (70%) researchers who had work experience was related to their work, and 9 (45%) of authors continued to work during their doctoral research projects, while 11 (55%) left their work during the research. Only one author who had not previously worked outside the world of academia had a company assignment that provided work related to the research project.

Work experience correlates very significantly when relating the research subject to work (questions 9a and 9b in the survey show a Pearson correlation 0,540 with Sig. 0,00). Interestingly, work experience does not statistically add to the researchers' pragmatic contribution to any significant degree. As such, it seems that researchers with long work experience relate their research to practical problems, but, on average, they appear to find it difficult to get their research abilities to realise their full contribution potential.

Researchers who related their research to their work can be distinguishable as a group with several variables. Table 37 provides the significant correlations of an experimental analysis.

Table 37. Statistically significant characteristics of research related to the researchers' work (Pearson correlations)

	Correlation & significance	(9b) Research related to work
(8a) Academic research funding	Correlation	-0,302
	Sig. (2-tailed)	0,046
(8c) Own research funding	Correlation	0,461
	Sig. (2-tailed)	0,002
(13b) Assured of practical significance	Correlation	0,395
	Sig. (2-tailed)	0,008
(16b) Interested in data collection and analysis methods	Correlation	0,318
	Sig. (2-tailed)	0,035
(16j) Interested in academic discussion	Correlation	-0,274
	Sig. (2-tailed)	0,035
(16k) Interested in practitioner discussion	Correlation	0,291
	Sig. (2-tailed)	0,042
(17a) Interested in researcher career	Correlation	-0,274
	Sig. (2-tailed)	0,044
(21a) Ph.D. significance to career	Correlation	-0,292
	Sig. (2-tailed)	0,018

Table 37 illustrates variables that showed statistically significant correlations with research related to the work of the researcher (question 9b in the survey). The following conclusions can be drawn: research related to work is mainly funded by the researcher him/herself (question 8c) and academic salaries or grants (question 8a) are not used extensively. Researchers who relate their research to their work are sure that their research has practical relevance (question 13b), and they are interested in developing their skills in data collection and analysis methods (question 16b). Such researchers are also motivated to discuss and consult with practitioners (question 16k) and uninterested in academic discussion (question 16j). Such researchers also appear to appreciate their practitioner careers, as they are uninterested in academic careers (question 17a). They also perceive that the doctoral thesis has not impacted on their careers very significantly (question 21a). In conclusion, researchers relating their research to their work appear rather distant from academic funding, academic discussion and researcher careers. It appears that, on average, they are conducting self-funded research and find motivation in developing the method skills that they may have lacked in their working careers. Interestingly, such researchers are indifferent about self-

development motives or instrumental motives⁴³. It is therefore difficult to conclude what motivates them. Possibly they are motivated by the chance to do something different to their daily job or to raise their self-esteem, but these options were not measured in the survey.

The demarcation between academic and practitioner oriented researchers is further intensified when investigating how researchers who perceive a strong academic influence (question 10a) and researchers who perceive a strong practitioner influence (question 10b) are motivated. The statistically significant findings related are illustrated in table 38.

Table 38. The statistically significant findings related to perceived practitioner and academic influence (Pearson correlations)

	Correlation & significance	10a_academic influence on research	10b_practitioner influence on research
(16d) Interest in studying previous research	Correlation		-0,320
	Sig. (2-tailed)		0,034
(16k) Interest in practitioner discussion	Correlation	-0,360	0,330
	Sig. (2-tailed)	0,016	0,029

It appears that the researchers who perceive a high practitioner influence are also highly interested in discussing with practitioners and have little interest in studying previous research. Meanwhile, researchers who perceive a high academic influence have low motivation to discuss with practitioners. Researchers have a tendency to pick either an academic or a practitioner path, and this tendency is predictable from the researcher backgrounds in the practitioner community.

6.1.2 Research funding

The importance of having sufficient funding for the entire course of doctoral studies is self-evident, since most doctoral students are unlikely to be able or willing to be without income during their doctoral dissertation project. Funding can also be seen as a source of social dependency, as researchers are

⁴³ Instrumental motives are motives that would advance either academic or practitioner careers.

likely to consider the interest of the funding party as being more important than other interests (Junger-Tas, 2005).

There is a general consensus that being a doctoral student is not very rewarding financially when compared to being a practitioner. An assistant position in Finnish universities for a person without previous work experience offers a pre-tax salary of 1,852-1,904 euros, depending on the location. Meanwhile, a Master's level practitioner can expect a starting pre-tax salary of over 2,500 euros. In five years, a PhD could expect about 2,500 euros (A24 salary for PhD researcher position), reaching the starting salary of a practitioner. Meanwhile, after five years of experience, the practitioner will have reached an average pre-tax salary of 3,950 euros. (Talentia, 30.4.2006; SEFE, 24.4.2006). However, the situation is not that grave for researchers, as several foundations offer generous tax-free funding, and also supplemental income from teaching is possible. Nevertheless, the acquisition of such funding requires significant efforts, and appears to be a significant reason for frustration, as discussed in chapter 6.1.3.

The survey included a question that asked how the respondents funded their doctoral research (question 8). The question was answered by 42 respondents and the results are presented in table 39.

Table 39. Means of funding doctoral research

	Respondents	1- 20%	21- 40%	41- 60%	61- 80%	81- 100%
(8a) Salary or grants related directly to research (university, grants)	36 (88%)	6	3	2	4	22
(8b) Sponsoring or salary from organisations that were interested in the practical applicability of the research	19 (45%)	8	3	1	2	5
(8c) Own funds, e.g. saving, salary from non-related work	9 (21%)	1	3	0	1	4
(8d) Other	3 (7%)	2	1	0	0	0

Table 39 reveals that 88% of the respondents received at least some funding from salary or grants related directly to their research, and that 50% of all the respondents received all of their funding from such sources. 45% received at least some funding from organisations that were interested in the practical applicability of the thesis. Although the majority of these respondents received

only limited funding and only five respondents received all of their funding in this manner, it is an indication that practically interesting doctoral research can be funded privately. There are also respondents who funded their research at least partially from their own funds. Statistically the source of funding does not relate significantly to work background nor to perceived influence of academics or practitioners.

6.1.3 Researcher motives and interests described

Generally, at least in retrospect, the respondents had no serious problems in maintaining their motivation during the research project (question 14). This is shown in table 40.

Table 40. Most respondents had no difficulties in maintaining their motivation

Scale: 1=very difficult, 5= no significant problems	Avg.	1	2	3	4	5
(14) Generally, how easy has it been to maintain motivation over the doctoral research project	4,0	5%	5%	19%	35%	37%

As can be seen from table 40, 72% of respondents gave an answer of four or five on a scale of one to five, where five represented no significant motivational problems, and only one indicated that motivation was very difficult. This result is to some extent self-evident, as people conducting doctoral research are doing interesting work and have the freedom to do so in ways that help to maintain their motivation. But motives may differ, and differences in motives are an important driver for making research choices. The researcher motives are divided into the following areas⁴⁴:

- Interest in contributing to reputational audiences and self-development
- Career aspiration-related motivation
- Focus of interest during the research project
- Reasons of demotivation during research project

Each of the above is now analysed separately. The interest in contributing to the discipline, practitioners and self-development (question 15 in the

⁴⁴ Additionally, the reasons for choosing the research topic can be seen partly as a motivational topic but this question was already discussed in chapter 5.1 where the choices of research subject areas were discussed.

survey) is an indication of the importance of the reputational audiences that the researcher serves. The results of this analysis are presented in table 41.

Table 41. Interests to contribute to reputational audiences and self-development through the author's own research process

Scale: 1=strongly disagree, 5= strongly agree	Avg.	1	2	3	4	5
(15a) The thesis and research project should contribute to the discipline	3,6	0%	16%	25%	39%	21%
(15b) The thesis and research project should contribute to practitioners	3,5	0%	16%	30%	41%	14%
(15c) The thesis and research project should improve one's own skills & knowledge	4,6	0%	0%	7%	27%	66%

As can be seen from table 41, all respondents consider self-development as an important motivator for the thesis research: 93% of all respondents agree or strongly agree with this statement, while none of the respondents disagrees. The importance of contributing to the discipline and practitioners is more open to debate. Generally, both types of contribution are seen as important, as only 16% of the respondents disagree with either question and none of the respondent strongly disagrees with either. Since doctoral research is primarily considered an academic effort, it is surprising that practitioner contribution is seen as being almost as important as disciplinary contribution: 13 respondents consider disciplinary contribution more important, 12 authors consider practical contribution to be more important than disciplinary contribution and 14 respondents consider both types of contribution equally important.

On a more detailed level of motivation, respondents were asked to indicate their areas of interest in the research process, and to give open-ended replies to major reasons that may have caused demotivation. These areas of interest were divided into 11 areas of research (question 16 in survey). These interest areas are described in table 42.

Table 42. Interests of respondents in particular areas of research

Scale: 1=not interesting at all, 5= very interesting	Avg.	1	2	3	4	5
(16a) Working on philosophical, ontological and epistemological issues	2,6	18%	39%	18%	11%	14%
(16b) Developing data collection and analysis methods	3,4	0%	14%	39%	43%	5%
(16c) Gaining access to and collecting empirical evidence	4,0	2%	9%	12%	35%	42%
(16d) Reading and studying previous research around the topic	4,0	0%	7%	16%	43%	34%
(16e) Building the theoretical framework	4,0	2%	2%	23%	41%	32%
(16f) Writing the text of the thesis	3,5	2%	14%	35%	30%	19%
(16g) Making the data analysis	3,9	0%	5%	34%	30%	32%
(16h) Drawing conclusion	4,3	0%	2%	9%	43%	46%
(16i) Writing articles and conference papers	3,8	0%	7%	30%	36%	27%
(16j) Discussing with academics related to research	4,0	2%	2%	21%	43%	32%
(16k) Discussing and consulting with practitioners related to research	4,3	0%	7%	7%	36%	50%

Table 42 reveals that working on philosophical, ontological and epistemological issues (question 16a) is the least interesting topic, while drawing conclusions (question 16h) and discussing and consulting with practitioners (question 16k) are the most interesting topics. Discussion with academics (question 16j) and the steps related to the background work of the research process (questions 16c,d,e & g) are perceived as highly interesting in general, with the exception of developing methods (question 16b) and writing the thesis (question 16f).

The literature work for the framework of this study did not offer a means for preparing any pre-assumptions for researcher-interest covariation. Consequently, an experimental approach was taken to seek correlations for each interest variable using methodological approaches. The size of the complete correlation matrix is very extensive and only part of it is presented in appendix 9. The most interesting results are interpreted in the following conclusions:

- Interest in building a theoretical framework (question 16e) is related to interest in philosophical, ontological and epistemological issues (question 16a), studying previous research (question 16d) and academic discussion (question 16j). It seems feasible to assume that the authors seek philosophical robustness for their frameworks through academic discussion. Additionally, framework building is related to interest in drawing conclusions (question 16h), which in turn is related to writing

the thesis (question 16f). This group of interest seems to form a group that reflects disciplinary contribution values and has the potential to show the researcher's interest in conceptual frameworks. In fact, interest in building the framework (question 16e) correlates positively with a conceptual approach (NN_conceptual). Interestingly, it also correlates negatively with a nomothetical approach (NN_NO), which may be a sign of a more method oriented approach to doing research without too much emphasis on the conceptual robustness of that research. In addition, the systems approach (AB_systems) correlates positively with interest in academic discussion, and it may therefore be considered an academic version of understanding holistic phenomena.

- Further to the logic of the previous findings, researchers who are interested in philosophical, ontological and epistemological issues (question 16a), framework building (question 16e), drawing conclusions (question 16h) and academic discussion (question 16j) also find a Ph.D. generally significant to their careers (question 21a), and, more specifically, the skills and knowledge gained in the research process are also found to be significant to their careers (question 21b). Furthermore, an interest in academic discussion seems to correlate with several types of perceived significance of the PhD research to the career. This combination sounds logical from the point of view of academic career paths (further discussed in chapter 6.1.4.1), which is also indicated by a positive relationship between motivation and framework building and enjoying the assurance of the academic significance (question 13a) of the thesis. Such academic researchers may have difficulties in linking their work to practical relevance, as the academic influence on research (question 10a) correlates negatively with interest in discussion with practitioners (question 16k).
- Interest in discussing with practitioners (question 16k) correlates positively with respondents who had practical work experience prior to initiating the research project (question 9a), those who enjoyed strong practitioner influence on their research (question 10b) and those who considered a practical contribution as important (question 15b). Meanwhile, it correlates negatively on who enjoyed a strong academic influence on their research (question 10a) and those who considered disciplinary contribution (question 15a) as important. Furthermore, researchers who perceive a high practitioner influence (question 10b) are not so interested in studying previous research (question 16d). Instead, such researchers seem to have an interest in drawing conclusions (question 16h) and focusing on creating a practical contribution (question 15b), but they have difficulties with the

academic requirements of studying previous research (question 16d). This polarisation to disciplinary and practically oriented research is also found in several other analyses of this study

The above-listed findings and discussion should be treated with caution before drawing far-reaching conclusions. As there were no previously available frameworks from which to draw hypotheses on the covariation of researcher interests, the discussion serves the purpose of developing a testable model in later research. The main theme in such a model is linked to the polarisation of logistics research to disciplinary and practically oriented research. The resulting hypothesising is presented in the form of a model for further research opportunities in chapter 7.2.

In addition to investigating motives and interests, the respondents were also requested to answer an open-ended question, stating factors that may have demotivated or frustrated them during the research (question 18). 33 respondents replied, of whom 30 discussed one or more themes of demotivation and frustration. The themes and number of respondents stating each theme are presented in table 43.

Table 43. Themes of frustrations and demotivation

Theme	Number of replies
Loneliness, lack of supervision and other academics for discussion	11
Difficulties in combining research with other work and/or personal life	7
Funding or salary level	5
Academic environment is bureaucratic and/or things happen very slowly	5
Technical uncertainty (methods)	5
Strategic uncertainty related to research (topic importance, direction)	3
Atmosphere in the academic community is not encouraging	2
Critique was given without sufficient familiarisation to work and/or by incompetent people	2
Too ambitious approach/delayed completion	2

Table 43 clearly shows that respondents perceive the lack of supporting discussion and supervision and the feeling of working alone as a major reason for demotivation and frustration. Chapter 6.2.1 shows that, at present, academic strategic and technical dependency, which is largely driven by discussion and getting opinions and advice from senior researchers, does not

reduce the doctoral student's strategic and functional uncertainties. Meanwhile, discussion with practitioners seems more capable of reducing uncertainty, and, interestingly, none of the respondents raised lack of practitioner discussion as an issue that demotivated or frustrated. Thus, there is a demand for additional academic discussion, and the academic community should find more effective ways of contributing to the research process. Some of the open-ended replies also pointed out that academics in the social audience (supervisors, immediate colleagues, pre-examiners) were not considered competent to discuss the research theme (2 respondents directly mentioned incompetence). Some replies revealed that technical (5 respondents) and strategic uncertainty (3 respondents) were direct reasons for demotivation and frustration. A doctoral thesis by definition deals with a new research area and its related uncertainty. However, tighter delineation of what topics and methods are acceptable and adequate discussion of these topics would very likely increase the perceived value of academic support.

Table 43 also shows that difficulties in combining research with personal life and work as well as funding may become frustrating in some cases. Furthermore, 2 replies stated that the academic environment is perceived as slow and bureaucratic and the atmosphere discouraging.

6.1.4 Personal research consequences

The personal research contribution is analysed from the following aspects:

- Descriptive career paths that show concretely what career background authors had in both academic and practitioner jobs, and the consequences of those backgrounds. The typical career paths are described and their frequency analysed. This is discussed in chapter 6.1.4.1.
- Analysis of the significance of the doctoral research process as perceived by the respondents of the survey is discussed in chapter 6.1.4.2. This analysis investigates what aspects in the research project have proven most significant to the respondents' careers, and also whether interrelations between the research approach and perceived significance exists. Additionally, there is analysis of the authors' perception of the match between their career expectations during the doctoral research project and the career realised after they have finished.
- The activeness in post-doctoral research and methodological loyalty of the respondents is investigated to see whether there are aspects in the doctoral research project with which they have been especially satisfied

or dissatisfied, consequently either fostering or abandoning such practices in their post-doc research. This is discussed in chapter 6.1.4.3.

6.1.4.1 Career paths

The respondents of the survey were asked how interested they were in careers in research, teaching and practitioner jobs (question 17). Additionally, a response alternative was given for those who did not consider their research as an instrument to career goals. Table 44, presents these results.

Table 44. Career interests of the respondents

Scale: 1=strongly disagree, 5= strongly agree	1	2	3	4	5
(17a) Interested in research career	5%	19%	33%	30%	14%
(17b) Interested in teaching career	19%	33%	35%	9%	5%
(17c) Interested in practitioner career	5%	16%	19%	47%	14%
(17d) No specific career interests but rather focus on developing skills and knowledge	11%	21%	14%	18%	35%

It can be seen from table 44 that practitioner careers are more interesting to the respondents than research careers, as 61% of respondents agree or strongly agree that they had been interested in a practitioner career, while only 44% of respondents agree or strongly agree that they had been interested in a research career. Moreover, many researchers (53%) rated self-development very highly and were not overly occupied with linking their career to their doctoral research project. A teaching career was interesting only to a few researchers (14%), while 52% were uninterested in such a career alternative. In particular the respondents who related their research to practical work (question 9b) were interested in a practitioner career.⁴⁵ More importantly, as shown in table 45, it appears that career aspirations were fulfilled best for those who were interested in a research career. Meanwhile, an interest in a practitioner career does not significantly correlate with a realised practitioner career, making it questionable whether doing a Ph.D. is a worthwhile effort if the researcher has a practitioner career in mind. Therefore, it is worthwhile for a novice researcher to consider whether a doctoral dissertation is the right move with respect to career aspirations, or would an MBA or second degree, for example,

⁴⁵ Spearman's rho: 0,338, Sig. 0,027

be good alternatives to achieving practitioner career objectives. A doctor's degree is after all a research degree.

Table 45. Career aspirations and career realisation correlations⁴⁶

Spearman's rho	Interested in research career	Interested in practitioner career
Realised academic career	0,404 Sig. 0,007	-0,350 Sig. 0,020
Realised practitioner career	-0,269 Sig. 0,077	0,247 Sig. 0,106

Considering the personal consequences of the doctoral dissertation, the career that follows is probably the most significant indicator. The respondents were asked an open question: *how does the career that you have had after your research correspond with what you expected during your doctoral research* (question 20)? 40 respondents replied to the question. The interpretation of the open-ended replies gives the results presented in table 46.

Table 46. Interpretation of the correspondence of expectations and career

Correspondence of career and expectations	Number of responses
Better than expected	1
Well or very well	18
OK or average	11
Not well	4
Not at all	2
No expectations, thus cannot say	3

As can be seen from table 46, most respondents perceive that their career expectations have been well met. Furthermore, from generally perceived matches between expectations and career, the following themes stand out in the open-ended replies:

- 16 respondents find that their dissertation has proven valuable in later research and teaching.
- None of the academic respondents finds the dissertation irrelevant to their career.

⁴⁶ Significant correlations are in bold

- 3 respondents working in academic careers mention the lack of research funding as surprisingly frustrating, and 1 respondent mentions a similar frustration with the overwhelming amount of administration work.
- 3 respondents were expecting to have an academic career but ended up with a practitioner career.
- 13 respondents find that their dissertation has proven useful in practitioner or practically oriented research work conducted in institutes that are not universities or consulting firms.
- 8 respondents who work in consulting or research outside a university appear very satisfied with their careers, and see that their dissertations have been valuable. This appears the most satisfied respondent group.
- Three practitioner respondents find that the dissertation has been irrelevant to their career.
- One author moved from a practitioner career to an academic career but does not perceive this as satisfying.

It appears that authors perceive positive effects regardless of whether they work in an academic or practical field. Authors that work in academia mostly value their thesis highly, and the causes of frustration are related to issues that keep them from conducting more research. Consultants and respondents who work in consultancy-like research institutes appear very satisfied with the possibility to combine research with practical relevance and a higher income level than in academia.

Career paths were synthesised by combining the results of the questions indicating careers prior to and during the research (questions 9a, 9b, & 9c) with the career consequences (question 19). Five distinguishable career paths became evident, which can be separated into academic careers (see figure 18), practitioner careers (see figure 19) and careers that are not related to logistics (see figure 20).

Academic careers that are illustrated in figure 18 include a purely academic career, in which the respondent does not have work experience outside academia before initiating the doctoral research, and has continued to follow an academic career after the completion of the thesis. 15 (34%) authors can be seen as pure academics. 8 (19%) can be seen as practically experienced academics, i.e. authors that have followed an academic career but have also work experience outside academia. This group includes the respondents who changed their career from a practitioner career to an academic career. In total, 23 (52%) out of the 44 survey respondents ended up with an academic career, and, in total, 37 (84%) of the respondents say that they have been active with at least some post-doc research. This indicates that a doctoral research project is rather successful in arousing interest in continuing with research, but only about half the respondents had an academic career, which is a modest result

when considering that a doctoral degree is aimed at preparing a person for a career in research.

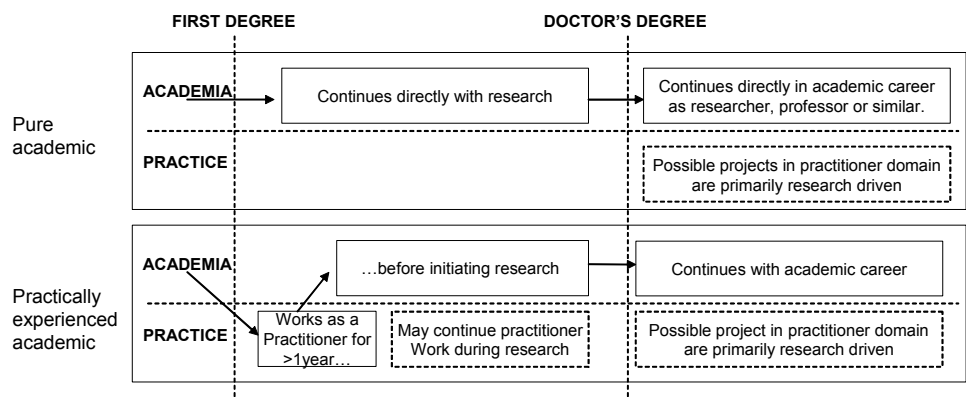


Figure 18. Academic career consequences

Practitioner careers that are illustrated in figure 19, include academics that became practitioners and specialist practitioners. In total, 10 (23%) of the 44 respondents ended up with a logistics-related practitioner career, although 6 of them have also been active in post-doc research. 5 (11%) of the respondents who ended up with a practitioner career had no previous work experience outside academia, i.e. they are academics who became practitioners after completing their doctor's degree. Interestingly, only one academic who became a practitioner found a job and a research topic from that industry. This indicates that companies and other organisations that could benefit from logistics research do not provide research opportunities to people that are not already their employees. As such, it seems almost impossible for young researchers who do not have an industry job to relate their thesis to a practical career, making a doctoral research project a poor stepping stone to a practitioner career.

Also illustrated in figure 19 are 5 (11%) respondents who had previous work experience outside academia, i.e. they are specialist practitioners. All except one of these specialist practitioners related their research to their job, and all except one continued in their job outside academia during the research. The specialist practitioner group is the only group that provides a statistically significant result concerning the relationship between the career path and

motivation, by being capable of maintaining their motivation⁴⁷. Members of this group also strongly agree with the statement that the research project should be practically applicable and solve actual problems in case or sponsoring companies.⁴⁸

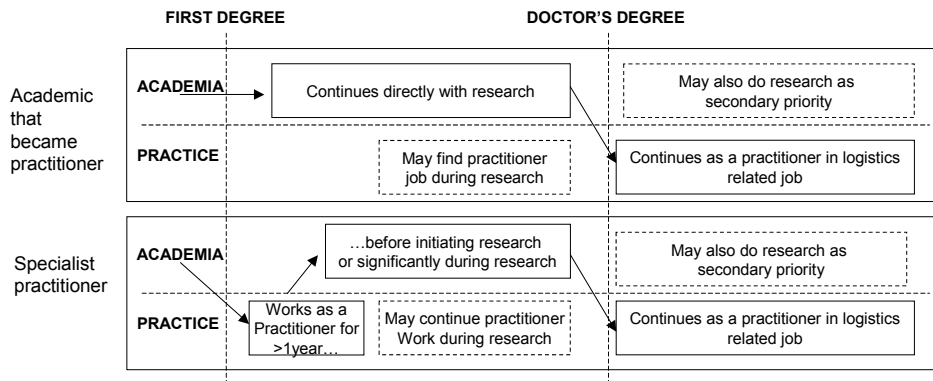


Figure 19. Logistics practitioner career consequences

Careers that are not related to logistics are illustrated in figure 20. In total, 11(25%) of respondents ended up with a career that is not primarily related to logistics, although 6 of these authors also see that logistics and their research still play a significant role in their careers. Consequently, only 5 (11%) respondents completely changed to a career outside logistics. Careers of such authors include legal, marketing, general management, financial analysis and trading, corporate governance, consulting, information systems and directing a research centre. Only two of the respondents in this career category did not participate actively in post-doc research.

⁴⁷ Logistic regression analysis shows Exp(B):20,862 and Sig:0,065 between question 14 and the specialist practitioner career type.

⁴⁸ Logistic regression analysis shows Exp(B):85,949 and Sig:0,07 between question 15b and the specialist practitioner career type.

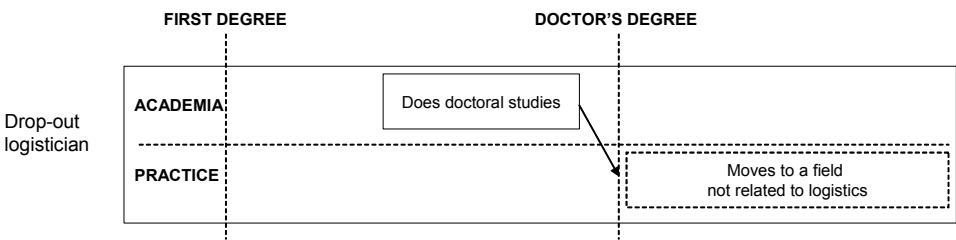


Figure 20. Non-logistics career consequences

Logistic regression analysis was conducted to establish the covariance between methodological approaches and career consequences. Neilimo & Näsi and Arbnor & Bjerke categories, positivist vs. hermeneutic and quantitative vs. qualitative approaches were defined as independent variables and the career types as dependent variables. The only covariances that had even modest significance were found among persons of a *pure academic* career type, as they have applied significantly conceptual⁴⁹ and action oriented⁵⁰ approaches. This is understandable, as authors who are not practically experienced need to make up for their deficiencies by making thorough conceptualisations, and they need to get an understanding of practical situations by utilising an action oriented approach. However, it seems that the choices of methodological approach do not have a widespread effect, and, most importantly, none of the methodological approaches needs to be avoided because of a statistically significant risk of undesirable career results.

6.1.4.2 Perceived significance of undertaking a doctoral research project

In addition to the career consequences, the perceived value of the thesis was also investigated (question 21). The response averages are presented in table 47, and a more detailed distribution of the replies is found in appendix 7.

⁴⁹ Exp(B): 18,540 and Sig. 0,056

⁵⁰ Exp(B): 7,059 and Sig. 0,059

Table 47. The average significance of the doctoral research project

	Mean	Academic career	Other career	Previous work exp.
(21a) How significant has your doctoral research been to your career generally	4,05	4,39	3,68	3,74
(21b) How valuable have the skills and knowledge that you gained during the research process been to your career	3,88	3,83	3,95	4,05
(21c) How valuable have the industry and research experience that you gained during the research process been to your career	3,65	3,57	3,74	3,68
(21d) How valuable have the personal relationships that you developed during the research process been to your career?	3,40	3,57	3,26	3,32
(21e) How valuable has it been to your career to possess a doctor's degree in logistics? (e.g. getting job offers, better salary, more credibility)	4,12	4,30	3,95	3,89

Table 47 reveals that respondents who ended up in an academic career estimate the value of their doctoral research project on an average level (21a), and the possession of a doctor's degree (21e) on a higher level than respondents who ended up in non-academic careers. Meanwhile, practitioners and those who have left logistics (all of whom are included in the research sample) value skills and experience gained in the research project slightly more highly than respondents with academic careers. Surprisingly, there is no significant difference between academic and non-academic career respondents in the perceived value of having the formal doctor's degree (21e), which is a prerequisite to many high profile academic jobs but not to practitioner jobs. Thus, it appears that a doctor's degree in logistics is equally valued in practitioner careers. Due to this surprising finding, a more thorough statistical analysis of the significance questions was conducted in order to compare career consequences with career aspirations (question 17). A correlation analysis is presented in table 48, in which statistically significant findings are in bold.

Table 48. The statistically significant correlations of career aspirations, career consequences and perceived significance⁵¹

	21a) General PhD significance	21e) PhD degree significance
(17a) Research career interests (Pearson's correlation)	0,212 Sig. 0,172	0,345 Sig. 0,024
(17c) Practitioner career interests (Pearson's correlation)	-0,385 Sig. 0,011	-0,523 Sig. 0,000
Realised academic career (Spearman's rho)	0,406 Sig. 0,007	0,288 Sig. 0,61
Realised practitioner career (Spearman's rho)	-0,354 0,020	-0,230 Sig. 0,138

The initial impression on table 48 is that practically- and academically oriented respondents perceive the significance of their research very differently. It can be seen from table 48 that the respondents who had research career interests perceive the PhD degree as significant, while respondents who had practitioner career interests perceive the general significance to their career and the significance of the PhD degree to be low. In conclusion, it appears that the respondents' career interests are more significant than the career consequences when analysing how significant the doctor's degree is perceived as being. Meanwhile, it is interesting to note that the perceived general significance of the PhD (21a) and the PhD degree (21e) correlate negatively with those who had practical career interests. There is good reason to believe that those interested in practitioner careers could spend their time more effectively with some other type of education than doctoral research. It might be an interesting future research topic to see how a second master's degree or MBA, for example, would correlate with perceived significance amongst practitioner oriented persons.

The next question asked is whether methodological choices result in differences in perceived significance. Three research approach types were found to be statistically significant, namely the approach of contributing to theory building, the actors' approach in the Arbnor & Bjerke model and the decision oriented approach in the Neilimo & Näsi model. These correlations are shown in table 49.

⁵¹ Question 17 was recoded so that disagreement was given negative values (-2=strongly disagree, -1=disagree), and agreement was given positive values in a similar way.

Table 49. Relation of research approach to authors' perceived significance of the research process (statistically insignificant results omitted for clarity)

	Spearman's rho	Theory building contrib.	A&B actors' approach	N&N decision oriented approach
(21a) How significant has your doctoral research been to your career generally	Correlation coefficient Sig. (2-tailed)	0,390 0,009		
(21b) How valuable have the skills and knowledge that you gained during the research process been to your career	Correlation coefficient Sig. (2-tailed)			
(21c) How valuable have the industry and research experience that you gained during the research process been to your career	Correlation coefficient Sig. (2-tailed)			-0,399 0,008
(21d) How valuable have the personal relationships that you developed during the research process been to your career?	Correlation coefficient Sig. (2-tailed)	0,383 0,011	-0,318 0,038	
(21e) How valuable has it been to your career to possess a doctors degree in logistics? (e.g. getting job offers, better salary, more credibility)	Correlation coefficient Sig. (2-tailed)	0,385 0,011		

It can be seen from table 49, that the approach of contributing to theory building is the only methodological choice that has a clear positive impact on several (21a, 21d and 21e) of the respondents' perceptions on the significance of their research process. Meanwhile, pragmatic-contribution or theory-testing contribution approaches did not show any statistically significant relations. Correlating the perceived significance with the Neilimo and Näsi and Arbnor and Bjerke approaches, it is not possible to say that some approach would have a noticeably positive impact on the perceived significance. However, the Arbnor and Bjerke actors' approach leads to negative correlation with the perceived significance of the relationships created during the research process. It may be that such researchers had exceptionally great expectations, and therefore chose an approach that typically leads to close co-operation with companies, and, once the project was over, the relationships did not prove as

significant as expected. Additionally, the Neilimo and Näsi decision oriented approach correlates negatively with the perceived significance of industry and research experience. This may be due to the highly analytical manner of the decision oriented approach, which typically concentrates on solving or investigating relatively narrow phenomena, and is therefore not easily applicable to situations that arise later in the career.

6.1.4.3 Post-doc research consequences

An impressive 84% of respondents say that they have been active in post doc research. The respondents were also asked which methods they had actively retained and abandoned in their post doc research. The replies to these two open-ended questions (questions 23 and 24) were then assessed to quantify the overall methodological loyalty, giving it values from one to five. Value three represents average loyalty, value 0 complete abandoning of the methodological approaches applied in the doctoral thesis and value 5 very high loyalty with the doctoral dissertation's methodology and research subject. The average value given to methodological loyalty is 4.1, meaning that it appears that the respondents are very loyal to their approaches. In practice, only one respondent who has shifted to another discipline says that he/she has abandoned the approach of the thesis. Most respondents only state that they have improved their understanding but built on the old methodological foundations, although some also state that they have abandoned some methods.

35 respondents replied to the question asking for particular areas of loyalty, and 27 respondents replied to the question asking for particular areas of disloyalty. Of the 35 respondents who replied to loyalty-related questions, 20 had applied primarily qualitative methods and 21 had applied primarily quantitative methods⁵². This distribution roughly follows that of the entire sample. The particular themes that arise from the responses for loyalty or disloyalty and the frequency of replies are presented in table 50.

⁵² Note that some of the authors have applied both quantitative and qualitative as primary methods, thus the sum is higher than the number of respondents.

Table 50. The number of authors that state a particular type of loyalty or disloyalty

Loyalty and disloyalty themes	Number of responses
Loyalty to quantitative methods	13
Loyalty to qualitative methods	19
Methodological approach loyalty	9
Topic loyalty	6
Framework loyalty	11
Disloyalty to quantitative methods	2
Disloyalty to qualitative methods	4
Topic disloyalty	1

As the respondents presented almost equally qualitative and quantitative methods in their dissertations, it is interesting to note that loyalty to qualitative methods (19 responses) appears higher than loyalty to quantitative methods (13 responses). Other areas that were mentioned as particular areas of loyalty are the utilisation of the theoretical and conceptual framework (11 responses), loyalty to methodological approaches (9 responses) and subject area (6 responses).

Most of the replies to the disloyalty questions were saying that nothing has been abandoned or that only additions to their methodological portfolio have been made. Consequently, disloyalty was identifiable only from the replies of seven authors, most of them stating that they had drifted away from qualitative methods (4 authors) or quantitative methods (2 authors). One author said that he/she had abandoned practically everything in the methodological approach due to a shift to another discipline. In conclusion, it appears that logistics PhDs are more prone to choosing qualitative methods to quantitative methods in the post doc research.

6.1.5 Personal dimension and methodological approach

The methodological approaches were discussed and analysed from a point of view of disciplinary development in chapter 5. The state of the logistics discipline is best described as pre-paradigmatic, and the social dependencies are weak. This setting effectively makes methodology very much a personal choice of the researcher, as the social environment and disciplinary practices are not as strong as in paradigmatically mature disciplines. As the methodological choices in the assessed dissertations are broad and varied, there must be something in the researcher's mind that contributes to

determining the methodological choices. A correlation matrix of an experimental analysis of these determinants is presented in appendix 9, showing that certain features in the motives and interests of the researcher are related to methodological choices.

The most obvious finding is that the linkages between motives and interests are statistically weak, even for those findings that pass the significance test. The following are statistically significant findings:

- The Arbner and Bjerke (A&B) Analytical approach correlates with the respondent opinion that disciplinary contribution is important
- The A&B systems approach correlates with the respondent interest in academic discussion.
- The A&B actors approach does not correlate significantly with any interest- and motivation-related variables.
- The Neilimo & Näsi (N&N) conceptual approach correlates with the respondent opinion that practical contribution is important and also with an interest in framework building.
- The N&N decision oriented approach correlates negatively with the respondents' interest in data collection. This may be indicative that the deterministic models that typically characterise such research have high requirements for data accuracy, and this may be difficult to achieve in reality.
- The N&N nomothetical approach correlates negatively with the respondent interest in building the theoretical framework and positively with the respondent interest in a researcher career.
- The N&N action oriented and constructive approaches do not correlate significantly with any of the interest- and motivation-related variables.

In the light of the above listed observations, it appears that researchers with a disciplinary focus have a tendency to conduct more positivistic research (A&B analytic and N&N nomothetical) and to add the holistic view by applying a systems approach. Meanwhile, researchers with a practitioner focus try to conceptualise the phenomena and build a theoretical framework. The A&B actors approach and N&N action oriented and constructive approaches are the most unpredictable, which do not correlate with the personal dimension of the research process.

6.2 Social dimensions in knowledge and application creation

6.2.1 Social dependency and certainty in logistics research

The perceived social influence of academic and practitioners alike was measured in the questionnaire using a 1-to-5 Likert scale⁵³. Overall, doctorates perceived high influence from both groups: academic influence averaged 3,488 (question 10a) and practitioner influence 3,186 (question 10b), indicating that doctoral research is a highly social effort.

The concepts of strategic and functional dependency between the researcher and the audiences, as well as the concepts of strategic and technical uncertainty are essential elements of Whitley's theory, as explained in chapter 3.1. According to this theory, the assumption is that an increase in dependency should reduce uncertainty, thus a mature discipline is characterised by high dependency and low uncertainty, resulting in a more effective, efficient and straightforward research process, which is motivating to the researcher. This assumption is investigated by using the correlation matrix presented in table 51, in which motivation (question 14) and certainty variables (questions 13a-b for strategic certainty and questions 13c-d for technical certainty) are checked for correlations with dependency variables (questions 10a-b, 11a-f & 12a-f). Overall dependency (questions 10a-b) are shown with a grey background, and the more detailed level (questions 11a-f & 12a-f) are presented in white. Significant correlations are in bold.

⁵³ 1=low, 5=high

- Influence from academics: question 10a
- Influence from practitioners: question 10b
- Academic strategic dependency: questions 11a, 11b and 11c
- Practitioner strategic dependency: questions 12a, 12b and 12c
- Academic functional dependency: questions 11d, 11e and 11f
- Practitioner functional dependency: questions 12d, 12e and 12f

Table 51. Correlations between dependency and certainty

		Academic influence on re- search (10a)	Practitioner influence on re- search (10b)	Academic strategic dependency (11a-c)	Academic functional dependency (11d-f)	Practitioner strategic dependency (12a-c)	Practitioner functional dependency (12d-f)
(13a) Assured of academic significance (academic strategic certainty)	Pearson	0,303	0,176	0,053	0,153	0,020	-0,067
	Correlation						
	Sig. (2- tailed)	0,046	0,252	0,736	0,329	0,902	0,683
(13b) Assured of practical significance (practical strategic certainty)	N	44	44	43	43	41	40
	Pearson	-0,071	0,550	-0,083	0,134	0,340	0,268
	Correlation						
(13c&d) Assured of method and analysis tools (technical certainty)	Sig. (2- tailed)	0,646	0,000	0,595	0,392	0,030	0,095
	N	44	44	43	43	41	40
	Pearson						
(14) Motivation maintenance	Correlation	0,187	0,247	-0,199	-0,008	0,096	0,168
	Sig. (2- tailed)	0,224	0,106	0,200	0,962	0,550	0,299
	N	44	44	43	43	41	40
(14) Motivation maintenance	Pearson	0,024	-0,038	-0,188	-0,132	0,293	0,056
	Correlation						
	Sig. (2- tailed)	0,875	0,809	0,227	0,398	0,063	0,731
(14) Motivation maintenance	N	44	44	43	43	41	40

As can be seen from table 51, the assumption that the influence of the reputational audience is related to uncertainty is true only to a certain extent. Academic influence makes researchers more assured of academic strategic significance, and practitioner influence makes researchers more assured of practical strategic significance. Interestingly, practitioner influence seems to have a stronger effect than academic influence. On the other hand, technical uncertainty and overall ability to maintain motivation over the research project seem unrelated to social influence. On a more detailed level (white area in table), the relation between dependency and uncertainty is limited only to strategic level practitioner discussion, increasing the researchers' confidence in practical strategic certainty. In conclusion, these findings are depressing to

the academic community, as the community seems unable to reduce researcher uncertainty. Further discussion on the problematic nature of academic discussion is presented in chapter 6.1.1, finding that the lack of academic discussion and supervision is perceived as an important reason for frustration and demotivation. Potentially improving the level of such discussion would help to reduce the uncertainty, but the present situation does not contribute enough to solving the uncertainty problem.

What then might increase the certainty of the researcher, making his/her research more productive and the research process less painful? Strategic certainty variables (questions 13a, 13b) and technical certainty variables (questions 13c and 13d) were averaged out to further investigate the importance of certainty in the research process, by comparing the respondents' interests (questions 16a-k) and contribution approaches (assessed in the in-depth analyses). The statistically significant findings are illustrated in table 52.

Table 52. Researcher certainty correlations

		Strategic Certainty (13a&b)	Technical Certainty (13c&d)
Strategic Certainty (13a&b)	Pearson Correlation Sig. (2-tailed)	1	0,579 0,000
Technical Certainty (13c&d)	Pearson Correlation Sig. (2-tailed)	0,579 0,000	1
Motivation in writing the thesis (16f)	Pearson Correlation Sig. (2-tailed)	0,349 0,020	0,016 0,919
Motivation in article writing (16i)	Pearson Correlation Sig. (2-tailed)	0,321 0,034	0,281 0,064
Theory testing contribution	Spearman correlation Coefficient Sig. (2-tailed)	-0,465 0,001	-0,213 0,165

Table 52 indicates that levels of strategic and technical certainty are highly interrelated. It may be that the perception of certainty is highly subjective, and some individuals simply experience more certainty than others in both types, or the other possibility exists that there truly is a causal relation between strategic and technical certainty. The information that is available does not provide a means exhaustively to investigate such a causal relation, but merely

shows that mastering research methods and tools is likely to covariate positively with strategic certainty. Researchers who wish to be as certain as possible should choose a practical topic, liaise with practitioners for discussion and also develop their skills in using analysis methods and tools. Strategic certainty is a highly desirable quality for the researcher to possess, as it increases the motivation to present results through writing the text of the thesis (question 16f) and writing articles and conference papers (question 16i). This means that high strategic certainty pays off in the final stages of the research, by increasing the writer's motivation to present the results to audiences. Strategic certainty correlates negatively with the researcher's tendency to contribute to theory testing. It may be that researchers who are uncertain about the strategic choices of their research may comfort themselves by testing existing theories, hypotheses and ideas. This approach inherently includes fewer strategic choices than theory generating or pragmatic research.

6.2.2 Influential individuals and their effect on motives and methodological choices – academic dependency

The 44 respondents of the survey had a total of 31 supervisors, which is a high number and indicates again the fragmented nature of the discipline. In many cases, the respondents had more than one supervisor. Only 11 supervisors supervised more one dissertation and they are listed in table 53, together with the authors whom they have supervised.

Table 53. Most active supervisors

Supervisor	Univ.	Author 1	Author 2	Author 3	Author 4	Author 5
Mats Abrahamsson	Lin-köping	Håkan Aronsson	Dan Andersson			
Sven Axsätter	Lund	Jonas Andersson	Johan Marklund			
Eero Eloranta	HUT	Juha-Matti Lehtonen	Kari Tanskanen	Ilkka Töyrylä	Jussi Heikkilä	
Jan Holmström	HUT	Mikko Punakivi	Vesa Kämäräinen			
Everth Larsson	Lund	Anders Ljungberg	Stefan Holmberg	Dag Näslund		
Kenth Lumsden	Chalmers	Roger Lindau	John Wedel	Lars Hulten	Jonas Waidringer	
Lauri Ojala	TSE	Tero Seppälä	Per-Olof Brehmer			
Lars Sjöstedt	Chalmers	Marianne Jahre	Magnus Blinge	Johan Woxenius	Stig Franzen	Birgitta Öjmertz
Kari Tanskanen	HUT	Mikko Punakivi	Hannu Yrjölä	Vesa Kämäräinen		
Ari Vepsäläinen	HSE	Markku Tinnilä	Aimo Inkiläinen	Virpi Tuunainen	Erkki Hä-mäläinen	
Sten Wandel	Lin-köping	Håkan Aronsson	Per-Olof Brehmer	Dan Andersson		

Looking solely at the supervisors is not the best approach for establishing who has had the greatest impact on the authors' dissertations. Therefore, the authors were asked to name all academics who have had a significant influence on their dissertations. The total list is presented in appendix 7, and shows 70 influential individuals (questions 5a-c). This list also shows high fragmentation of the discipline, as there are only 16 individuals who were named by at least two authors. These are presented in table 54.

Table 54. Influential academics and the respondents who mention them

Name	Univ.	Respondent 1	Respondent 2	Respondent 3	Respondent 4	Respondent 5	Respondent 6	Respondent 7
Mats Abrahamsson	Lin-köping	Håkan Aronsson	Dan Andersson	Lauri Ojala				
Sven Axsätter	Lund	Jonas Andersson	Johan Marklund					
Eero Eloranta	HUT	Juha-Matti Lehtonen	Kari Tanskanen	Ilkka Töyrylä	Jussi Heikkilä	Mikko Punakivi	Ulla Seppälä	
Ari-Pekka Hameri	HUT	Ulla Seppälä	Vesa Kämäräinen					
Jan Holmström	HUT	Mikko Punakivi	Vesa Kämäräinen	Hannu Yrjölä	Juha-Matti Lehtonen			
Karin Holstius	TSE	Lauri Ojala	Jari Juga					
Everth Larsson	Lund	Anders Ljungberg	Stefan Holmberg	Dag Näslund				
Kentth Lumsden	Chalmers	Roger Lindau	John Wedel	Lars Hulten	Jonas Waidringer			
Lauri Ojala	TSE	Tero Seppälä	Per-Olof Brehmer	Stefan Holmberg				
Jukka Ranta	HUT	Ulla Seppälä	Jussi Heikkilä					
Timo Saarinen	HSE	Virpi Tuunainen	Markku Tinnilä					
Lars Sjöstedt	Chalmers	Marianne Jahre	Magnus Blinge	Johan Woxenius	Stig Franzen	Birgitta Öjmertz	Per-Olof Brehmer	Lars Hultén
Jorma Taina	TSE	Jari Juga	Kari Jalkanen					
Kari Tanskanen	HUT	Mikko Punakivi	Hannu Yrjölä	Vesa Kämäräinen				
Ari Vepsäläinen	HSE	Markku Tinnilä	Aimo Inkiäinen	Virpi Tuunainen	Erkki Hämäläinen			
Sten Wandel	Lin-köping	Håkan Aronsson	Per-Olof Brehmer	Dan Andersson	Lauri Ojala	Richard Lehtola		

Looking at the most influential individuals in table 54, it is noticeable that the most influential academics are, with very few exceptions⁵⁴, from the same university as the author. This indicates that there is no regular interaction between the universities, which would allow schools of thought to emerge in the doctoral research process and methodologies. Instead, the schools of thought that emerge around influential individuals are almost a synonym for schools of thought that emerge in each university. This finding is also supported by in-depth analysis of the dissertations, which indicates that Chalmers, HUT, Linköping, LUT, and two schools from Lund have some specific characteristics of their own.

The influential individuals are likely to have a far-reaching influence on the research choices, motivation and interest areas of the authors. Testing these influences with the small sample size used in this study is limited, but some correlations are identifiable between influential persons and contribution approaches. The statistically significant correlations are presented in table 55.

Table 55. Correlations of the influential individuals and contribution

Name	Univ.	Theory testing	Theory building	Practical
Mats Abrahamsson	Linköping			
Sven Axsätter	Lund			-0,316
Eero Eloranta	HUT			
Ari-Pekka Hameri	HUT			0,274
Jan Holmström	HUT			
Karin Holstius	TSE			
Everth Larsson	Lund	-0,300		
Kenth Lumsden	Chalmers			-0,357
Lauri Ojala	TSE			
Jukka Ranta	HUT			0,274
Timo Saarinen	HSE			
Lars Sjöstedt	Chalmers		0,344	
Jorma Taina	TSE		-0,299	
Kari Tanskanen	HUT			0,339
Ari Vepsäläinen	HSE			
Sten Wandel	Linköping			

⁵⁴ Exceptions: Per-Olof Brehmer of Linköping names Lars Sjöstedt of Chalmers, Kari Jalkanen of the University of Turku names Jorma Taina of the Turku School of Economics (Jorma Taina, however, had a previous posting at the same institute at the University of Turku), Lauri Ojala of the Turku School of Economics and Richard Lehtola of the Tampere University of Technology name Sten Wandel of Linköping.

The most interesting finding from table 55 is the correlation between the influential individuals from the Helsinki University of Technology with a practical contribution. Meanwhile, none of the influential individuals seems to have a significant positive correlation with theory testing to support a positivistic school in logistics, and Lars Sjöstedt appears to be the only person to have a statistically significant positive correlation with theory building. In conclusion, researchers who are mainly interested in generating a practical contribution might do well to consider associating with some of the influential individuals from the Helsinki University of Technology, but there are no influential individuals who could help the positivistic theory-testing researcher.

6.2.3 Literature reference analysis

6.2.3.1 General tendencies in using literature

The method and the background of the literature reference analysis are explained in chapter 4.2.2. This analysis was initially started as a separate analysis, and the complete database that is analysed below was collected over three projects in 1999, 2003 and 2006. The literature reference database includes over 12,172 references from 76 Nordic dissertations. As was explained in chapter 4.2.2, the database is more extensive than the empirical evidence used in other sections of this research. It was decided to use the entire sample, as it provides a broader view of Nordic doctoral dissertations. However, in analyses where the literature usage is linked to variables that were measured either by the in-depth analyses of the dissertations or the survey, the sample is narrowed to include only the literature references of the 54 dissertations analysed. The reference database is presented mainly descriptively, and serves the purpose of offering further empirical evidence that the discipline of logistics research is fragmented. Discussions are presented on the literature that serves as the backbone of logistics research, and how the approaches to and standards of literature usage vary between authors.

Figure 21 illustrates the number of references used by each dissertation, and the standard deviation for the age of the references. Figure 21 includes all references that were presented in the reference list of the main texts and the papers that were appended in the same volume with the main text. It does not include any references presented in separate volumes, such as Licentiate theses or separate appendices.

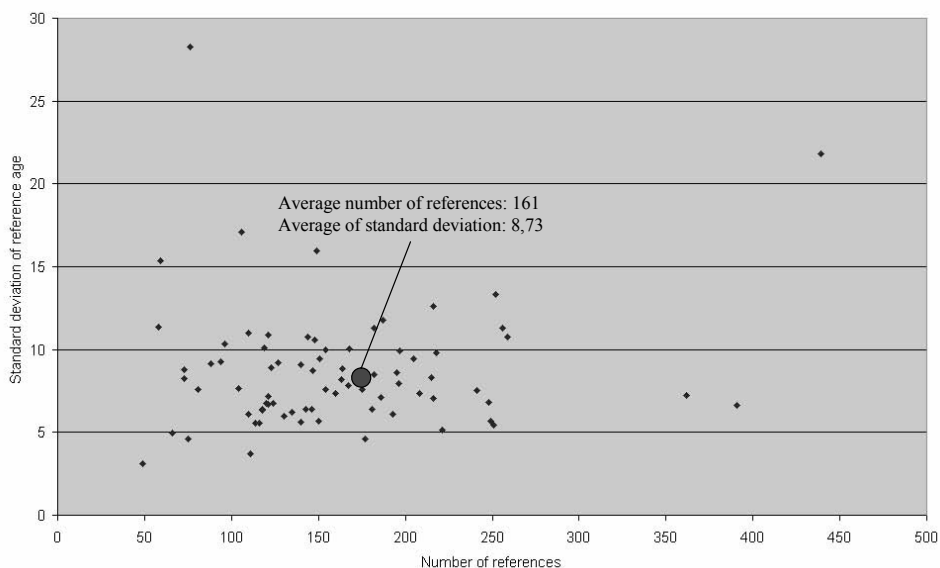


Figure 21. Number of literature references and standard deviation of the age of references in each dissertation

Figure 21 is congested due to the large number of dissertations. A more detailed table with the positioning of each dissertation is presented in appendix 8. As can be seen from the figure, the “performance standards” where most dissertations are positioned is easily visible as the most crowded area. However, there are large variations in the number of references as well as the standard deviation in the age of the references that authors give. A high number combined with a highly deviating reference age is an indication of a thorough literature analysis, extending to various topics and including a review of the history of the topic. Appendix 8 also shows the average ages of the references for each dissertation, which varies from less than 4 years to almost 20 years. The total average of the reference ages in the entire sample is 9.2 years.

When investigating reference usage, it must be borne in mind that the topics of the dissertations are very different: the dissertations of Ojala or Jalkanen, for example, rely heavily on very new literature sources for their empirical evidence. This approach easily generates a much more extensive reference list than research in which references are used mainly to formulate the framework of the study, and in which empirical evidence is collected elsewhere. For some

reason it appears that the number of references increases noticeably when the scale of the research topic grows from nano- towards macro-topics.⁵⁵ Another interesting finding is that research that applies primarily quantitative methods uses fewer references than qualitative research.⁵⁶

As explained in chapter 4.2.2, references were categorised into academic journals (JOA), trade journals (JOT), textbooks (TEX), working papers (WOR), thesis (THE), other published material (OTP) and other unpublished material categories (OTU). Each individual journal (JOA and JOT) is considered as an academic or trade journal, as shown in appendix 5. The detailed reference usages by author are presented in appendix 8, and table 56 simplifies this presentation into simple academic and non-academic references.

Table 56. References in each reference category for each author

Author	Academic JOA, THE, WOR	Non-academic JOT, TEX, OTP	Other OTU
Abrahamsson, Mats	41 %	56 %	3 %
Adjadjihouc, Christian	59 %	41 %	0 %
Andersson, Dan	79 %	21 %	0 %
Andersson, Jonas	90 %	10 %	0 %
Aronsson, Håkan	54 %	46 %	0 %
Berglund, Mats	56 %	44 %	0 %
Blinge, Magnus	39 %	61 %	0 %
Brehmer, Per-Olof	55 %	45 %	0 %
Huge Brodin, Maria	66 %	34 %	0 %
Carlsson Jan	35 %	61 %	5 %
Dreyer, Heidi	45 %	55 %	0 %
Enarsson, Leif	32 %	68 %	0 %
Franzén, Stig	49 %	51 %	0 %
Freytag, Per	31 %	68 %	1 %
Füßel, Lanni	45 %	51 %	4 %
Gammelgaard, Britta	25 %	74 %	1 %
Gjesing-Hansen, Leif	31 %	69 %	1 %
Hagman, Thore	38 %	57 %	5 %
Heikkilä, Jussi	57 %	41 %	1 %
Hellberg, Roland	42 %	56 %	2 %
Helo, Petri	74 %	26 %	1 %
Hilmola, Olli-Pekka	79 %	21 %	0 %
Holmber, Stefan	54 %	46 %	0 %
Holmström Jan	54 %	41 %	5 %

⁵⁵ The average number of references are: nano-topics: 126 (n=12), micro-topics: 149 (n=18), meso-topics: 158 (n=21), macro-topics: 164 (n=3)

⁵⁶ Quantitative dissertations had on average 130 literature references, and qualitative dissertations had on average 162 literature references.

Author	JOA, THE, WOR	JOT, TEX, OTP	OTU
Hultén, Lars	53 %	47 %	0 %
Hämäläinen, Erkki	12 %	67 %	21 %
Inkiläinen, Aimo	74 %	24 %	2 %
Jahre, Marianne	35 %	64 %	1 %
Jalkanen, Kari	45 %	51 %	4 %
Janhunen, Antero	43 %	57 %	1 %
Jansen, Karl	58 %	38 %	4 %
Johnsson, Mats	35 %	64 %	2 %
Jonsson, Patrik	16 %	84 %	0 %
Juga, Jari	57 %	43 %	0 %
Juhantila, Olli-Pekka	49 %	49 %	2 %
Kalsaas, Bo Terje	39 %	56 %	4 %
Kaski, Timo	76 %	21 %	3 %
Kornum, Nils	40 %	60 %	0 %
Korpela, Jukka	66 %	34 %	0 %
Kämäräinen, Vesa	51 %	40 %	9 %
Lehmusvaara, Antti	73 %	26 %	1 %
Lehtinen, Ulla	51 %	48 %	1 %
Lehtola, Richard	52 %	48 %	0 %
Lehtonen, Juha-Matti	55 %	45 %	0 %
Lindau, Roger	55 %	45 %	0 %
Ljungberg, Anders	20 %	80 %	0 %
Lysgaard, Jens	73 %	27 %	0 %
Marcussen, Carl Henrik	61 %	37 %	1 %
Marklund, Johan	93 %	7 %	0 %
Medbo, Lars	49 %	51 %	0 %
Møller, Charles	41 %	56 %	2 %
Näslund, Dag	60 %	40 %	0 %
Nørby, Merete	15 %	81 %	4 %
Norrman, Andreas	67 %	33 %	0 %
Ojala, Lauri	55 %	42 %	3 %
Öjmertz, Birgitta	61 %	39 %	0 %
Petzäll, Jan	52 %	47 %	1 %
Pirttilä, Timo	14 %	84 %	2 %
Punakivi, Mikko	43 %	47 %	11 %
Ranta, Tapio	76 %	24 %	0 %
Sarv, Hans	62 %	38 %	1 %
Seppälä, Tero	75 %	23 %	2 %
Seppälä, Ulla	70 %	29 %	1 %
Seristö, Hannu	53 %	40 %	7 %
Spens, Karen	52 %	38 %	10 %
Stentoft Arlbjörn, Jan	38 %	55 %	7 %
Svensson, Göran	52 %	48 %	0 %
Tanskanen, Kari	49 %	51 %	0 %
Tinnilä, Markku	57 %	43 %	0 %
Tuunainen, Virpi	60 %	35 %	5 %
Töyrylä, Ilkka	35 %	65 %	0 %
Virolainen, Veli-Matti	66 %	9 %	25 %
Waidringer, Jonas	57 %	42 %	1 %

Author	JOA, THE, WOR	JOT, TEX, OTP	OTU
Wedel, John E.	27 %	71 %	2 %
Woxenius, Johan	40 %	57 %	3 %
Yrjölä, Hannu	32 %	61 %	7 %
Avg share of ref type	51 %	47 %	2 %

As can be seen from table 56, academic and non-academic references are used in about the same quantities as in the total sample (51% academic and 47% non-academic), which indicates once more that logistics research is very applied and non-disciplinary influence is important.

6.2.3.2 Distinctive characteristics of academic and non-academic reference usage

The traits in utilising academic and non-academic references are reflected in the methodological choices of the dissertations. First, it appears that quantitative and qualitative references are utilised in different quantities, and also that the utilisation traits of academic and non-academic references differ, as shown in table 57.

Table 57. References utilisation traits in quantitative and qualitative research

	References	Academic %	Non-academic %
Quantitative	141,7	60%	40%
Qualitative	162,1	50%	50%

It appears from table 57 that qualitative research uses more references than quantitative. Simultaneously, quantitative research is more academic in its reference utilisation, as 60% of references in quantitative research are academic, compared to 50% of references in qualitative research. These findings are not surprising, considering the often narrative nature of qualitative research.

A further analysis was done to investigate the statistically significant differences in utilising academic and non-academic references with different methodological choices. Table 58 shows the significant correlation of this analysis.

Table 58. The correlations between reference usage and methodological approach (Pearson's correlations)

		Academic references percentage	Non-academic references percentage
Quantitative	Correlation	0,323	-0,320
	Sig. (2-tailed)	0,017	0,018
Qualitative	Correlation	-0,387	0,386
	Sig. (2-tailed)	0,004	0,004
Framework openness	Correlation	-0,343	0,339
	Sig. (2-tailed)	0,011	0,012
A&B analytical approach	Correlation	0,336	-0,331
	Sig. (2-tailed)	0,013	0,014
A&B actors' approach	Correlation	-0,333	0,327
	Sig. (2-tailed)	0,014	0,016
N&N decision oriented	Correlation	0,301	-0,299
	Sig. (2-tailed)	0,027	0,028
N&N_action oriented	Correlation	-0,320	0,316
	Sig. (2-tailed)	0,018	0,020

All the findings in table 58 prove a difference in reference utilisation between the positivistic and hermeneutic research approaches. The correlation analysis of table 58 proves that the traits in utilising academic and non-academic references differently in quantitative and qualitative research are statistically significant. Research with open-ended frameworks tends to utilise more non-academic references than research with predetermined frameworks, as is the case for the Arbnor & Bjerke actors' approach and the Neilimo & Näsi action oriented approach. Meanwhile, the more positivistic manners of the Arbnor & Bjerke analytical approach and the Neilimo & Näsi decision oriented approach have a tendency to use more academic references.

Practitioner oriented research utilises on average more references than disciplinary oriented, and applies more qualitative methods and hermeneutic methods than disciplinary oriented research. Open-ended frameworks are characterised by more references than predetermined frameworks, and they tend to be more non-academic than with predetermined frameworks. Based on these findings, it appears that the typically positivist research, characterised by quantitative methods and predetermined frameworks, directs the researcher to stick more strictly to fewer academic references. It seems that discipline oriented research is on average more positivistic and quantitative than practically oriented research. Although the approach of this study does not allow for causal analysis, it might be a valid hypothesis for future research that non-positivist research approaches are caused by practically oriented endeavours.

Encouraged by the above findings that the reference utilisation might be significantly linked to methodological choice, an experimental analysis was

conducted to investigate whether linkages between reference utilisation and the personal and social dimensions of the research process also exist. The significant correlations are presented in table 59.

Table 59. Statistically significant correlations with the reference types

		Academic references percentage	Non-academic references percentage
(9a) Years of work experience before research	Pearson Correlation Sig. (2-tailed)	-0,297 0,048	0,297 0,047
(10b) Practitioner influence on research	Pearson Correlation Sig. (2-tailed)	-0,300 0,048	0,301 0,047
(13b) Assured of practical significance	Pearson Correlation Sig. (2-tailed)	-0,427 0,004	0,428 0,004
(14) Motivation maintenance in general	Pearson Correlation Sig. (2-tailed)	0,367 0,014	-0,366 0,015
(15a) Disciplinary contribution important	Pearson Correlation Sig. (2-tailed)	0,315 0,037	-0,313 0,039
(15b) Practical contribution important	Pearson Correlation Sig. (2-tailed)	-0,428 0,004	0,428 0,004
(16c) Interested in collecting data	Pearson Correlation Sig. (2-tailed)	-0,306 0,044	0,304 0,045
(16k) Interested in practitioner discussion	Pearson Correlation Sig. (2-tailed)	-0,357 0,017	0,353 0,019
(13a-b) Strategic Certainty	Pearson Correlation Sig. (2-tailed)	-0,323 0,032	0,323 0,033

The findings in table 59 support the conclusions made in analysing the personal and social levels of the research process. In particular, there are clear indications that practitioner- and discipline-oriented research also differ in reference utilisation. In more detail, the findings from the correlation analysis are as follows:

- 1 Work experience as a practitioner (9a) and influence from practitioners (10b) correlate negatively with utilisation of academic references, while there is no significant correlation with influence from academics.

Furthermore, researchers with a tendency to utilise non-academic references are practically oriented in their contribution efforts to the research. They consider that practical contribution (15b) is important, and are assured of the practical relevance (13b) of their research, while utilisation of academic references indicates that the researcher considers that disciplinary contribution (15a) is important. As such, the favouring of academic over non-academic references is a strong indicator that the researcher considers disciplinary contribution more valuable and important than practical contribution. Interestingly, the utilisation of academic reference does not correlate significantly with the interest of the researcher in discussing with other academics, while the utilisation of non-academic references does correlate with the researcher's interest in discussing with practitioners (16k). This may be an indicator that academically oriented researchers have more introverted personalities and have a tendency to use written sources of information, while practically oriented researchers also find information in discussions, which would appear a natural way to ensure practical significance.

- 2 As also indicated in the previous chapters, strategic certainty is stronger with practically oriented than disciplinary oriented researchers, and the same finding is enforced by correlations with reference utilisation. This means that the utilisation of non-academic references indicates practical orientation and higher strategic certainty (13b).
- 3 Researchers who use more academic references are also more interested in studying previous research. Meanwhile, researchers who use more non-academic references are less interested in reading previous research and are more interested in collecting data (16c) and discussing with practitioners (16k). However, motivation maintenance (14) correlates negatively with the utilisation of non-academic references and positively with utilisation of academic references. This finding cannot be concluded with certainty, but it may indicate that the research process is guided by disciplinary expectations, which the practically oriented researchers find demotivating, as they would prefer to focus more on the practical aspects of the research.

6.2.3.3 Most cited authors

The reference database includes a total of 12,172 reference entries from 9,805 publications, written by 5,262 authors. 3,345 (64%) authors appear only once in the database and 1,063 (20%) appear two to three times. As such, 84% of the authors listed in the literature database of 76 dissertations appear a

maximum of three times, which could appear as very sporadic and arbitrary. Although logistics researchers generally use references rather arbitrarily, there are some frequently cited authors who may be seen as pioneers in formulating the logistics discipline. 41 authors appear more than 20 times in the database, totalling 1,515 (12,5%) of the reference entries. Figure 22 shows the most frequently cited authors.

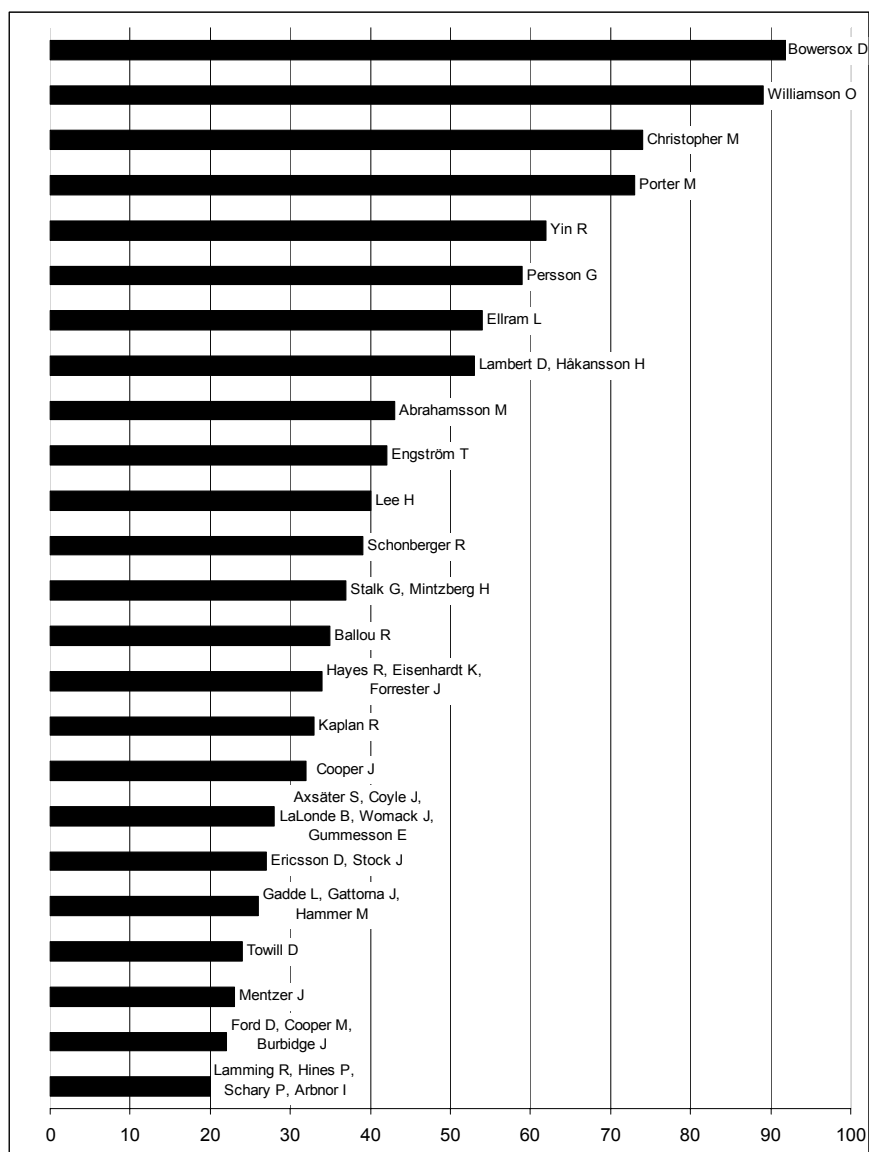


Figure 22. The 41 authors appearing 20 or more times in the reference database and their frequency of appearance

Figure 22 indicates that certain logisticians and non-logisticians form the literature backbone in the investigated dissertations. As many of the most cited authors are not logisticians, these findings reinforce the understanding that, on its own, the logistics discipline lacks strong theoretical foundations, and is not self-sufficient in literature usage, being instead a very applied discipline with much of its roots in other disciplines. The following discussion deals with the authors that appear 40 or more times in the database:

The most frequently emerging author is D. Bowersox with 34 publications, approximately half of which are journal articles and half textbooks, most of which were published in the 1980s. Generally Bowersox is a 'generalist' of the discipline and famous mainly for textbooks that most logistics students study as part of their undergraduate studies. He can therefore not be considered an author who drives logistics towards distinguishable paradigmatic development.

It is more interesting to investigate which authors have provided theoretical or methodological perspectives that might guide the logistics discipline in specific directions. O. Williamson, the second most frequently emerging author in the database, is such an author. As Williamson is associated with the transaction costs theory, his frequent appearance incidence is a clear indicator that the transaction costs theory is widely applied in logistics.

M. Christopher and M. Porter share the third position. Christopher is mostly represented in the database by numerous textbooks and some academic and trade journal articles, mainly in the areas of distribution, effectiveness and strategic nature of logistics, but without a really identifiable strong theoretical foundation. Porter is a well-known author who discusses the roots of competitive advantage, which is at the core of any business-related discipline. These publications are often classical examples in business literature, and the most recent publication from Porter in the database is from 1996.

R. Yin is a well-known author in case-study research methods, the topic of all his publications in the database. As such, Yin can be seen as the dominant author when research methods in the dissertations are considered.

G. Persson is the most frequently emerging Nordic author, with a variety of textbooks, articles and working papers, mainly discussing materials management and the role of logistics in the competitiveness of companies. Many of the publications are written in Swedish and, not surprisingly, these publications are mainly used as a literature reference by Swedish authors. Only three Finnish authors refer to Persson, who therefore emerges mainly as a nationally important author in Sweden.

Ellram is the first North American logistics author to be renowned for research in supply chain management and purchasing. Lambert, also a North American logistics author, is the first to be seen as representing the Council of

Supply Chain Management Professionals (Council of Logistics Management) approach, which is also considered an influential organisation by Nordic logistics researchers. Lambert's publications range over a long time period and a variety of topics, including supply chain management.

Håkansson is an author best known for works in relationship marketing and the industrial marketing and purchasing (IMP) school, which can be seen to some extent as a counterpart of Nofoma in the marketing discipline of Nordic countries. It seems that many of the ideas discussed in the IMP school are closely related to logistics, and there is some convergence between the schools of thought.

M Abrahamsson, a Swedish author, has 18 publications, most of which are from the late 80's or mid 90's in the field of time-based distribution. Although he has not had any recent publications, his work in distribution-related research is influential, as is research from the Linköping School of Technology in general.

Ensgtröm is a Swedish author with a large number of publications in industrial production, and is therefore the most frequently cited author on production systems, followed closely by Schonberger with a similar background and approach. Hau Lee is a supply chain management and industrial dynamics author from Stanford University.

It is interesting to note that there are several Swedish authors in the list of the most frequently emerging authors, but no Finnish or other Nordic authors make it on to this list.

The above analysis approach was chosen as the main presentation format because a similar analysis was presented in Vafidis (2002), and continuity in approach was considered important. The other alternative to investigating the emerging authors is to see how many of the dissertations refer to any of the reference authors. The strength of this approach is that it eliminates the possibility of overemphasising specific authors just because a few dissertations refer to them in great numbers. Table 60 presents the authors who are referred to in ten or more dissertations. This is an indication of how widely known the authors are.

Table 60. The number of dissertations that refer to any of the reference authors' publications.

Author	Count	Author	Count	Author	Count
Yin R	51	Coase R	16	Hall R	12
Bowersox D	41	Hayes R	16	Kaplan R	12
Porter M	39	Lee H	16	Lamming R	12
Christopher M	35	Mentzer J	16	Novack R	12
Lambert D	32	Checkland P	15	Prahalad C	12
Stalk G	29	Eisenhardt K	15	Storhagen N	12
Williamson O	27	Schary P	15	Andersson P	11
Ballou R	26	Towill D	15	Churchman C	11
Coyle J	26	Gadde L	14	Kuhn T	11
Ellram L	23	O'Laughlin K	14	Monden Y	11
Persson G	23	Senge P	14	Simon H	11
Cooper J	22	Shapiro R	14	Stern L	11
Schonberger R	22	Andersson D	13	Thorelli H	11
Forrester J	21	Ericsson D	13	Byrne P	10
Håkansson H	20	Houlihan J	13	Fisher M	10
Stock J	20	Johanson J	13	Gits C	10
Womack J	20	Kasanen E	13	Holmström J	10
Abrahamsson M	19	Kotler P	13	Jarillo J	10
Arbner I	19	McKinnon A	13	Magee J	10
Gattorna J	19	Miles M	13	Sarv H	10
LaLonde B	19	Pfeffer J	13	Shingo S	10
Mintzberg H	19	Axelsson B	12	Skjött-Larsen T	10
Gummesson E	18	Chandler A	12	Slack N	10
Hammer M	18	Eisenhardt K	12	Wandel S	10
Cooper M	17	Ford D	12		

It can be noted from table 60 that the names of authors that are cited in the largest numbers are mostly – but not entirely – similar to those presented in figure 21. Looking at the Nordic authors, S. Axsäter, who had 28 references in the total database, is not found on table 60, appearing in only 4 dissertations. Axsäter is clearly an operations analysis author, and used as reference by his own doctoral students. Engström too, who had strong representation of 42

references in figure 21, suffers the same fate, with references to his work found only in 6 dissertations. In the case of more international authors, it seems that the names of Kaplan, Ford, Burbidge, Lamming and Hines do not appear in table 60. However, they are still relatively well-known, as each of these authors appears in 8 to 9 dissertations.

Other interesting findings in the table are that R. Yin, a major author in case study research methods, is cited in 51 dissertations and appears the best known author within the sample. The emergence of R. Coase was not identified in figure 21, but appears to be quite well-known with citations in 16 dissertations, which further strengthens the impression that transaction costs theory is central to logistics research.

The emergence of certain “gurus” or authors of profound and seminal texts would indicate an increase in the discipline’s dependence. The reference usage in logistics is mainly fragmented, and the most cited and best known authors are typically generalists. However, the emergence of authors such as Williamson (transaction cost theory), Forrester (industrial dynamics) or Håkansson (IMP school and network approach) indicate that certain theoretical or conceptual approaches have emerged to form theoretical and conceptual thinking in the discipline. Additionally, the case study research methods dominated by Yin’s writings are at the core of Finnish and Swedish logistics research.

7 CONCLUSIONS AND SUMMARY

7.1 Conclusions

Detailed conclusions related to the methodological, social and personal levels in the knowledge and application generation process are presented in chapters 5 and 6, along with the analyses. This chapter concentrates on presenting the conclusions concerning the entire knowledge and application creation process as a whole, in which two potential demarcation lines appear in the development of logistic research traditions towards paradigmatic disciplines:

- Methodological choices on positivistic vs. hermeneutic ideals, both being valid scientific approaches, but which are found in different paradigms in the case of mature sciences.
- Approach toward disciplinary vs. practitioner contribution, the first being more geared towards the creation of knowledge, and the latter being more explicitly a creation of practical applications.

The positivistic vs. hermeneutic demarcation in logistics exists so that research can be conducted at both ends. It appears, however, that the mainstream of logistics research is conducted between the extreme ends of the continuum, utilising an approach called the systems approach. This approach attempts to reach a holistic understanding of the whole system, yet is capable of selecting individual parts of the system for analysis. Although the systems approach appears dominant and offers a compromise between the approaches that many researchers find satisfactory, a significant amount of purely positivistic or hermeneutic research is still conducted in logistics, and the battle between the approaches is far from complete.

The approach that a research project adopts to serving disciplinary or practical audiences has a very significant relationship with the perceived significance of the research. The researcher's background and career interests seem to influence this choice as well, and, surprisingly, many doctoral students link their research to a practical background and/or have practically oriented career interests. As such, the pragmatic approach is strong in logistics research, which is likely to drive methodological discussion and choices into marginalised positions, and to focus efforts on finding practically applicable solutions by any means that seem applicable. However, it seems that practically oriented researchers perceive that their research consequences have not been as significant as for those who are discipline oriented. It was beyond

the scope of this study to investigate why practically oriented people chose to pursue a doctor's degree over, say, an MBA. Possibly the perceived status associated with a doctor's degree, the financing possibilities, and overall cultural values and norms direct ambitious people to conduct doctoral research. Unfortunately this trait, where very diverse interests of researchers must be accommodated, disturbs the discipline's development towards a paradigmatic state, but, on the other hand, it keeps logistics research linked to practically relevant research that supports the economy and industries.

It is noticeable that the method dimension (quantitative vs. qualitative) is excluded from the above list of potential demarcation lines. This is not to say that the choice of methods is insignificant, as it can be very significant depending on the interests or orientation of individual researchers. However, the technical dependency related to methods seems very immature at the moment. There are situations when quantitative methods are favoured over qualitative. For example, operations analysis and theory-testing research favours quantitative methods. However, logistics research cannot be solely based on a theory-testing approach, as the theoretical foundations are still undeveloped and many research projects focus more on theory building, which can be approached with either qualitative or quantitative methods. As there is no way of saying when either method makes a better choice, researchers seem to be on their own when they face the decision on method choices.

The main lessons learned from the individual researcher's point of view are that personal motives and career interest should not be underestimated. A personal assessment of whether one is interested in an academic or practical career, and whether these purposes are better served by disciplinary theory testing, theory building or practical contribution should be translated into careful selection of a methodological approach. The positivistic-hermeneutic approaches do bring expected results in relation to theory testing or theory building, with the positivist tradition being more related to theory testing and the hermeneutic approach more to theory building. Meanwhile, the positivist-hermeneutic dimension does not work well in relation to practical contribution. This could be expected as the methodological discussion is based on disciplinary interests and should also be accommodated in such things as post-graduate methodology courses. Practical contribution appears to be most noticeably related to the constructive approach, which, on the other hand, is often disciplinary handicapped due to typically vague theoretical foundations of such research. Influential individuals also emerge who can be related to different contribution approaches – most notably the Helsinki University of Technology has several scholars who relate to practically oriented research contribution. However, the orientation of schools of thoughts is far from

mature and clear, as is a novice researcher's decision criteria concerning from where to conduct research.

It is surprising that practitioner career interests are stronger than academic career interests amongst the respondents, which suggests that the reputational system based on purely academic merits is weak, and that logisticians find it more rewarding to serve more practical purposes. It is beyond the scope of this study to answer why this is so, but the implications for doctoral education could be dramatic: either doctoral education has to address these interests more strongly and take pragmatic requirements better into account, or doctoral research should become more clearly a path to academic careers, and practically oriented research ambitions should be directed to other types of education. Strong relationships with practical life characterise logistics research in most cases. However, it seems that novice researchers are insecure about committing their efforts to serving purely practical purposes, since it is the academic interest groups that can either accept or reject the proposed dissertation. The limitations placed by academic interests are quite open, as there are obviously several acceptable approaches and theories that can be applied in an accepted dissertation. Even dissertations that focus purely on applying various sub-theory models to situational cases are considered as legitimate dissertations, as long as they bring some practical contribution or generalisation. In other words, theoretical development or presence seems not to have been a strict requirement in Nordic logistics research.

Thus, Nordic logistics research still remains in its infant, pre-paradigmatic and scattered stage, where research documents appear more like individual reports than an accumulation of a knowledge-creation and methodological tradition. This leaves researchers uncertain, but, on the other hand, allows for great freedom of choice. The side effect of this freedom is that strategic and task certainty may suffer, although, due to the "anything goes" state of the discipline, the results are unlikely to be a total rejection of the research. Many researchers apply this freedom – combined with uncertainty of academic expectations – by directing their research to serve practitioners. The benefit of this is that Nordic logistics researchers cover a wide range of practically relevant problem-solving topics. This approach should be conducted in close collaboration with companies, which also opens opportunities for private financing and improved job opportunities in the industry. At the moment, however, there is something wrong with the realisation of job opportunities, as practically oriented researchers are not very satisfied with the career consequences of their research. Although practically oriented research improves the certainty of the researcher during the research process, practical career choices leave the researcher feeling that the whole process was less significant than for those who have an academic career. This calls for further

development of the practical research stream. Another pitfall with practical orientation is that the freedom in choosing methodological approaches is in some cases used to legitimise bad research design, theoretical foundation and poor understanding and usage of research and analysis methods.

The emergence of supply chain management as the mainstream of logistics research is on a par with the systems approach that seems to dominate Nordic logistics research. Supply chain management topics are typically meso-level problems that investigate relatively practical phenomena in a systems perspective. The development of CLM (Council of Logistics Management) into CSCMP (Council of Supply Chain Management Professionals) indicates that the practical approach in mainstream logistics research is turning from a positivistic approach towards a systems approach, both in Europe and North America. This is good news for the typical Nordic researcher who has been more inclined towards more situational research approaches than the North American journals have been willing to publish.

It may be that logistics research is spread too broadly to be able to mature. The wide variety of academic and pragmatic interests and the reputational audiences related to these interests enhance the fragmentation of the discipline. This fragmentation is indicated in the broad scope of research subjects, diverse literature utilisation, multiple methodological approaches, diverse researcher interests and personal consequences. Experienced researchers, who network with each other, find that individuals have differing preferences in research approaches or research subjects. This situation often results in comments that indicate a lack of mutual respect between discipline- and practically oriented schools of thought. The discipline oriented may consider practical orientation methodologically and theoretically shallow, while the practically oriented may consider the disciplinary orientation as excessively basic research with no practical value. This situation of mutual disrespect is typical in the stage where a dominant paradigm has not yet emerged. The situation is of no comfort to the novice researcher, who would benefit by understanding which school has emerging traditions that relate to his/her individual interests.

It is likely that both applied and basic research, as well as research on all levels (nano-, micro-, meso- and macro-) and all subject areas is needed both now and in the future, but an understanding of which schools specialise in what should become clearer. It may be that the clearest distinction to specialisation areas is a split of present logistics into clearly distinguishable disciplines. Likewise, such sciences as physics, a very mature one, investigates the world from the largest to the tiniest of entities with some of the research being very basic and totally without foreseeable practical applicability and some of it being very much a practical-engineering type of research.

Nofoma is acting to bring together Nordic logisticians, and could henceforth offer an opportunity to establish a more methodologically tolerable yet structured academic reputational system. However, Nofoma has so far had little to offer in bringing coherence to methodological approaches or research topics. It is unclear how such a broadly scoped network as Nofoma could help to bring clarity to the situation by accommodating all the streams of logistics research under one umbrella. It might be more beneficial to respect the differences of the approaches and encourage distinct research streams to form their own distinguishable identities, and to encourage researchers of different streams to stop understanding each other and form their own paradigms. This is supported by the fact that a feeling of loneliness during the research process is the most significant reason for demotivation and frustration. Loneliness is not mitigated by very loose networks of scholars. It is more likely that the feeling of loneliness can best be reduced if just a few people with very close interests are brought together.

7.2 Opportunities for further research

This study developed and applied a number of analytical frameworks and categorisation tools to specifically Finnish and Swedish doctoral dissertations. The developed tools are more widely applicable to logistics and also potentially applicable to other applied sciences that combine ideals from positivist and hermeneutic traditions and have a practical interest. A comparison of the findings of this study to the findings of journal articles would be very interesting, and provide a means for understanding how the methodological preferences of Finnish and Swedish doctoral dissertations compare to the choices in journal articles. It is widely recognised, at least amongst discussions within Nofoma, that North American journals favour more positivistic research than the Nordic trait of conducting situational research. If a clear difference between the approaches is found, further reasoning as to how researchers perceive such differences in methodological approaches would make interesting reading. This study finds that the authors of the dissertations analysed are mostly active in post-doc research and that methodological loyalty is especially high for qualitative methods. A further analysis of whether certain methods and methodological approaches in the doctoral dissertation phase lead to a better publication track record in journals would be interesting, as appearing in journal publications is a 'must' for researchers aiming for an academic career.

While this research analyses the disciplinary status with reasonable rigour, the attempts to investigate the research process stay mostly on a descriptive and

hypothesis-generating level. As such, opportunities to attempt to model and test the causal relationship between social, personal, methodological and consequence dimensions can be considered as interesting areas for further research. Several of the analyses in this study should be considered as a first attempt to develop such causal models, and the general findings indicating that the research process differs for discipline- and practically-oriented research is a good starting point. Figure 23 describes an example of a hypothesis-based causal model, for which more detailed data could be collected and the model tested. Such an approach would help to understand better what actually determines the disciplinary-practical research interest polarisation and research consequences. As such, there is good potential to develop such models further and build structural equation models.

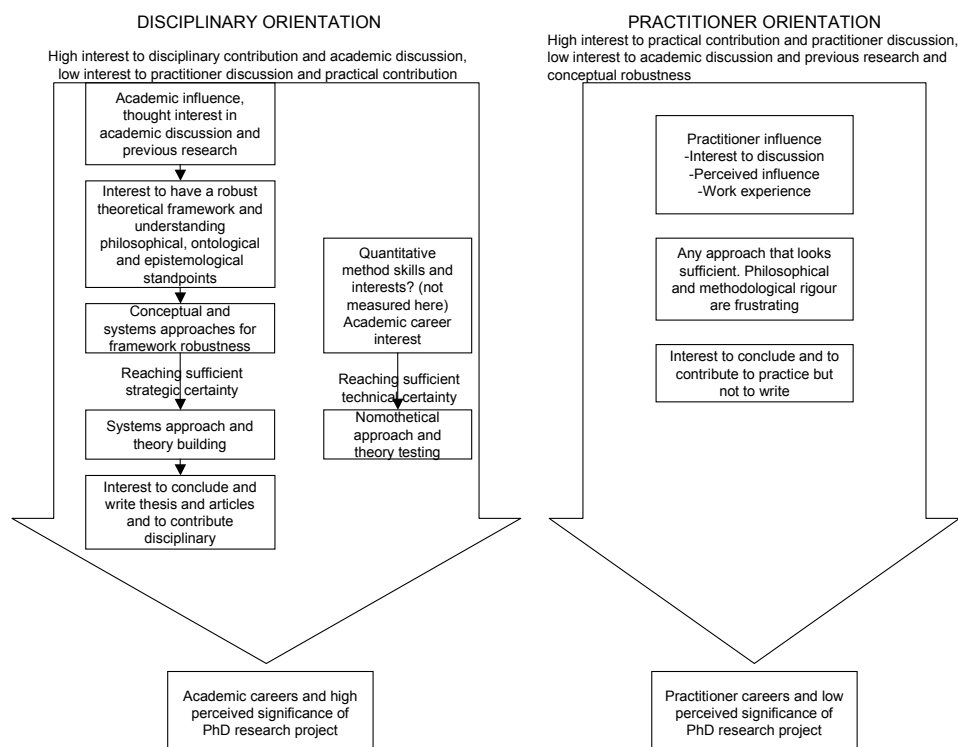


Figure 23. Hypothesis model for further research

The causal model proposition in figure 22 is based on hypotheses drawn from this study. The left side describes the hypothesis of the causal relations of the phases in discipline oriented research, and the right side the causal relation of the phases in practically oriented research. Testing such models would without doubt bring a better understanding of the research process, which

would offer good grounds for standardising the research to include certain milestones that could be made clear even for the novice researcher. This in turn is likely to make the research effort more efficient and less uncertain.

The scope of this study is to investigate the methodological, social and personal levels of the research process. This is a highly complex web of concepts and many other dimensions, some probably beyond imagination, are likely to influence the choices in the research process. In particular, the effect of researcher personality was left out of the scope of this study in the final stages before conducting the survey. This was done due to limitations on the length of the survey and the relatively complicated manner in which personality could be analysed in order for the analysis to be reliable. There are readily available frameworks and analysis tools that can be borrowed from psychology. In particular, the Myers-Briggs type indicator and NEO-PIR analyses appear useful. The utilisation of such tools to investigate the relations between personality and interest of the researcher is evident and worth further research. (See e.g. Berdie, 1944; Costa – McRae, 1992; Edwards, 2003; Honkonen, 1999; Myers – McCaulley, 1990; Komarraju – Karau, 2005)

7.3 Summary

This study is a continuation of the author's Licentiate thesis (Vafidis, 2002). The purpose of this study is to facilitate future research by adding to the understanding of the characteristics and applicability of methodological research choices, the social and personal perspectives and the research process.

The empirical evidence used in this study is based on 54 Finnish and Swedish doctoral dissertations published in the period 1994-2003, addressing a ten-year period of logistics doctoral research. The means for collecting empirical information are in-depth analyses of the dissertations, surveys given to the authors (44 replies) and a literature reference database that includes the bibliography of the investigated dissertations (over 12000 entries).

The study investigates the research process from methodological, social and personal points of view. Methodological approaches were investigated by reading the dissertations and applying three main frameworks to categorise the dissertations analysed: Neilimo and Näsi, Arbnor and Bjerke and a synthesis framework that was developed for the purposes of this study. The methodological approaches applied in the dissertations analysed are diverse, and it was concluded that the disciplinary status of the discipline is in a pre-paradigmatic stage. The survey that was sent to the authors of the dissertations

shed light mainly on the social and personal dimensions of the process, which are not visible from the published dissertations themselves.

The methodological approaches are divided into two distinguishable mainstreams that are commonly identified in social sciences, namely positivism and hermeneutic traditions. Logistics research seems to apply both traditions, but mainly falls in the ground in between, and the mainstream of logistics research is conducted using the systems approach. Importantly, logistics is considered an applied science, where research may serve both disciplinary and practical needs. It appears that the logistics research field is fragmented into research that follows different research traditions and the means to conducting that research.

The fragmentation of the logistics discipline is evident when investigating the social and personal levels of the research processes, as well as the literature references that develop the background knowledge of the researcher. The social level is investigated mainly by utilising the concepts of social dependency and certainty (Whitley, 1983). It appears that the logistics research process is a social effort, that researchers face significant influence from interest groups and that social influence increases the strategic certainty of the researcher, having a positive effect on willingness to present results. It also appears that logisticians that are related to practical audiences are prone to conduct practically oriented research, and researchers who relate to academic audiences are prone to conduct discipline oriented research.

The investigation of the personal level addresses the researcher backgrounds, motivation, interest areas and research consequences. It appears that doctoral research is primarily perceived as a means of self-development. Instrumental interests in helping academic or practitioner career development are surprisingly strong biased towards practitioner career interests, thus the majority of those conducting doctoral research do not primarily consider the process as a means of getting into an academic researcher career.

The contribution of the study is twofold. First, it is a meta-scientific study, which means that it investigates the science itself and provokes discussion on the directions in which the discipline of logistics could continue to develop. The frameworks that are developed and applied in this study offer effective methods for structuring such discussion analytically. Secondly, this study contributes practically to researchers who face uncertainty and who may be puzzled by their own research choices. A self-assessment of one's own interest and the research process on methodological, social and personal levels demands considerable effort. Such an effort will improve the researcher's understanding of what research choices are likely to benefit those interests.

8 REFERENCES

- Addleson Mark (1995) *Equilibrium versus understanding towards the restoration of economics and social theory*. Routledge. London.
- Adjadjihoue Christian (1995) *Corridor analysis and forecasting of intermodal transportation systems between Finland and Eastern European countries*. Doctoral dissertation, University of Oulu. Oulu.
- Agar Michael (1986) *Speaking of ethnography*. Sage. Beverly Hills.
- Alasuutari Pertti (1995 & 1999) *Laadullinen tutkimus* [in Finnish: qualitative research]. Osuuskunta Vastapaino. Tampere.
- Alexander Jeffrey C. (1982) *Positivism, presuppositions, and current controversies*. Routledge & Kegan Paul Ltd. London.
- Andersson Dan (1997) *Third party logistics*. Doctoral dissertation, Linköping University. Linköping.
- Andersson, Jonas (1999) *Coordinated multi-stage inventory systems with stochastic demand*. Doctoral dissertation, Lund University: Lund
- Angyal A. (1941) A logic of systems. Reprinted in (1969), *Systems thinking*. Ed. F.E. Emery. Penguin Books. Middlesex. Pp. 17–29.
- Arbnor, I. – Bjerke, B. (1997) *Methodology for Creating Business Knowledge*. SAGE Publications. Thousand Oaks, CA.
- Arlbjørn Jan Stentoft – Haldórsson Árni (2001). Logistics knowledge creation: reflections on content, context and processes. *International Journal of Physical Distribution and Logistics Management*. Vol. 32, No: 1, 22–40.
- Arlbjørn Jan Stentoft – Jonsson Patrik – Johansen John (2006) *Nordic research in logistics and supply chain management: an empirical analysis*. A work-in-progress paper presented in the 2nd Northern Lights of Logistics seminar in Oslo.
- Aronsson Håkan (2000) *Three perspectives on supply chain design*. Doctoral dissertation, Linköping Institute of Technology. Linköping.
- Austin James T. – Bobko Philip (1985) Goal-setting theory: unexplored areas and future research needs. *Journal of Occupation Psychology*. No: 58, 289–308.
- Bacharach Samuel H. (1989) Organizational theories: Some criteria for evaluation. *Academy of Management Review*. Vol. 14, No: 4, 496–515.

- Ballou Ronald H. (1995) *Business logistics management, planning and controlling*. Prentice Hall. Englewood Cliffs.
- Berdie R.F. (1944) Factors related to vocational interests. *Psychological Bulletin*. No: 41, 137–157.
- Berglund Magnus (2000) *Strategic positioning of the emerging third party logistics providers*. Doctoral dissertation, Linköping Institute of Technology. Linköping.
- Berry L.M. – Murtagh B.A. – McMahon G.B. – Sugden S.J. – Welling L.D. (1998) Genetic Algorithms in the Design of Complex Distribution Networks. *International Journal of Physical Distribution and Logistics Management*. Vol. 28, No: 5, 377
- Blaikie Norman (1993) *Approaches to social enquiry*. Polity Press. Cambridge.
- Blinge Magnus (1998) *ELM: environmental assessment of fuel supply systems for vehicle fleets*. Doctoral dissertation, Chalmers University of Technology. Göteborg.
- Bothamley Jennifer (1993) *Dictionary of theories*. Gale Research International Ltd. London.
- Bourdieu Pierre (1988) *Homo academicus*. Polity Press. Cambridge.
- Brehmer Per-Olof (1999) *Towards a Model of Lean Freight Transport Operations*. Doctoral dissertation, Linköping Institute of Technology. Linköping.
- Brodin Maria Hüge (2002) *Logistics systems for recycling – on the influences of products, structures, relationships and power*. Doctoral dissertation, Linköping Institute of Technology. Linköping
- Brown Lawrence (1985) Using citation analysis to assess the impact of journals and articles on contemporary accounting research (CAR). *Journal of Accounting Research*. Vol. 23, No: 1, 84–109.
- Brown Lawrence (1996) Influential accounting articles, individuals and Ph.D. granting institutions and faculties: a citational analysis. *Accounting, Organizations and Society*. Vol. 21, No: 7/8, 723–754.
- Burrell Gibson – Morgan Gareth (1988) *Sociological paradigms and organizational analysis: elements of the sociology of corporate life*. Gower. Aldershot.
- Cacioppo, John T. – Petty Richard E. (1984) The elaboration likelihood model of persuasion. *Advances in Consumer Research*. Vol. 11, No: 1, 673–675.
- Caldwell Bruce (1991) *Beyond positivism – economic methodology in the twentieth century*. Unwin Hyman Ltd. London.
- Coase R.H. (1937) The nature of the firm. *Economica*. No: 4 (November)

- Cooper Martha – Lambert Douglas – Pagh Janus (1997) Supply chain management: more than a new name for logistics. *International Journal of Logistics Management*. Vol. 8, No: 1, 1–13.
- Costa P.T. – McRae R.R. (1992) *NEO PI-R: Professional manual: Revised NEO PI-R and NEO-FFI*. Psychological Assessment Resources inc. Florida.
- Cote Joseph – Leong Siew Meng – Cote Jane (1991) Assembling the influence of Journal of Consumer Research: a citation analysis. *Journal of Consumer Research*. Vol. 18, 402–410.
- Czarniawska-Joerges Barbara (1992) *Exploring complex organisations a cultural perspective*. SAGE Publications. Newbury Park.
- DiMaggio Paul J. (1995) Comments on “What theory is not”. *Administrative Science Quarterly*. Vol. 40, No: 3, 391–397.
- Dunn Steven C. – Seaker Rober E. – Waller Matthew A. (1994) Latent variables in business logistics research: scale development and validation. *Journal of Business Logistics*. Vol. 15, No: 2, 145–172.
- Edwards John A. (1997) Effects of causal uncertainty on the dispositional attribution process. *Journal of Experimental Social Psychology*. No: 34, 109–135.
- Edwards John A. (2003) The interactive process of processing preference and motivation on information processing: Causal uncertainty and the MBTI in a persuasion context. *Journal of Research in Personality*. Vol. 37, NO:2, 89–99.
- Edwards John A. – Lanning K. – Hooker K. A. (2002) Jungian personality theory and social information processing. *Journal of Personality Assessment*. No: 34, 109–135.
- Evered R. & Louis M.R. (1981) Alternative perspectives in the organisational sciences: “Inquiry from the inside” and “Inquiry from the outside.” *Academy of Management Review*. No: 3, 385–395.
- Firestone William A. (1991) Accommodation: toward a paradigm-praxis dialectic. In: *The paradigm dialog* ed. By Egon G. Guba. SAGE Publications. Newbury Park. Pp. 105–124.
- Frankel Robert – Dag Näslund – Yemisis Bolumole (2005) The “white space” of logistics research: A look at the role of methods usage. *Journal of Business Logistics*. Vol. 26, No: 2, 185–209.
- Franzén Stig E.R. (1999) *Public Transportation in a Systems Perspective: A Conceptual Model and an Analytical Framework for Design and Evaluation*. Doctoral dissertation, Chalmers University of Technology. Göteborg.

- Fried Yitzhak – Slowik Linda Haynes (2004) Enriching goal-setting theory with time: an integrated approach. *Academy of Management Review*. Vol. 29, No: 3, 404–422.
- Friedman M. (1953) The Methodology of Positive Economics. In: *Essays in Positive Economics* ed. by M. Friedman. Chicago. University of Chicago Press. Pp. 2–43
- Fryer D (1931) *The measurement of interests in relation to human adjustment*. Henry Holt. New York.
- Gadde (1991) *Professional Purchasing*. Routledge. London.
- Gammelgaard Britta (1996) *PhD education in logistics*. ILT Working paper 11/1996. Copenhagen
- Gammelgaard, Britta (2001) A Joint-Nordic PhD Program in Logistics Management. *International Journal of Physical Distribution & Logistics Management*. Vol. 31, No: 7/8, 585–601.
- Gammelgaard, Britta (2004) Schools in logistics research: A methodological framework for analysis of the discipline. *International Journal of Physical Distribution & Logistics Management*. Vol. 34, No: 6, 479–491.
- Gammelgaard Britta – Vafidis Dimitrios (2001) *Understanding Best Practice in Doctoral Education – a Case Study from the Scientific Field of Logistics Management*. Working paper, Copenhagen Business School. Copenhagen.
- Gammelgaard Britta – Vafidis Dimitrios (2001) Understanding Best Practice in Doctoral Education. A case study from the scientific field of Logistics Management. In *Proceedings of 2001 CLM Educators Conference*, ed. by B.J. La Londe and T.L. Pohlen. Kansas City. pp. 55–88.
- Gammelgaard Britta – Vafidis Dimitrios (2006) *The State of Nordic Logistics Management Research*. A work-in-progress paper presented in the 2nd Northern Lights of Logistics seminar in Oslo.
- Garfinkel Harold (1989) *Studies in ethnomethodology*. Cambridge Polity Press. Cambridge.
- Gibbson Brian J. – Mentzer John T. – Cook Robert L. (2005) Supply chain management: the pursuit of a consensus definition. *Journal of Business Logistics*. Vol. 26, No: 2, 17–25.
- Giddens Anthony (1974) *Positivism and sociology*. Heineman Educational Books Ltd. London.
- Giddens Anthony (1976) *New rules of sociological method*. Hutchinson & Co. Ltd. London.
- Glaser B. – Strauss A. (1967) *The discovery of grounded theory*. Aldine. Chicago.

- Goh C. – Holsapple C. – Johnson L. – Tanner J. (1996) An empirical assessment of influences on POM research. *Omega, International Journal of Management Science*. Vol. 24, No: 3. 337–345.
- Guba Egon G. (1991) *The paradigm dialog*. Sage Publications inc. Newbury Park.
- Gubi Ebbe – Arlbjørn Jan Stentoft – Johansen John (2003) Doctoral dissertations in logistics and supply chain management – a review of Scandinavian contributions from 1990 to 2001. *International Journal of Physical Distribution and Logistics Management*. Vol. 33, No: 10, 854–885.
- Hagman Thore (1998) *Logistics time requirements in fast sea transportation systems*. Doctoral dissertation, Chalmers University of Technology. Göteborg.
- Hahtola Kauko (1986) Onko toiminta-analyttinen tutkimusote törmännyt luonnontieteellisen filosofian muuriin? [in Finnish: Has action research collided to the wall of philosophy of natural sciences?] *Liiketaloudellinen aikakauskirja*. No: 4, 376–383.
- Hakanen Armi (1992) *Perustietoa persoonallisuuden psykologiasta* [in Finnish: Basic knowledge on personality psychology]. University of Turku. Turku.
- Haldórsson Árni – Larsson Paul (2000) *Wanted: SCM! A search of elements of SCM in logistics education and research*. Working paper presented in the Council of Logistics Management Educators day, September 24th 2000. New Orleans.
- Hämäläinen Erkki, (2003) *Evolving logistics roles of steel distributors*. Doctoral dissertation, Helsinki School of Economics. Helsinki.
- Heide Jan – John George (1992) Do norms matter in marketing relationships? *Journal of Marketing*. Vol. 56, No:2, 32–44.
- Heikkilä Jussi (2000) *Managing demand chain management: case study on the fast growing cellular networks industry*. Doctoral dissertation, Helsinki University of Technology. Helsinki.
- Helo Petri (2001) *The dynamics of agile manufacturing in the electronic industry – a product availability based approach*. Doctoral dissertation, University of Vaasa. Vaasa.
- Hensvold Eilif (1997) Logistics, searching for an academic discipline. In *Proceedings from the 8th Nordic logistics conference*. Ed. Britta Gammelgaard & Tage Skjøtt-Larsen. Copenhagen. Pp. 3-8.
- Hilmola Olli-Pekka (2001) *Total productivity and its relation to throughput accounting – a deductive single-case study of electronics contract manufacturing*. Doctoral dissertation, University of Vaasa. Vaasa.

- Hines R.D. (1988). Financial accounting: in communicating reality, we construct reality. *Accounting Organisations and Society*, No.3, 251–261.
- Hirsjärvi Sirkka – Remes Pirkko – Sajavaara Paula (1998) *Tutki ja kirjoita* [In Finnish: Do research and write]. Kirjayhtymä Oy. Helsinki.
- Holmberg Stefan (2000) *Supply chain integration through performance measurement*. Doctoral dissertation, Lund University. Lund.
- Honkonen Maria (1999) *Psychological type and career expectations of business students – An application of Schein's career anchors*. University of Vaasa. Discussion papers 249. Vaasa.
- Hultén Lars (1997) *Container logistics and its management*. Doctoral dissertation, Chalmers University of Technology. Göteborg.
- Firestone William A (1991) Accommodation: toward a paradigm-praxis dialectic. In: *The paradigm dialog* ed. By Egon G Guba. Sage Publications inc. Newbury Park.. Pp. 105-124.
- Inkiläinen Aimo (1998) *Managerial view on distribution systems – heuristic justification of centralization and postponement*. Doctoral dissertation, Helsinki School of Economics. Helsinki.
- Jahre Marianne (1995) *Logistics systems for recycling – efficient collection of household waste*. Doctoral dissertation, Chalmers University of Technology. Göteborg.
- Jalkanen Kari (1996) *Suomen satamien toiminnallinen rakenne, työnjako ja kehitys* [In Finnish: Functional structure, work distribution and development of the ports in Finland]. Doctoral dissertation, University of Turku. Turku.
- Janhunen Antero (1994) *Toimitustäsmällisyyden suunnittelumentelmä* [In Finnish: A planning method for timely deliveries]. Doctoral dissertation, Lappeenranta University of Technology. Lappeenranta.
- Jansen Karl (2001) *Network modelling of port terminals – development of a concept and a tool*. Doctoral dissertation, Chalmers University of Technology. Göteborg.
- Jobber David – Simpson Paul (1988) A citation analysis of selected marketing journals. *International Journal of Research in Marketing*. Vol. 5, No: 2, 137–142.
- Johnsson Mats (1998) *Packaging logistics – a value added approach*. Doctoral dissertation, Lund University. Lund.
- Jonsson Patrik (1999) *The impact of maintenance on the production process – achieving high performance*. Doctoral dissertation, Lund Institute of Technology. Lund.

- Juga Jari (1996) *Changing logistics organization*. Doctoral dissertation, Turku School of Economics and Business Administration. Turku.
- Juhantila Olli-Pekka (2002) *Establishing intercompany relationships – motives and methods for successful collaborative engagement*. Doctoral dissertation, Lappeenranta University of Technology. Lappeenranta.
- Junger-Tas Josine (2005) The scientific integrity of applied research. *European Journal on Criminal Policy and Research*. Vol. 11, No: 2, 143–158.
- Kämäräinen Vesa (2003) *The impact of investments on e-grocery logistics operations*. Doctoral dissertation, Helsinki University of Technology. Espoo.
- Kasanen E. – Lukka K. – Siitonen A (1993) The constructive approach in management accounting research. *Journal of Management Accounting Research*, Vol. 5, 243-264.
- Kasanen E. – Lukka K. (1995) The problem of generalizability: anecdotes and evidence in accounting research. *Accounting, Auditing and Accountability Journal*. Vol. 8, No: 5, 71–90.
- Kaski Timo (2002) *Product structure metrics as an indicator of demand-supply chain efficiency: Case study in the cellular network industry*. Doctoral dissertation, Helsinki University of Technology. Espoo.
- Kast Fremont E. – Rosenzweig James E. (1973) Foreword. In: *Contingency views of organisational management* ed. by Fremont E. Kast & James E. Rosenzweig. Science Research Associates inc. Chicago.
- Keto Tuula (1976) *Systeemanalyysin perusteet* [in Finnish: Fundamentals of systems analysis]. University of Jyväskylä. Julkaisuja No: 22. Jyväskylä.
- Klein Howard J. (1989) An integrated control theory model of work motivation. *The Academy of Management Review*. Vol. 14, No: 2, 150–172.
- Komarraju, Meera and Karau, Steven (2005) The relationship between the big five personality traits and academic motivation. *Personality and individual differences*. No. 39, pp. 557-567.
- Komarraju Meera – Karau Steven (2005) The relationship between the big five personality traits and academic motivation. *Personality and Individual Differences*. No: 39, 557–567.
- Korpela Jukka (1994) *Analytic approach to distribution logistics management*. Doctoral dissertation, Lappeenranta University of Technology. Lappeenranta.

- Kovács Gyöngyi – Spens Karen (2005a) Abductive reasoning in logistics research. *International Journal of Physical Distribution & Logistics Management*. Vol.35, No: 2, 132–144.
- Kovács Gyöngyi – Spens Karen (2005b) The theory building challenge of logistics. *NOFOMA proceedings 2005*.
- Kuhn Thomas (1970) *The structure of scientific revolutions*. University of Chicago Press. Chicago.
- Kuhn Thomas (1994) *Tieteellisten vallankumousten rakenne* [in Finnish: The structure of scientific revolutions]. WSOY. Juva.
- Lakatos Imre (1970) Falsification and the methodology of scientific research programmes. In: *Criticism and the growth of knowledge* ed. By Imre Lakatos and Alan Musgrave. Cambridge University Press. Cambridge. Pp. 91–196.
- Lakatos Imre (1976) *Proofs and Refutations: The logic of Mathematical Discovery*. Cambridge University Press. Cambridge.
- Larson Paul D. – Haldórsson Árni (2002) What is SCM? And, where is it? *Journal of Supply Chain Management*. No. 38, No: 4, 36–44.
- Lehmusvaara Antti (1998) *Improving the potentials of logistics processes: identification and solutions*. Doctoral dissertation. Lappeenranta University of Technology. Lappeenranta.
- Lehtinen Ulla (2001) *Changing subcontracting – a study on the evolution of supply chains and subcontractors*. Doctoral dissertation. University of Oulu. Oulu.
- Lehtola Richard (1997) *A conceptual approach to the analysis and evaluation of the logistics of a company and its business chain*. Doctoral dissertation, Tampere University of Technology. Tampere.
- Lehtonen Juha-Matti (1999) *Supply chain development in process industry*. Doctoral dissertation, Helsinki University of Technology. Espoo
- Lévi-Strauss Claude (1997) *Tropiikin kasvot*. Loki Kirjat. Helsinki. (Originally published in French as *Tristes Tropiques* in 1955. Publisher: Librairie Plon)
- Lindau Roger (1995) *The impact of high-quality information on performance in manufacturing*. Doctoral dissertation, Chalmers University of Technology. Göteborg.
- Little Daniel (1991) *Varieties of social explanation*. Westview Press Inc. Oxford.
- Ljungberg Anders (1998) *Measurement systems and process orientation with focus on the order process*. Doctoral dissertation, Lund University. Lund.

- Lukka Kari (1991) Laskentatoimen tutkimuksen epistemologiset perusteet [in Finnish: Epistemological foundations in management accounting research]. *Liiketaloudellinnen Aikakauskija*. No:2, 160–186.
- Lukka Kari – Tuomela Tero-Seppo (1998) Testattuja ratkaisuja liikkeenjohdollisiin ongelmiin: konstruktivinen tutkimusote [in Finnish: Tested solutions for managerial problems: constructive research approach]. *Yritystalous* 4/98.
- Marklund Johan (1999) *Supply chain inventory control – Methods for coordination and evaluation*. Doctoral dissertation, Lund University. Lund.
- Mears-Young B. – Jackson M. (1997) Integrated logistics – call in the revolutionaries! *Omega – International Journal of Management Science*. Vol. 25, No:6, 605-618.
- Medbo Lars (1999) *Materials supply and product descriptions for assembly systems – design and co-operation*. Doctoral dissertation, Chalmers University of Technology. Göteborg.
- Mentzer John T. – Kahn Kenneth B. (1995) A framework of logistics research. *Journal of Business Logistics*. Vol. 16, No: 1, 231–250.
- Meredith J. – Raturi K. – Gyampah K. – Kaplan B. (1989) Alternative research paradigms in operations. *Journal of Operations Management*. Vol. 8, No: 4, 297–326.
- Mitchel Terence R. (1982) Motivation: new directions for theory, research and practice. *The Academy of Management Review*. Vol. 7, No: 1, 80–88.
- Morse Janice M. (1994) *Critical issues in qualitative research methods*. Sage. Thousand Oaks.
- Mouritsen Jan – Skjott-Larsen Tage – Kotzab Herbert (2003) Exploring the contours of supply chain management. *Integrated Manufacturing Systems*. Vol. 14, No: 8, 686–695.
- Myers I.B. – McCaulley M.H. (1985 & 1990) *Manual: a guide to the development and use of the Myers-Briggs type indicator*. Consulting Psychologists Press. Palo Alto.
- Myllykangas Markku – Tuomainen Raimo (1997) Postmoderni loikkaus modernista [in Finnish: A postmodern jump from modern]. *Hallinnon tutkimus*. No: 2.
- Näslund Dag (1999) *Towards bridging the gap between strategy and operations - a process based framework*. Doctoral dissertation, Lund University. Lund.

- Neilimo Kari – Näsi Juha (1980) *Nomoteettinen tutkimusote ja suomalainen yrityksen taloustiede, tutkimus positivismiin soveltamisesta* [in Finnish: *Nomothetical approach and Finnish business science, a research in application of positivism*]. University of Tampere. Yrityksen taloustieteen ja yksityisoikeuden laitoksen julkaisuja, Series A2: tutkielmia ja raportteja 12. Tampere.
- Niiniluoto Ilkka (1980) *Johdatus tieteenfilosofiaan, käsitteen ja teorianmuodostus* [In Finnish: *An introduction to the philosophy of science, formulation of concepts and theory*]. Otava. Helsinki.
- Niiniluoto Ilkka (1984) *Tiede, filosofia ja maailmankatsomus filosofisia esseitä tiedosta ja sen arvosta* [In Finnish: *Science, philosophy and worldview. Philosophical essays about knowledge and its value*]. Otava. Helsinki.
- Niiniluoto Ilkka (1986) *Pragmatismi* [Finnish. *Pragmatism*]. In: *Vuosisatamme filosofia* [In Finnish: *Philosophy in our century*]. Ed. Ilkka Niiniluoto & Esa Saarinen. WSOY. Juva.
- Näslund Dag (2002) *Logistics needs qualitative research – especially action research*. *International Journal of Physical Distribution & Logistics Management*, Vol. 32, No:5, 321–338.
- Norrman Andreas (1997) *Organising timebased distribution in transnational corporations, integration between logistics and organizational structure*. Doctoral dissertation, Linköping University. Linköping.
- Ojala Lauri (1995) *Lection Praecursoria*. Lecture given on 1st September 1995 in Turku School of Economics.
- Ojala Lauri (1995) *Logistics management in Finnish foreign trade transport*. Doctoral dissertation, Turku School of Economics. Turku.
- Ojala Lauri (1998) *Logistiikan väitöskirjojen eniten käytetyt lähteet* [In Finnish: *The most used references in doctoral dissertations in logistics*]. Working paper, Turku School of Economics. Turku.
- Ojala Lauri (1999) *Logistiikan ja kuljetusalan asiantuntijalista- yliopistot ja tutkimuslaitokset* [In Finnish: *List of specialists in the field of logistics and transportation, universities and research institutes*]. Turku School of Economics. Turku. (Unpublished list of logistics experts collected for the purposes of KETJU-programme. Copy obtainable from log@tukkk.fi)
- Ojala, Lauri – Olli-Pekka Hillmola (editors) *Case Study Research in Logistics*. Publications of the Turku School of Economics, Series B 1:2001. Turku.
- Petty Richard E. – Cacioppo John T. (1986) *The Elaboration Likelihood Model of Persuasion*. Academic Press. New York

- Popper Karl R. (1995) *Arvauksia ja kumoamisia – tieteellisen tiedon kasvu*. Gaudeamus. Tampere. (Translated from: Popper K. R. (1963) *Conjectures and Refutations*.)
- Ranta Tapio (2002) *Logging residues from regeneration fellings for biofuel production – a GIS-based availability and supply cost analysis*. Doctoral dissertation, Lappeenranta University of Technology: Lappeenranta.
- Raunio Kyösti (1999) *Positivismi ja ihmistiede, sosiaalitutkimuksen perustat ja käytännöt* [In Finnish: Positivist and human sciences, fundamentals and practices in social research]. Gaudeamus. Tampere.
- Routamaa Vesa (1981) *Contingency theory, managerial decision making and organizational study*. Proceedings of the University of Vaasa, Discussion papers 33. Vaasa.
- Saarinен Esa (1986) *Fenomenologia ja eksistentialismi* [In Finnish: Phenomenology and existentialism]. Ed. by Niiniluoto I. & Saarinен E.: *Vuosisatamme filosofia* [In Finnish: Philosophy in our century]. WSOY. Juva.
- Sachan Amit – Datta Subhash (2005) Review of supply chain management and logistics research. *International Journal of Physical Distribution & Logistics Management*. Vol. 35, No:9, 664–705.
- Schueler Heinz – Thornton George C III – Frintrup Andreas – Mueller Hanson Rose (2004) *AMI – Achievement Motivation Inventory – Manual*. Hoegrefe & Huber Publishers. Cambridge.
- Schutz Alfred (1972) *The phenomenology of the social world Alfred Schutz translated by George Walsh and Frederick Lehnert with an introduction to George Walsh*. Heineman Educational Books. London.
- SEFE <www.sefe.fi/jasensivut/palkkaneuvonta>, retrieved 30.4.2005. [In Finnish: web page containing income information of business educated people]
- Seppälä Ulla (1997) *An evolutionary approach for locating economic facilities*. Doctoral dissertation, Helsinki University of Technology. Espoo.
- Seppälä Tero (2003) *Three perspectives on buyer-seller relationships: A Relationship Assessment Model for Investigating Buyer-Supplier Relationships in Inter-organisational, Inter-functional and Intra-functional Perspectives*. Doctoral dissertation, Turku School of Economics. Turku.

- Seristö Hannu (1995) *Airline performance and costs – an analysis of performance measurement and cost reduction in major airlines*. Doctoral dissertation, Helsinki School of Economics. Helsinki.
- Silverman David (1993) *Interpreting qualitative data. Methods for analysing talk, text and interaction*. Sage. London
- Spens Karen (2001) *Managing critical resources through supply network management - a study of the Finnish blood supply network*. Doctoral dissertation, Swedish School of Economics and Business Administration. Helsinki..
- Spens Karen – Kovács Gyöngyi (2005) A content analysis of research approaches in logistics research. *International Journal of Physical Distribution & Logistics Management*. Vol.36, No: 5, 374–390.
- Stank Theodore – Goldsby Thomas (1998) Bridging the gap between academic responsibilities and practical applications in logistics. *Journal of Transportation Management*, Spring 1998.
- Stock James R. (1987) A compendium of doctoral research in logistics: 1970-1986. *Journal of Business Logistics*. Vol. 8, No:2, 123–202.
- Stock James R. (1988) A compendium of doctoral research in logistics: 1970-1986. *Journal of Business Logistics*, Vol. 9, No:1, 125–234.
- Stock James R. (1990). Logistics Thought and Practice: a Perspective. *International Journal of Physical Distribution and Logistics Management*. Vol. 20, No: 1, 3–6.
- Stock James R. (1995) Advancing logistics research and thought through the borrowing of theories from other disciplines: some old ideas whose times have come. In: *Breakthrough Thinking in Logistics – Proceedings of the twenty fourth Annual Transportation and Logistics Educators Conference*. October 8th 1995, Pp.181–215 . The Transportation and Logistics Research Fund – The Ohio State University and the Council of Logistics Management.
- Stock James R. (1997) Applying theories from other disciplines to logistics. *International Journal of Physical distribution and Logistics Management*. Vol. 27, No: 9, 515–539.
- Stock James R. (2001) Doctoral research in logistics and logistics-related areas: 1992-1998. *Journal of Business Logistics*. Vol. 22, No: 1, 125–256
- Stock James R – Luhrsen David (1993) Doctoral research in logistics-related areas: 1987-1991. *Journal of Business Logistics*. Vol. 14, No:2, 197–373.
- Stock, James R. – Broadus, Jared C. (2006) Doctoral research in supply chain management and/or logistics related areas: 1999-2004. *Journal of Business Logistics*. Vol. 27, No: 1, 139–496.

- Sullivan Daniel (1998) Cognitive Tendencies in International Business Research: Implications of a “Narrow vision.” *Journal of International Business Studies*, Vol. 29, No: 4, 837–862
- Sutton R.I. – Staw B.M. (1995) What theory is not. *Administrative Science Quarterly*. September issue, Vol. 40, No: 3, 371–384.
- Talentia <www.talentia.fi/index.php?m=4&s=2&d=5&did=58>, retrieved 30.4.2006
- Tanskanen Kari (1994) *Supplier management in just-in-time manufacturing*. Doctoral dissertation, Helsinki University of Technology. Espoo.
- Tanskanen Kari (22.2.2006) Telephone interview.
- Tinnilä Markku (1997) *Division of service and business processes*. Doctoral dissertation, Helsinki School of Economics. Helsinki.
- Töttö Pertti (1997) *Pirullinen positivismi – kysymyksiä laadulliselle tutkimukselle* [In Finnish: Demonic positivism – questions to qualitative research.]. Kampus kustannus. Jyväskylä.
- Töttö Pertti (1999) *Kvalitatiivisen ja kvantitatiivisen tuolle puolen?* [In Finnish: Beyond qualitative and quantitative]. Metodipoliittinen puheenvuoro. Sosiologia.
- Töyrylä Ilkka (1999) *Realising the potential of traceability – a case study on usage impacts of product traceability*. Doctoral dissertation, Helsinki University of Technology. Espoo.
- Tuunainen Virpi (1999) *Different models of electronic commerce, integration of value chains and business processes*. Doctoral dissertation, Helsinki School of Economics. Helsinki.
- Tyler L.E. (1945) Relationships between strong vocational interest scores and other attitude and personality factors. *Journal of Applied Psychology*. No: 29, 58–67.
- Vafidis Dimitrios (2002) *Methodological Tendencies in Logistics Research – Empirical Evidence from 25 Finnish and Swedish Doctoral Dissertations 1994-1998*. Licentiate Thesis, Turku School of Economics. Turku
- Vafidis Dimitrios (2003) Methodological choices of 25 Finnish and Swedish logistics dissertations in 1994-1998. In: *Case Study Research in Logistics*, ed. By Lauri Ojala & Olli-Pekka Hilmola, 157–182. Turku School of Economics. Turku.
- Vessey Iris – Glass Robert (1998) Strong vs. weak approaches to systems development. *Communications of the ACM*. Vol. 41, No: 4.
- Vihanto Martti (1987) Liiketaloustieteen ja kansantaloustieteen metodologioiden vertailu: kommentti [In Finnish: A comparison on methodologies in business research and economics research: a comment]. *Projekti*. No. 13, 15–18.

- Virolainen Veli-Matti (1998) *Motives, circumstances, and success factors in partnership sourcing*. Doctoral dissertation, Lappeenranta University of Technology. Lappeenranta.
- Von Bertalanffy (1950) The theory of open systems in physics and biology. Reprinted in 1969, *Systems thinking*. Ed. F.E. Emery. Penguin Books. Middlesex. Pp. 70–85.
- Waidringer, Jonas (2001) *Complexity in transportation and logistics systems – an integrated approach to modelling and analysis*. Doctoral dissertation, Chalmers University of Technology. Göteborg.
- Weary Gifford – Jacobson Jill A. – Tobin Stephanie J. – Edwards John A. (2001) Chronic and temporarily activated causal uncertainty beliefs and stereotype usage. *Journal of Personality and Social Psychology*. Vol. 81, No: 2, 206–219.
- Weary Giffors – Edwards John A. (1994) Individual differences in causal uncertainty. *Journal of Personality and Social Psychology*. Vol. 67, No: 2, 308–318.
- Weber Max (1978) *Economy and society, an outline of interpretative sociology*. Ed. Roth Guetnher & Claus Wittich. Berkeley University of California Press.
- Wedel John (1996) *Lead-time reduction in manufacturing – from initiation to realisation*. Doctoral dissertation, Chalmers University of Technology. Göteborg.
- Weick Karl E. (1995) What theory is not, theorising is. *Administrative Science Quarterly*. Vol. 40, No: 3, 385–390.
- Wenger Etienne – Snyder William (2000) Communities of Practice: The Organizational Frontier. *Harvard Business Review*. Vol. 78, No: 1, 139–145.
- Wenger Etienne (1998) *Communities of Practice: Learning, Meaning and Identity*. Cambridge University Press. Cambridge.
- Whitley Richard (1983) *The development of management studies as a fragmented adhocracy*. Working paper series 84. Manchester Business School and Centre for Business Research.
- Whitley, Richard (1984a) The Fragmented State of Management Studies: Reasons and Consequences. *Journal of Management Studies*, Vol. 21, No. 3, 331–349.
- Whitley, Richard (1984b) The Scientific Status of Management Research as a Practically-Orientated Social Science. *Journal of Management Studies*, Vol. 21, No. 4, 369–391.
- Whitley, Richard (1984c) *The Intellectual and Social Organization of the Sciences*. Clarendon Press – Oxford.

- Williamson Oliver (1975) *Markets and hierarchies: analysis and antitrust implications*. The Free Press. New York.
- Woxenius Johan (1998) *Development of small-scale intermodal freight transportation in a systems context*. Doctoral dissertation, Chalmers University of Technology. Göteborg.
- Yin Robert K. (1988) *Case study research design and methods*. SAGE Publications. Beverly Hills.
- Yrjölä Hannu (2003) *Supply chain considerations for electronic grocery shopping*. Doctoral dissertation, Helsinki University of Technology. Espoo.
- Öjmertz Birgitta (1998) *Materials handling from a value-adding perspective*. Doctoral dissertation, Chalmers University of Technology. Göteborg.
- Österåker Maria (1999a) Measuring motivation in a dynamic organisation – a contingency approach. *Strategic Change*. No: 8, 103–109.
- Österåker Maria (1999b) Measuring motivation in a learning organisation. *Journal of Workplace Learning*. Vol. 11, No: 2, 73–77.

APPENDIX 1 LIST OF THE DISSERTATIONS REVIEWED

1. Adjadjihoue, Christian (1995) Corridor analysis and forecasting of intermodal transportation systems between Finland and Eastern European countries. University of Oulu: Oulu.
2. Andersson, Dan (1997) *Third party logistics*. Linköping University: Linköping.
3. Andersson, Jonas (1999) Coordinated multi-stage inventory systems with stochastic demand. Lund University: Lund
4. Aronsson, Håkan (2000) Three perspectives on supply chain design. Linköping institute of technology: Linköping.
5. Berglund Magnus (2000) Strategic positioning of the emerging third party logistics providers. Linköping institute of Technology, Sweden: Linköping.
6. Blinge, Magnus (1998) ELM: environmental assessment of fuel supply systems for vehicle fleets. Chalmers University of Technology: Göteborg.
7. Brehmer, Per-Olof (1999) *Towards a Model of Lean Freight Transport Operations*. Linköping institute of Technology, Sweden: Linköping.
8. Brodin, Maria Hüge (2002) Logistics systems for recycling – on the influences of products, structures, relationships and power. Linköping institute of technology: Linköping
9. Franzén, Stig E.R. (1999) Public Transportation in a Systems Perspective: A Conceptual Model and an Analytical Framework for Design and Evaluation. Chalmers University of Technology: Göteborg.
10. Hagman, Thore (1998) Logistics time requirements in fast sea transportation systems. Chalmers University of Technology: Göteborg.
11. Heikkilä, Jussi (2000) *Managing demand chain management: case study on the fast growing cellular networks industry*. Helsinki University of Technology, Finland. (Johannes Raitio)
12. Helo, Petri (2001) *The dynamics of agile manufacturing in the electronic industry – a product availability based approach*. University of Vaasa: Vaasa.
13. Hilmola, Olli-Pekka (2001) *Total productivity and its relation to throughput accounting – a deductive single-case study of electronics contract manufacturing*. University of Vaasa: Vaasa.

14. Holmberg, Stefan (2000) *Supply chain integration through performance measurement*. Lund University: Lund.
15. Hultén, Lars (1997) *Container logistics and its management*. Chalmers University of Technology: Göteborg.
16. Hämäläinen Erkki, (2003) *Evolving logistics roles of steel distributors*. Helsinki School of Economics: Helsinki.
17. Inkiläinen, Aimo (1998) *Managerial view on distribution systems – heuristic justification of centralization and postponement*. Helsinki School of Economics and Business Administration: Helsinki.
18. Jahre, Marianne (1995) *Logistics systems for recycling – efficient collection of household waste*. Chalmers University of Technology: Göteborg.
19. Jalkanen, Kari (1996) *Suomen satamien toiminnallinen rakenne, työnjako ja kehitys*. University of Turku: Turku.
20. Janhunen, Antero (1994) *Toimitustäsmällisyyden suunnittelumentelmä*. Lappeenranta University of Technology: Lappeenranta.
21. Jansen, Karl (2001) *Network modelling of port terminals – development of a concept and a tool*. Chalmers University of Technology, Sweden: Göteborg.
22. Johnsson, Mats (1998) *Packaging logistics – a value added approach*. Lund University: Lund.
23. Juhantila, Olli-Pekka (2002) *Establishing intercompany relationships – motives and methods for successful collaborative engagement*. Lappeenranta University of Technology: Lappeenranta.
24. Juga, Jari (1996) *Changing logistics organization*. Publications of the Turku School of Economics and Business Administration A-7:1996, Turku.
25. Kaski, Timo (2002) *Product structure metrics as an indicator of demand-supply chain efficiency: Case study in the cellular network industry*. Helsinki University of Technology
26. Korpela, Jukka (1994) *Analytic approach to distribution logistics management*. Lappeenranta University of Technology: Lappeenranta
27. Kämäräinen, Vesa (2003) *The impact of investments on e-grocery logistics operations*. Helsinki University of Technology.
28. Lehmusvaara, Antti (1998) *Improving the potentials of logistics processes: identification and solutions*. Lappeenranta University of Technology: Lappeenranta.
29. Lehtinen, Ulla (2001) *Changing subcontracting – a study on the evolution of supply chains and subcontractors*. University of Oulu: Oulu.

30. Lehtola, Richard (1997) A conceptual approach to the analysis and evaluation of the logistics of a company and its business chain. Tampere University of Technology: Tampere.
31. Lehtonen Juha-Matti (1999) *Supply chain development in process industry*. Helsinki University of Technology: Espoo.
32. Lindau, Roger (1995) *The impact of high-quality information on performance in manufacturing*. Chalmers University of Technology: Göteborg.
33. Ljungberg, Anders (1998) *Measurement systems and process orientation with focus on the order process*. Lund University: Lund.
34. Marklund Johan (1999) Supply chain inventory control – Methods for coordination and evaluation. Lund University: Lund.
35. Medbo, Lars (1999) Materials supply and product descriptions for assembly systems – design and co-operation. Chalmers University of Technology, Sweden: Göteborg.
36. Norrman, Andreas (1997) Organizing timebased distribution in transnational corporations, integration between logistics and organizational structure. Linköping University: Linköping.
37. Näslund, Dag (1999) Towards bridging the gap between strategy and operations - a process based framework. Lund University, Sweden: Lund.
38. Ojala, Lauri (1995) Logistics management in Finnish foreign trade transport. Publications from the Turku School of Economics and Business Administration A-3: 1995: Turku.
39. Punakivi, Mikko (2003) Comparing alternative home delivery models for e-grocery business. Helsinki University of Technology: Espoo
40. Ranta, Tapio (2002) *Logging residues from regeneration fellings for biofuel production – a GIS-based availability and supply cost analysis*. Lappeenranta University of Technology: Lappeenranta.
41. Seppälä, Tero (2003) Three perspectives on buyer-seller relationships: A Relationship Assessment Model for Investigating Buyer-Supplier Relationships in Inter-organisational, Inter-functional and Intra-functional Perspectives. Turku School of Economics and Business Administration A-3: 2003: Turku.
42. Seppälä, Ulla (1997) An evolutionary approach for locating economic facilities. Helsinki University of Technology: Espoo.
43. Seristö, Hannu (1995) *Airline performance and costs – an analysis of performance measurement and cost reduction in major airlines*. Helsinki School of Economics: Helsinki.

44. Spens, Karen (2001) Managing critical resources through supply network management - a study of the Finnish blood supply network. Swedish School of Economics and Business Administration in Helsinki: Helsinki.
45. Tanskanen, Kari (1994) Supplier management in just-in-time manufacturing. Helsinki University of Technology: Espoo.
46. Tinnilä, Markku (1997) *Division of service and business processes*. Helsinki School of Economics: Helsinki.
47. Tuunainen Virpi (1999) Different models of electronic commerce, integration of value chains and business processes. Helsinki School of Economics: Helsinki.
48. Töyrylä, Ilkka (1999) Realising the potential of traceability – a case study on usage impacts of product traceability. Helsinki University of Technology: Espoo.
49. Virolainen, Veli-Matti (1998) Motives, circumstances, and success factors in partnership sourcing. Lappeenranta University of Technology: Lappeenranta.
50. Waidringer, Jonas (2001) Complexity in transportation and logistics systems – an integrated approach to modelling and analysis. Chalmers University of technology: Göteborg.
51. Wedel, John (1996) *Lead-time reduction in manufacturing – from initiation to realisation*. Chalmers University of Technology: Göteborg.
52. Woxenius, Johan (1998) Development of small-scale intermodal freight transportation in a systems context. Chalmers University of Technology: Göteborg.
53. Yrjölä, Hannu (2003) *Supply chain considerations for electronic grocery shopping*. Helsinki University of Technology: Espoo.
54. Öjmertz, Birgitta (1998) *Materials handling from a value-adding perspective*. Chalmers University of Technology: Göteborg.

APPENDIX 2 HALL OF FAME IN PHILOSOPHY OF SCIENCE

Name	Era and place of birth	Ideology and main publications
Aquinas, Thomas St.	1215-1274	<ul style="list-style-type: none"> - Developer of scholasticism - Summa Contra Gentiles (1259-1264) - Summa Theologiae (1266-1273)
Carnap, Rudolf	Rondsdorf, Germany 1891-1970	<ul style="list-style-type: none"> - Logical positivist and the Vienna Circle. - The Logical Syntax of Language (translated 1937) - Meaning and Necessity (1947) - Logical Foundations of Probability (1950).
Comte, Auguste	Montpellier, France 1798-1855	<ul style="list-style-type: none"> - Considered as the founder of positivism. - Système de politique positive (4 vols, 1851-1854), System of Positive Polity)
Durkheim, Emile	Epinal, France 1858-1917	<ul style="list-style-type: none"> - Often considered as founder of sociology, hermeneutics. - Les Règles de la méthode sociologique (1894, The Rules of Sociological Method)
Dilthey, Wilhelm	Biebrich, Germany 1833-1911	<ul style="list-style-type: none"> - Hermeneutics: considered that knowledge can only be understood as involving the knower's life in a historically conditioned culture.
Gadamer, Hans Georg	Marburg, Germany 1900-	<ul style="list-style-type: none"> - Hermeneutics - Wahrheit und Methode (1960, Truth and Method)
Garfinkel, Harold	Newark, NJ USA 1917-	<ul style="list-style-type: none"> - Hermeneutics (ethnomethodology) - Studies in Ethnomethodology (1967),
Habermas, Jürgen	Düsseldorf, Germany 1929-	<ul style="list-style-type: none"> - Critical theory - Erkenntnis und Interesse (1968, Knowledge and Human Interests) - Theorie des kommunikativen Handelns (1982, Theory of Communicative Action).
Heidegger, Martin	Messkirch, Germany 1889-1976	<ul style="list-style-type: none"> - Existentialism - Sein und Zeit (1927, Being and Time)
Hempel, Carl Gustav	Oranienburg, Germany 1905-	<ul style="list-style-type: none"> - Logical positivism - Concept Formation in Empirical Science (1952)
Husserl, Edmund	Prossnitz, Czech Republic 1859-1938	<ul style="list-style-type: none"> - Existential phenomenology - Logische Untersuchungen (2 vols. 1900-1901, Logical Investigations)

Kant, Immanuel	Königsberg, Germany 1724-1804	<ul style="list-style-type: none"> - Phenomenology - Kritik der reinen Vernunft (1781, Critique of Pure Reason) - Grundlagen zur Metaphysik der Sitten (1785, Foundations of the Metaphysics of Morals) - Kritik der praktischen Vernunft (1788, Critique of Practical Reason) - Critique, the Kritik der Urteilkraft (1790, Critique of Judgment)
Kuhn, Thomas	Cincinnati, OH USA 1922-1996	<ul style="list-style-type: none"> - Developer of the idea of scientific revolutions, closer to hermeneutics than positivism. - The Structure of Scientific Revolutions (1962)
Lakatos, Imre	Debrecen, Hungary 1922-1974	<ul style="list-style-type: none"> - Responded to Kuhn's ideas by saying that core theories never change. More positivist than hermeneutic - Proofs and Refutations (1976)
Mill, John Stuart	London, England 1806-1873	<ul style="list-style-type: none"> - Positivism - A System of Logic, (1843) - On Liberty (1859) - Utilitarianism (1863) - Three Essays on Religion (1874).
Neurath, Otto	Vienna, Austria 1882-1945	<ul style="list-style-type: none"> - Logical positivism, member of the Vienna Circle - International Picture Language (1936) - Modern Man in the Making (1939).
Peirce, Charles	Cambridge, MA USA 1839-1914	<ul style="list-style-type: none"> - Founder of pragmatism - Very diverse writings are collected and published in eight volumes (1931-1958)
Plato	Athens, Greece c.428-347 BC	<ul style="list-style-type: none"> - Founder of the Academy of Athens and the most influential of Sokrates' followers - Several preserved dialogues
Popper, Karl	Vienna, Austria 1904-1994	<ul style="list-style-type: none"> - Positivism. Participated in Vienna Circle, yet was very critical. - Die Logik der Forschung (1934, The Logic of Scientific Discovery) - The Open Society and its Enemies (1945) - The Poverty of Historicism (1957).
Schlick, Moritz	Berlin, Germany 1882-1936	<ul style="list-style-type: none"> - Logical positivism, member of the Vienna Circle - Allgemeine Erkenntnislehre (1918, General Theory of Knowledge) - Fragen der Ethik (1930, Problems of Ethics).
Schutz, Alfred	Vienna, Austria 1899-1959	<ul style="list-style-type: none"> - Existential phenomenology - Collected Papers (3 vols. 1962-1966)
Socrates	Athens, Greece c. 469-399 BC	<ul style="list-style-type: none"> - First characters in philosophy and founder of the Socratic method. - No preserved works, yet the work of Sokrates can be seen in the writings of Plato.

Weber, Max	Erfurt, Germany 1864-1920	<ul style="list-style-type: none"> - Positivism - Die protestantische Ethik und der Geist des Kapitalismus (1904, The Protestant Ethic and the Spirit of Capitalism)
Wittgenstein, Ludwig	Vienna, Austria 1889-1951	<ul style="list-style-type: none"> - Influenced strongly the development of logical positivism of the Vienna Circle. - Tractatus logico-philosophicus (1921) - Philosophische Untersuchungen (1953, Philosophical Investigations)

APPENDIX 3 SUMMARIES OF THE REVIEWED DISSERTATIONS

The appendix is divided into the two samples that were analysed separate for this study. The first sample includes dissertations that were published 1994 – 1998 and the second sample dissertations that were published 1999 – 2003. Both lists are arranged alphabetically. The table below lists the authors of the dissertations analysed.

Authors in 1994 – 1998 sample	Authors in 1999 – 2003 sample
Adjadjihoue, Christian	Andersson, Jonas
Andersson, Dan	Aronsson, Håkan
Blinge, Magnus	Berglund, Magnus
Hagman, Thore	Brehmer, Per-Olof
Hultén, Lars	Brodin, Maria, Hüge
Inkiläinen, Aimo	Franzén, Stig
Jahre, Marianne	Heikkilä, Jussi
Jalkanen, Kari	Helo, Petri
Janhunen, Antero	Hilmola, Olli-Pekka
Johnsson, Mats	Holmberg, Stefan
Juga, Jari	Hämäläinen, Erkki
Korpela, Jukka	Jansen, Karl
Lehmusvaara, Antti	Juhantila, Olli-Pekka
Lehtola, Richard	Kaski, Timo
Lindau, Roger	Kämäräinen, Vesa
Norrman, Andreas	Lehtinen, Ulla
Ojala, Lauri	Lehtonen, Juha-Matti
Seppälä, Ulla	Ljungberg, Anders
Seristö, Hannu	Marklund, Johan
Tanskanen, Kari	Medbo, Lars
Tinnilä, Markku	Näslund, Dag
Wedel, John	Punakivi, Mikko
Virolainen, Veli-Matti	Ranta, Tapio
Woxenius, Johan	Seppälä, Tero
Öjmertz, Birgitta	Spens, Karen
	Tuunainen, Virpi
	Töyrylä, Ilkka
	Waidringer, Jonas
	Yrjölä, Hannu

1994-1998 SAMPLE

Adjadjihoue Christian (1995) Corridor analysis and forecasting of intermodal transportation systems between Finland and Eastern European countries. University of Oulu.

Purpose

The main objectives of this 139 page thesis are stated as:

“1) To identify and analyse factors which are behind freight transportation mode especially for Eastern European markets. Knowing those primordial elements which acted as barriers before; Finnish shippers, consignors and carriers can get to the roots of Eastern European country trade.

2) To investigate the issues of how the intermodal transportation systems ought to be designed so that Finnish companies or shippers and carriers, can get powers to penetrate Eastern European country markets.

3) To bridge the gap between mathematical theory and its application to the analysis and forecast of intermodal commodity transportation networks between Finland and Eastern European countries.

4) To develop an efficient and effective model that can be a useful economic tool to evaluate and provide that the systems are feasible from Finnish economic point of views.”

Empirical evidence, method and theory

Empirical evidence is collected from e.g. customs, railroads, harbours Finmap, etc. The role of this data seems not to be in model generation or testing, but is rather used to validate the model so that it is run with actual data.

The model is based on interviews with Finnish and Polish shippers, forwarders and carriers.

No paradigmatic theoretical background is presented in this mathematical modelling thesis. Combinatorial, forecasting and gravity models are discussed as a background for the model construction in this thesis.

Contribution

The academic contribution lies clearly in building a static mathematical optimisation model, taking time and costs of alternative multimodal transportation choices into account, but disregarding reliability issues. The author also states practical goals, so that the thesis attempts to provide a model which users (“private sector, public sector, consumers, shippers, carriers and government”) can easily use as a decision-making aid. This possibility sounds relatively theoretical, as there are no attempts to prove practical applicability, and the complexity of the model far exceeds the skills of normal route planning personnel. However, the model is basically a valid tool for transportation planning if someone turns it into more user-friendly product.

Andersson Dan (1997) Third party logistics. University of Linköping

Purpose

As is the thesis of Norrman, this one is also a direct continuation of a licentiate thesis. The aim to the research is "... to contribute to a better knowledge of logistics partnerships (between shippers and service providers) on the part of the firm buying the logistics services (i.e. the shipper)." The effects and their reasons for outsourcing are investigated from the service buyer's point of view. The purpose of the thesis is expressed in the following questions: 1) Why do the service buyers outsource logistics activities in the form of partnerships? 2) What are the long-term effects of logistics partnerships from the service buyers' perspective? 3) How are the effects of the logistics partnership achieved? 4) What kind of factors influence the success of a logistics partnership?

Empirical evidence, method and theory

Empirical evidence is collected via cases based on personal interviews and a survey. For reasons of confidentiality the cases are not presented. This causes distortions to the evaluation of the thesis. The survey respondents were found using snowball sampling, contacting managers in assembly plants and referring to a list of 100 largest North American computer industries. The respondents were from North American companies.

The author considers an objective reality and seeks for explanatory knowledge deduced from the complex world. These beliefs are visible in the survey. The fact that the cases are not presented makes it difficult to evaluate how the processes behind service buyers' decision-making are investigated.

Transaction cost theory clearly dominates this thesis, although the author has also considered resource dependence theory, exchange theory and agency theory. The author specifically denies that the thesis aims to make a theoretical contribution, the aim being to contribute to logistics literature.

Contribution

The author claims that this research is rather hypothesis-generating than hypothesis-testing. The results are presented in a tightly causal way: driving forces affect characteristics, which affect the effects (benefits) of third party relationships. Success factors are presented in a non-normative way but the results hint at practical applicability, i.e. there is some pragmatism in this thesis. Most importantly, companies considering outsourcing may find managerial benefits from the results.

Blinge Magnus (1998) ELM: environmental assessment of fuel supply systems for vehicle fleets. Chalmers University of Technology. Göteborg.

Purpose

“... to apply the logistics approach, to follow the complete supply chain from energy raw material to end use in the vehicle, in analyses of the environmental load from using motor fuels and further the viability of this approach in the decision-making process of choosing fuel for a vehicle fleet.”

Empirical evidence, method and theory

Empirical evidence includes definitions of different (meso-level) transportation systems cases. Thereafter, empirical evidence turns into chemistry-like (nano-level) measurement of energy contents and usage of fuel, as well as emissions of different kinds of fuel in different uses. These measurements are tightly bound to the entire system from production to consumption of each kind of fuel. The conclusions are then taken back to meso level system analysis. As such this thesis makes a perfect U-shaped level of analysis approach: from meso to nano level and back.

The thesis follows a three step approach: 1) characterise LCA, 2) develop ELM based on LCA 3) validate EML in case studies. Thus the thesis is based on existing theory which is tailored to the problem at hands, and is further tested with the use of cases.

The systems approach is the basis for life cycle analysis (LCA), which forms the theoretical basis of this thesis. LCA is applied to the situation at hand by developing the environmental logistics management (ELM) model, which includes accurate measurement of emissions and energy consumption. The model is further tested with seven case studies.

Contribution

The academic contribution includes a development of the ELM method. The thesis includes thorough discussion, including all the elements of fuel systems starting from raw materials through to consumption.

The developed ELM model can be applied to ISO environmental standards, providing a significant practical contribution of the findings. It may also help in making feasible laws and regulations on engine emissions, taking the entire system from fuel production to consumption into account.

While the developed modelling method can be applied universally, the results of this thesis are applicable only locally. Additional limitations are that only air emissions were analysed.

Hagman Thore (1998) Logistics time requirements in fast sea transportation systems. Chalmers University of Technology.

Purpose

“The aim of this thesis is to bring forward an approach and a time definition, which places the user/customer, in this case the passenger, in focus, as this is the most relevant time definition for the passenger.” I.e. this thesis merely extends beyond the ferry transportation speed, to the speed effectiveness of required land transportation and port terminal operations.

Empirical evidence, method and theory

Three ferry lines are analysed with regard to transportation times, technical matters, harbour and sea conditions, as well as regulations and environmental issues. Most empirical evidence is collected from the Scandinavian ferry routes.

There is no clear method applied in this thesis. It remains mainly descriptive and various time-aspects as between conventional and fast ferries and terminal operations are discussed. Conclusions are drawn inductively, based on real-life observations.

The systems approach is paradigmatic. As this is a relatively descriptive thesis the approach seems to be to extend systems thinking to passenger ferry transportation and the concept of time in the ferry business.

Contribution

Practical ferry transportation issues are conceptualised. The thesis emphasises the importance of defining the boundaries of passenger sea transport so that terminal operations are also included instead of merely sea transport times. This thesis seems to have a rather descriptive and technical approach, leading to clearer definition of the concept and the meaning of time in the passenger ferry business. Lack of identifiable methods and a clear research problem makes it rather difficult to assess its contribution, which is understandable, as this is a pre-study type of research, making early conceptualisations of practical matters.

Managerially this thesis brings attention to various time and cost components of the transportation systems. It is specifically emphasised that time-saving by increasing sailing speed are much more expensive than the reduction of terminal costs. This information and conceptualisations might be potentially useful for passenger ferry company managers when they plan their transportation systems and competitiveness. However, neither concrete ways of utilising this information nor models to make calculations are presented.

Hultén Lars (1997) Container logistics and its management. Chalmers University of Technology. Göteborg.

Purpose

“This dissertation is concerned with the modus operandi of a container transport system, and it seeks to develop, and contribute to, models and descriptions of the system. This includes descriptions of how the system interacts with its environment, of how various parts of the system interact, of how the complexity arises in the system and of the role of information in coping with the systemic complexity. The analysis primarily considers the situation of a shipping company.”

Empirical evidence, method and theory

Empirical evidence is included in the six associated papers. The role of the empirical evidence is to identify research problems in a grounded approach style, to gather information for modelling and to illuminate phenomena, but not to test a hypothesis.

The systems approach is paradigmatic. Additionally the author considers that this research is highly interdisciplinary and recognises the use of cognitive psychology, transport economics, cybernetics, early information theory, and - interestingly - also thermodynamics and entropy. These are discussed from the point of view of adapting them to transportation systems. Although the systems approach is chosen, the author does not take an overly critical view of analytical approaches. Instead he sees that this thesis is a combination of general systems description and disciplinary language development, language meaning natural language, graphics and models.

Contribution

This is a rather exploratory and descriptive study, contributing mainly to the basic understanding of a very complicated container logistics system. Providing such basic and structured understanding of container logistics allows academics to formulate further theory- or hypothesis-testing kinds of studies in the future. Most importantly this thesis suggests the application of systems thinking rather than operations research in transportation logistics and particularly container logistics issues. As the author states it, the approach has been to gather empirical evidence and to engage theoretical concepts and findings from various disciplines to describe the system.

It is unlikely that the thesis provides much managerial contribution to shipping lines. Container logistics decision support systems are mentioned but the author states that decision support is outside the scope of this thesis.

Inkiläinen Aimo (1998) Managerial view on distribution systems – heuristic justification of centralization and postponement. Helsinki School of Economics and Business Administration

Purpose

The purpose of the thesis is “to devise a clear-cut framework that management could apply in setting the priorities for reconfiguring the distribution system.”

Empirical evidence, method and theory

Three case companies are presented (Schneider Electric Oy, Oy Ford Ab & Nokia Mobile Phones).

A heuristics method is applied, with simulation to define the main dimensions. Heuristics is claimed to be a suitable tool to fill the gap between theoretical modelling and theoretical modelling techniques. I.e. heuristics is aimed to find near-optimal solutions quickly in the real decision-making environment. The model is tested by questioning managers about the justification of the attributes in the model, and later in comparison with the current distribution systems of the case companies by requesting experts to fill in heuristics data sheets on the basis of the relevant characteristics of the case companies.

The managerial heuristics model rather than strong theoretical root dominates the focus of this thesis. The conceptual framework is very thoroughly constructed from a pragmatic point of view, taking concepts applicable to distribution solutions.

Contribution

The thesis is quantitative and highly managerial. The strong conceptual frameworks and the use of simulation are used to define the significant dimensions of the heuristic model, which is then not left open to surprising findings from the empirical evidence. Contrasting findings simply falsify the applicability of the model in those specific cases and require modifications to the entire model from the beginning. The model in itself is limited to purely financially justified decision-making. As such the thesis gives a significant theoretical contribution though introducing a model, which is further tested with the case companies.

This thesis is an interesting example of how to contribute to pragmatic problem solution though building a model and even testing the created model in the same work. The author sees the thesis as constructive. In my opinion it is also decision oriented in its nature, as it is not attempting to give normative advice to the case companies. Instead it provides a practical and tested model applicable to practical distribution decision-making for the future.

Jahre Marianne (1995) Logistics systems for recycling – efficient collection of household waste. Chalmers University of Technology

Purpose

The purpose of the thesis is confusing and given differently in several instances. The following quotation should give an idea: “How to describe and explain the design of a collection system according to different system environments in order to achieve high logistics performance in terms of low costs and high service.”

Empirical evidence, method and theory

Almost 50 recycling systems were examined in an exploratory study. Later three cases were investigated in depth.

This thesis applies multiple methods, such as exploratory and in-depth case studies, statistical methods such as regression and correlation analysis, as well as modelling, to assess costs and service levels of various systems. The open-ended exploratory case study was made in the beginning to create nine propositions which were then answered in the following and more predetermined phases of the research. All in all, this thesis makes an interesting combination of exploratory case methods and exact statistical, modelling and simulation methods. Emphasis is in the more predetermined positivistic types of methods.

The systems approach is paradigmatic. Additionally the concept of postponement is found to be applicable in reverse logistics and recycling issues.

Contribution

The academic contribution includes theory generation through an application of systems thinking to recycling systems, as well as a model for recycling system evaluations and for testing the developed propositions. An application of postponement concepts in recycling systems contributes as a new application area of a well-known concept.

Managerial applicability is indirect and emerges from illustrating various alternatives for efficient recycling planning and aspects which should be considered when planning for an efficient recycling system. The discussion on the effect that population density has on the structure and costs of an efficient recycling system will be especially useful for those planning recycling. In particular, the number of materials that can be efficiently collected and the point of sorting (either at the consumer or at a specific centre) are valid findings for practical purposes. There is a heavy emphasis on costs but attention is also paid to the service ability to various related groups of recycling systems.

Jalkanen Kari (1996) Suomen satamien toiminnallinen rakenne, työnjako ja kehitys. University of Turku. Turku.

Purpose

“To chart the functional structure of Finnish ports in the mid-1098’s and to analyse how the division of labour between them developed from the early 1970’s to the end of the 1980’s.”

Empirical evidence, method and theory

The empirical evidence consists of statistics, the main source being merenkulkuhallitus. 1985 was chosen for in-depth analysis, since there was particularly detailed statistical information available for that year.

Factor analysis is the main method of analysis. Additionally Ward’s grouping method, the Hirschman index, shift & share analysis and other statistical indexes and analysis methods are used.

There is no identifiable paradigmatic theory. Several concepts that are used in geographic research are described briefly. Empirical evidence and analysis clearly dominate the thesis.

Contribution

Although there are no stated hypotheses, this thesis takes a clearly positivist approach. Objective analysis of statistics offers a clear picture of the functional diversification and changes in Finnish ports. Factor analysis and various statistics calculation and indices describe the reasons for the functional diversification of ports, as well as changes in the structures of sea trade and ports. The drawing of a hypothesis from a sound theoretical framework would have greatly enhanced the generalisability of this thesis, as it would have allowed more systematic theory-testing in addition to descriptive presentation of empirical data.

Explanations for the functional diversification of ports are sought in industries in the harbour hinterlands, administration, land transport connection, foreland characteristics and other reasons. This analysis is conducted for two time periods (1972-1973 and 1988-1989) allowing the explanation of causal reasons for changes and enhancing the explanatory credibility of the findings. The analysis is also prepared separately for various types of trade goods. All in all the amount of collected empirical data is astonishing and highly diversified analyses are illustrated showing functional diversification from many aspects.

The managerial contribution is not obvious, although this kind of information may prove useful for the planning and management of ports, as it improves understanding of the reasons behind the functional diversification of ports.

Janhunen Antero (1994) Toimitustäsmällisyyden suunnittelumentelmä. Lappeenranta University of Technology. Lappeenranta.

Purpose

The aim of the thesis is to develop a method that enables the planning of time accuracy of deliveries within delivery routes in a manner that allows achieving set delivery accuracy limits with the lowest possible cost. (A translation from the Finnish)

Empirical evidence, method and theory

A single case (Neste Chemicals) is used to illustrate the developed method in practice. The case company provides only the distribution structure, market areas, and division of delivery times. Other values are randomly fed into the simulation. An artificial construction of a delivery system would have sufficed to provide a similar testing of the method to that provided by the case company. As such this is not really an empirical thesis. An exception is the information on percentages of successful deliveries, which are actual and compared to the simulation results.

There is no particular theory in this thesis. The discussion is mostly mathematical language, which includes some formalisations of the basic assumptions. The mathematical discussion concentrates upon formalising the duration and standard deviation of transportation.

Contribution

This thesis lacks strong theoretical foundations. The academic contribution consists in the creation of a formal (mathematical) method for discussing the accuracy and costs of alternative delivery links. The method can be used for theoretical calculations of delivery speed, accuracy and costs for various delivery routes between two points, when there is perfect information availability on costs, when distribution times are normally distributed, and when no arbitrary limitations or opportunities exist. Additionally the method allows that deliveries move through several stages, optimising the speed, accuracy and costs of the whole delivery path rather than just a part of it. An optimum path is considered to give acceptable delivery speed and accuracy at the lowest possible cost.

It is difficult to find any managerial applicability in such a formal and simplifying method as presented in this thesis. E.g. capacity, stock-out, forecasting and planning, and long-term contracts find no place in the method. The author also states that practical situations differ so much that the method needs to be tailored for each setting. This would require skills and effort which are unlikely to be available in practical situations.

Johnsson Mats (1998) Packaging logistics – a value added approach. Lund University. Lund.

Purpose

The objective of this approx. 170 page thesis is stated as: “to structure and analyse interactions and relations between logistics and packaging and to identify potential improvements of the total logistics chain by integration of the two disciplines.” This purpose is divided further into (1) identification of inter-related activities in packaging and logistics, (2) identification and development of decision support tools, (3) identification of areas requiring development.

Empirical evidence, method and theory

Theory and the existing literature on packaging is considered a serious problem. Thus four case companies were used to spot different problem areas in packaging logistics. A survey was then used to test whether the findings were generally applicable to industry. Finally a model was developed.

Data collection was begun with open-ended questions. Several visits and interviews at each case company were made as previous answers gave rise to new questions. Observation also seems to have been a method for data collection.

Contribution

This thesis takes a pioneering role in combining packaging and logistics. The lack of an existing literature and theory is filled by a grounded approach, seeking relevant issues in the case companies. A survey is used to test the generalisability of these findings, rather than to test any generated theory. A model is then built on the basis of Porter’s value chain, illustrating packaging as contributing to the value-added of a business. Additionally a balanced scorecard based framework is suggested as being able to translate the packaging strategy into practice.

The managerial contribution is obvious. The thesis occasionally takes a normative approach, indicating some solutions which the case companies ought to consider to their practical packaging problems. However, the normative approach does not prevail in the thesis, and most of the practical solutions are observed from companies with an attempt to generalise on a broader sense. The managerial contribution is in making managers realise that packaging issues should be taken into account when making logistics decisions, rather than thinking that these are very down-to-earth and non-complex issues. In conclusion, this thesis takes a very practical topic and attempts to conceptualise in a manner that may contribute to better business performance.

Juga Jari (1996) Changing logistics organization. Turku School of Economics and Business Administration. Turku.

Purpose

”To describe and analyse, both theoretically and empirically, the changing logistics organisation within its particular external and internal context.” It is further stated that the thesis “describes organisational changes along three elementary dimensions: technical, political, and cultural.” The “rediscovery of processes” and the emphasis on organisational structure are the carrying idea of this thesis.

Empirical evidence, method and theory

Three case companies (Multilift, Hackman and Enso) are presented in individual journal articles. Cases are based primarily on interviews and supported with annual reports, statistics and internal documents. The respondents were allowed to comment on preliminary interview reports. One of the cases is on an operating unit level, while the others are on corporate levels.

The idea is to discuss process organisations, but there is no specific theory mentioned. “Rediscovery of processes” seems to be the basis of the thesis, and in the last of the three articles network theory is related to process thinking. Transaction cost and contingency theories are discussed but rejected. Both processes and networks are explained as systems within individual companies, without extensions to intra-company relationships. However, the starting point of the thesis is clearly on the conceptual framework, which has only loose ties with strong theories. Observations are based on this framework.

Contribution

Analysis of the cases shows that the emphasis has been on describing and understanding the organisational transformation process, giving little normative advice. The case descriptions are still highly managerial, as the principles and the actual transformation of process organisation are explained with a heavy emphasis on showing the benefits for the companies. It is obvious that the research was involved with the companies, having the role of a facilitator for organisational change, but unfortunately, the details are not explained in the thesis on the grounds of confidentiality. The thesis is highly ideographic, with very modest attempts to generalisation, the cases being analysed independently from each other.

Thus the thesis descriptively contributes to managerial understanding of the change concerning process organisations, but fails to harness the opportunities of generalisation and strong theoretical contribution.

Korpela Jukka (1994) Analytic approach to distribution logistics management. Lappeenranta University of Technology. Lappeenranta.

Purpose

“The objective of this thesis is to develop decision support systems for the different phases of the distribution logistics strategic management process by applying the Analytic Hierarchy Process (AHP) that is a decision-aiding method developed by Saaty (1990).”

Empirical evidence, method and theory

The AHP method is very clearly the starting point for this thesis. It is applied in the case of ten different problems within one company (Kymmene Oy), nine of them presented in separate conference papers, and one as a submitted journal article. Alternative methods to AHP are merely listed in the thesis as: listing pros and cons, Delphi technique and multiattribute utility theory. These alternatives are not further discussed. The case company was chosen on the grounds of the author’s employment in that company.

The AHP method in itself is applicable to a wide array of problems, since the significant variables of the quantitative part of the analysis are found with qualitative interviews and they may freely differ in every case, making this a very flexible method.

Contribution

The contribution is fully pragmatic, as the application of the AHP method was aimed to support decision-making in the Kymmene Corporation constructively and directly. The contribution of the thesis is to the case company, where decision-making was facilitated, the AHP method making ambiguous problems quantifiable. Lack of theoretical discussions, and acceptance of the AHP method without apparent consideration of alternatives, makes this thesis theoretically handicapped.

Lehmusvaara Antti (1998) Improving the potentials of logistics processes: identification and solutions. Lappeenranta University of Technology. Lappeenranta.

Purpose

The aim of this thesis is “to propose analytic tools for supporting strategic level logistics decision making by emphasising service level elements on two levels: (1) to introduce and propose approaches to categorise the developing efforts of logistics and (2) to introduce and/or propose approaches for solving some customer service related strategic level logistics problems.”

The problem comprised a brief introductory part and eight publications.

Empirical evidence, method and theory

The eight papers presented in the thesis provide the empirical evidence from a variety of companies and supply chains, as well as all Finnish municipalities. The investigated units are not mentioned by name.

Methods vary greatly from paper to paper, choices depending generally on pragmatic issues. Multiple case interviews, AHP, mixed integer linear programming (MILP), modelling and surveys are all used – whichever seems to fit best to the problem at hand (Observation→Method). In some of the papers AHP and MILP methods seem to be selected and before the case (M→O).

In addition to a fragmented use of methods, there is no theory discussion in the monograph part of the thesis. The thesis is highly pragmatic, with development efforts towards real life situations, by the use of any means found to be applicable for each case.

Contribution

The pragmatic nature of most of the papers shows that the contribution has been to the case companies and municipalities. Part of the contribution has been analysis of the major logistics problems of the observed companies or municipalities, while in addition other companies are helped to improve their logistics. It is difficult to identify any theoretical testing or contribution, although the thesis serves well as a guide for the application of various methods to various cases.

The openness of the framework is blurred, as there is no identifiable conceptual framework in this thesis. Papers are based on open-ended survey, AHP, as well as on predetermined surveys. The thesis remains on the descriptive level, there is no theoretical discussion, the conceptual framework is fragmented, and the presented regularities or interpretation of the findings are modest. As such, more discussion and conclusions of the experiences for applying various methods would have greatly enhanced the academic value of this thesis.

Lehtola Richard (1997) A conceptual approach to the analysis and evaluation of the logistics of a company and its business chain. Tampere University of Technology. Tampere.

Purpose

The purpose is “to produce a conceptual model with which the logistics of a company and business chain, and in particular of the customer-supplier relationship, can be analysed and evaluated with attention being paid simultaneously to the overall functioning of the business chain and to any point of detail within in.”

Empirical evidence, method and theory

A single case study (Serla) is used to validate the model which is being constructed. The case is used twice: once for a preliminary analysis that helps towards refining the model, and once for in-depth analysis to validate the model. Several business chains are analysed within the case. Data is collected mainly through interviews but also through internal reports and bookkeeping records. Data collection is clearly structured through the theoretical framework, and the case company is used for testing the model with real quantitative data.

Systems theory is considered to be most appropriate, as it is seen to allow limitations to the model without ignoring the world outside its boundaries. Additionally there is a thorough and in part highly philosophical discussion of measurement theory, as quantitative measurement is seen as the basis of for the use of the model. The constructed model is extended to first tier suppliers and customers, in which case transaction cost theory and network theory are briefly discussed.

Contribution

The main contribution of this thesis is clearly in building a model. The model is a novel combination of logistics value chains and measurement theory in a systems context. Additionally the model is tested in a case company.

A normative approach seems obvious at the beginning of the thesis, as the normative aim of the model is specifically stated. Advice on optimal ways of managing things is indeed given on a conceptual level. The model as such is a generalisation of a flexible tool that can be applied to many practical situations, allowing varying quality of measures in each case. However, the case study is far less normative than the beginning of the thesis suggests. The model is used to make an analytical description of the measurements used in the case company's processes, as well as in those of some of its first tier suppliers' and customers'. No normative work in the case company is reported that reaches beyond raising the awareness level on problem areas and gaps in the measurement system.

Lindau Roger (1995) The impact of high-quality information on performance in manufacturing. Chalmers University of Technology. Göteborg.

Purpose

“...to show how high-quality information affects performance in manufacturing.”

Empirical evidence, method and theory

Empirical evidence is gained from multiple case companies (interviews, observation, archives) and mail surveys.

Both quantitative and qualitative methods are used. Qualitative methods are used to identify problems within the case companies' manufacturing systems. The information obtained is then used to build a simulation model, giving quantitative data on the effect of high-quality information on a manufacturing system.

It is difficult to find any prevailing theories in this thesis. Production planning and control to reduce waste seems the only paradigmatic idea.

Contribution

The contribution lies mainly in the academic testing of the framework with the information found from the case companies. I.e. the thesis tests whether the ideas regarding the significance of information to manufacturing performance work in the case companies. However, the author keeps practice in mind, and even discusses the poor practical applicability of the findings in one of the papers.

The qualitative data is used as a basis of inductive reasoning to form the simulation parameters. However, such theory-building from empirical evidence seems modest. Instead cases are mainly used to describe a real-life environment for simulation models, or to describe improvements caused by the use of various information-flow enhancement procedures. The main contribution of this thesis lies in simulations on manufacturing systems, as well as in describing practically-applied variations of data capturing systems, and the resulting operational improvements.

Managerial applicability of the findings seems fairly limited. It is possible that the simulations and critical assessments of the effects of company procedure have helped the management of the case companies to re-plan their information capturing and flows, but this is not addressed in the thesis in any way. Instead the author concludes that practical applications of the results are difficult to realise.

Norrman Andreas (1997) Organising timebased distribution in transnational corporations, integration between logistics and organizational structure. Linköping University. Linköping.

Purpose

“...to contribute to the knowledge of organising time-based distribution.”
The thesis has a clear focus on organisational structures of distribution in individual companies from the point of view of responsibility and ownership of goods in the distribution channel.

Empirical evidence, method and theory

Three cases are described: Atlas Copco Industrial Technique, Pharmacia Biotech. The cases are described in greater detail in the author's licentiate thesis, while the doctoral thesis focuses on making inductive theoretical explanations based on that evidence. Case descriptions are based mainly on interviews but also on secondary material such as annual or internal reports.

The starting point for this thesis is in the time-based distribution framework. The framework is open to findings in the cases, making the role of the cases to be merely descriptive. However, the heavy emphasis on time-based-distribution framework rules out a fully grounded approach.

Contingency theory is seen as fundamental, as various situations are explained in order to find various distribution structures and their reasons. TCA theory and IMP approach are rejected.

Contribution

The main contribution of this thesis is clearly in theory-formation from the ambiguous data described in the cases - no hypotheses are tested. The thesis is not normative, but it includes applicable managerial solutions to different situations, and thus is characterised by a “hidden” pragmatism. Generalisability is considered especially high on geographical peripheries and business-to-business products, and the theoretical contribution provides a list of areas that should be emphasised on a normative framework. As such this thesis offers a good basis for normative follow-up studies.

The main contribution is in discussion of how time-based distribution is applied in companies, and the indications that applying time-based distribution affects the organisational structures of the companies. The latter contribution in particular matures sufficiently for the author to form a model.

Ojala Lauri (1995) Logistics management in Finnish foreign trade transport. Turku School of Economics and Business Administration. Turku.

Purpose

The purpose of this thesis is to “analyse logistics management in Finnish enterprises in order to explain the changes that have occurred in the governance structure in Finnish foreign trade transport of general cargo during the past 15 years.”

The thesis includes a lengthy monograph and four articles.

Empirical evidence, method and theory

Empirical evidence describing the institutional structure and structural change in the Finnish shipping industry is plentiful. This data is collected from numerous public sources, such as annual reports. Usage of only secondary data gives some problems with e.g. non-comparable time-periods. However, secondary data is well triangulated. Analysis of data relies on basic statistics methods.

This is a rather analytical thesis, relying greatly on transaction cost theory. There are also several testable hypotheses in the thesis, relating to the ownership and governance structures between heavy industry and sea transportation. The author had also considered applying network theory to discuss the hierarchical relations that hindered traditional strategic management theories from being applicable with Finnish foreign transport. The relations were considered so complex that these two approaches would have grown into unmanageably large network. As such this thesis has a remarkably well justified choice of a strong theory.

Contribution

The academic contribution can be found in the making a well-founded link between TCA theory and logistics, thus contributing to building a theoretical foundation for a managerial concept, as logistics was seen at that time. Paradigmatic reliance upon a strong theory allows only the weak generation new theory, because the theory is applied in an entirely new field.

The managerial contribution is difficult to find as the thesis focuses on broad meso and macro levels. Political decision-making could benefit from such knowledge about efficiency with different governance structures of the shipping industry.

Seppälä Ulla (1997) An evolutionary approach for locating economic facilities. Finnish Academy of Technology. Espoo.

Purpose

The aim is "... to develop a normative model for the location of economic facilities before equilibrium is reached or where it is not reached at all." This aim is then developed into the following questions:

1) Can an evolutionary approach be applied in studying the location of economic facilities? 2) What are the advantages and disadvantages of an evolutionary approach in studying the location of economic facilities? 3) In what kind of problem situations concerning the location of economic facilities should an evolutionary approach be used?

Empirical evidence, method and theory

Five cases (Alko, Valio, PPG Industries, Nokia Telecommunications, Rank Xerox) are used to test the model. Four of the cases were companies wishing to use the model to test alternative structures and one case was based on historical data and compared to the present situation of the company.

Several location theories and evolutionary approaches are discussed before the author constructs her own model. Comparing this thesis to the other theses it seems clear that theory development in geography has been developing for a long time compared to theory development in logistics.

Contribution

The construction of a normative location model for dynamic environments is the main contribution of this thesis. The academic contribution includes a discussion of the model compared to traditional location theories and models. This discussion depends mostly on formal mathematical language. Thus the thesis test traditional location models and builds its own evolutionary model.

The model is tested in several cases solving managerial problems. The model goes beyond static models, attempting to be applicable to real dynamic environments, where customer behaviour changes depending on the firm's decisions. As such, the model can be used to find the most robust locations. The constructive model has gone through a weak market test, i.e. several companies used it, but no decisions were made based solely on the results.

The model gives a sound starting point for location decisions, although the model is without doubt highly managerial. However, its applicability is significantly limited due to many sharp assumptions made in each of the cases. Thus this model needs to be significantly complemented with a use of sound thinking about other factors effecting location decisions.

Seristö Hannu (1995) Airline performance and costs – an analysis of performance measurement and cost reduction in major airlines. Helsinki School of Economics and Business Administration. Helsinki.

Purpose

“Primarily, what are the potential ways to reduce costs in airline operations. Secondly, how applicable are they in the case of major European carriers.”

Empirical evidence, method and theory

A survey and statistical analysis were used to gain a cross-sectional analysis, and a single case (Finnair) was used for longitudinal analysis. The survey was sent to 115 senior managers in 28 European airlines. A statistical data file of 42 airlines was created comprising 78 variables. Data for the statistical analysis was collected from annual reports, timetables, and trade magazines. In the case study all 28 managers of the case company were interviewed and additional data was collected from annual reports.

Statistical analysis included parametric and non-parametric measures. It is concluded that simple partial measures are most useful for management decision-making. Correlation, factor and regression analyses are used. These analyses are summed up in a model illustrating the interdependence of a range of variables to airline performance. The case study takes a very practical and situational approach in discussing various costs and cost-cutting opportunities for Finnair.

The author sees that the thesis is driven by its substance and is not structured around any specific theory or paradigm. Yet Chandler’s (1962) strategy-performance-structure paradigm is seen as the one that covers most of the relevant issues. Systems theory, the theory of strategic decision-making and the theory of strategic marketing are seen to be relevant by the author, but no single one dominates.

Contribution

The author sees that this thesis takes a managerial perspective with little emphasis on theoretical issues. The thesis was motivated by the observation of heavy losses in European airline industry, causing the search for cost-cutting alternatives. Extensive empirical material on airline costs, and ideas for cost cutting, are interesting and practical reading for airline management. The case study part is also highly managerial and interesting to Finnair’s management.

The mathematical complexity of some methods is likely to limit their practical usefulness. Theoretically the thesis contributes to formalisation of strategic decision-making frameworks into a mathematical model for airlines.

Tanskanen Kari (1994) Supplier management in just-in-time manufacturing. Finnish Academy of Technology. Helsinki.

Purpose

The purpose of the thesis is found in the three main questions: 1) What are the elements of good supplier management system in just-in-time manufacturing? 2) Under what circumstances are these elements appropriate? 3) What is the process by which companies should develop their supplier management?

The focus is on the supplier management of manufacturing industries, covering the strategic planning process, the tactical level process and the planning of operations. Supplier management is seen mainly as supportive of manufacturing – preferably JIT manufacturing.

Empirical evidence, method and theory

Four case companies are analysed: Nokia Mobile Phones, Saab-Valmet, Kawasaki U.S.A., Elopak Engineering. The companies have differing market growth and process types (one-of-a-kind, batch, repetitive), and the case descriptions intend to illustrate what type of supplier management is good for what type of companies. The alternative ways of supplier management are divided into universal and situational factors, with the claim that these are interconnected. The method for acquiring case information is not explicit. The information of the Kawasaki case is said to rely on public information, while the others are said to include the researcher's involvement.

The theoretical discussion is limited to the framework of concepts applicable to this thesis. However, the approach seems situational (contingency approach) as the typology of the thesis categorises case companies in order to find different universal and situational factors that contribute to supplier management. As such, openness to situations keeps the framework somewhat open-ended.

Contribution

The author seems to have a highly normative approach, as “to form a normative method for developing supplier management” is considered a central part of the thesis. Even though the approach seems highly normative, however the main contribution is in theory rather than in pragmatic involvement in enhancing company performance. Normative results clearly suffer from inadequate documentation of case descriptions. The main theoretical results are found in the conceptual discussion of the framework of the thesis where the situational factors are explained in a logical and causal means-ends manner.

Tinnilä Markku (1997) Division of service and business processes. Helsinki School of Economics and Business Administration. Helsinki.

Purpose

There is no single purpose clearly defined but the following quotation gives a good idea of the aim: "... a systematic analysis of the principles of developing and dividing business processes, and also as assessment of the operational, organisational and strategic aspects of processes and process structures." The focus is on the conceptual division of processes into service and business process. The principles of describing and measuring processes are also examined. One chapter is based on a journal article, presented within the text.

Empirical evidence, method and theory

Kone Elevators is the single case, and its role is in testing the proposed concepts. Data collection included interviews, supported with internal documentation, annual reports, and earlier academic research material.

This study focuses "on developing frameworks and concepts for analysing service and business processes, rather than empirically validating earlier proposed models and frameworks." The developed service process analysis (SPA) model aims to determine the most efficient delivery channel as a trade-off between transaction and production costs of services.

The thesis includes a relatively weak theoretical background based on behavioural and decision models and TCA. The author sees, that due to insufficient theory in the field, it important to contribute to conceptual theorising of business processes (SPA model is such theorising).

Contribution

The thesis strengthens the basis of ambiguous concepts and uses a single case to describe and generate concepts, rather than specifically testing them.

Theory testing is weak as a loosely TCA related application in the SPA model, which is then conceptually compared to other service classification models. The emphasis is clearly on adding to the explanatory power of previous models from the point of view of customer service processes.

The managerial contribution can be found in the model's ability to suggest suitable solutions for distribution process differentiation, and to provide a typology for the discussion of pros and cons for the organisations. Additionally "repositioning of services" may help in discovering new niche markets.

The division of process measurement into operational, and organisational & strategic levels also has managerial applicability, helping to find situational misfits compared to service requirements.

Wedel John (1996) Lead-time reduction in manufacturing – from initiation to realisation. Chalmers University of Technology. Göteborg.

Purpose

“... how improvement processes are to be managed in order to ensure high efficiency in lead time reductions.” The thesis subdivides this general purpose into several subpurposes which are treated separately in the papers. The criterion for the division into sub-purposes is mainly in the phase of change (initiation to realisation and follow-up).

Empirical evidence, method and theory

The thesis includes six papers, one discussing lead-times generally in Swedish industries, and the rest focusing on one part of the lead-time reduction process each (2 initiation, 3 planning and goal setting, 4&5 implementation and change, 6 follow-up).

Several case companies were included. Data was collected using interviews and internal documentation, as well as a mail survey. Case studies dominate as they are used in five of the papers, compared to one survey.

The structure of the mail survey is clearly pre-determined, and the cases also seem to be primarily aimed at testing the frameworks of the thesis.

The lack of relevant theory in logistics is recognised as a problem, which the author attempts to overcome by using theories from such disciplines as change management, strategy and organisational theory (no specifications).

Contribution

“This work is aimed at trying to explain phenomena and developing theory in order to increase knowledge about basic conditions for the lead-time reduction process, so that companies can benefit from findings.”

There is a hypothesis-like proposition given for each paper. The survey and the numerous cases act primarily as theory-testing or explanatory devices. The cases also provide some input in developing the testable frameworks, thus the cases are also used for grounded theory-building. This is an interesting approach, as the lack of change theory is considered a problem in this study. Thus the author conducts his own theorising, in order to provide a framework, which he then explains with further findings. As a result the framework is open in most papers; however, some papers use a predetermined survey, and the role of cases is more in explaining the process than in theory creating.

Many dimensions of a change process are discussed in a manner which provides managerial guidelines for lead-time reduction. However, direct normative advice is avoided.

Virolainen Veli-Matti (1998) Motives, circumstances, and success factors in partnership sourcing. Lappeenranta University of Technology. Lappeenranta.

Purpose

The purpose of this study is "to add to the general knowledge of strategic partnership in partnership sourcing and to provide a framework for improving the understanding of problems related to the implementation of partnership sourcing." There is some confusion about the aim of the study as later the author states that "the ultimate aim of this study was to improve the understanding associated to partnership sourcing" (p. 211) and "the purpose of this study was to provide a holistic view and deep understanding of the phenomena of partnership sourcing" (p. 213). In any case the essence of the purpose is in finding genuinely different types of partnerships and the motives of the buying company for entering into partnerships, as well as critical success factors on a company (micro) –level.

Empirical evidence, method and theory

This is a single case study (Nokia Telecommunications), analysing five business units. Open-ended interviews are a main source of data.

Transaction cost theory dominates, but agency theory is also mentioned as providing some explanatory power in partnerships.

The core issues of the framework of the thesis are on make-or-buy and purchasing decision-making. Alternative purchasing strategies are introduced, with the following being the most important elements of purchasing strategy: make-or-buy decisions, number of suppliers per product, length of contract, structure of supplier network, supplier relationships, object, subject, time, and area. Key questions are the number of suppliers and how the suppliers are organised. The theoretical framework is developed deductively from existing literature.

Contribution

Virolainen separates results into theory results and managerial implications. The theoretical contribution is low, as the theoretical framework is summarised from available literature. The approach is clearly theory-testing in the case company. The normative nature of this thesis makes the main contribution on pragmatic level, as it seems obvious that this study was conducted in order to improve the operations of the case company.

Woxenius Johan (1998) Development of small-scale intermodal freight transportation in a systems context. Chalmers University of Technology. Göteborg.

Purpose

The theoretical purpose of the thesis is “to contribute to the understanding, conceptual modelling and description of intermodal transport at different system levels.” This is limited to explorative and descriptive, as there is a lack of academic foundation. Rather it seems that the main aim is more in understanding the underlying structures and processes of intermodal transportation systems, although this is not specifically stated in the thesis.

Additionally “various and partly disparate analytic and even predicting purposes are fulfilled through demarcated studies at different system levels.”

Empirical evidence, method and theory

Empirical evidence was first collected from four transport relations between Swedish and continental cities. After the termination of this project, data was collected from various sources with various methods, including interviews, annual reports, pamphlets, surveys, and observation.

Woxenius goes through a thorough discussion, stating that methods should be selected according to the needs of the research. As there are many different sub-projects ending up in this thesis, there is also a wide range of diverse and mainly qualitative methods. Woxenius also argues that the research question should originate from knowledge of the object of study rather than from knowledge of methods.

Systems theory is clearly a paradigmatic approach, and is applied using some key concepts of the IMP group’s network approach, namely actors-activities-resources –based networks.

Contribution

The approach is heavily grounded with an emphasis on theory generation. The relevance of traditional academic generalisable contribution is denied. The usefulness of findings and theorising is left to the readers, as the thesis only extensively describes the findings. Instead of presenting generalisable results or models, the academic contribution is more in presenting a descriptive report with several conceptualisations. The successful generation of systems theory-based framework in an intermodal transportation context is the most noticeable academic contribution of this thesis.

The managerial contribution comes from extensive descriptions of various systems and development possibilities and even some normative advice. The systems approach also gives management a framework of practical analysis.

Öjmertz Birgitta (1998) Materials handling from a value-adding perspective. Chalmers University of Technology. Göteborg.

Purpose

The thesis consists of six papers (3 submitted to journals and 3 conference papers, all papers have additional authors) and an 85 page introductory section. The purpose is stated as "...to develop a method for evaluation and improvement of materials flow systems regarding the efficiency of the materials handling function."

Empirical evidence, method and theory

Ten case studies are used, mainly for theory-generation but also to some extent to find contrasting views.

Data collection methods are mainly direct and video observation, open-ended and structured interviews, and a PAK questionnaire (for ergonomics). Ergonomics and packaging related issues are especially observed. Additionally non-value-adding tasks in materials handling are sought after for elimination.

This is clearly a grounded theory approach with a very open framework, which was structured only after observation. A systems theory approach is still used in order to make comparisons of the investigated system to a constructed, optimally functioning reference system. This comparison stems from the so-called zero-based analysis.

Contribution

A method is introduced for materials flow system evaluation and improvement. The method can be used to identify non-value-adding activities in materials handling systems. The model measures and compares the materials handling activities of any system to a constructed optimal system, enabling the spotting of problem areas, and directing improvement initiatives.

This thesis contributes to theory also by applying a novel way of mixing ergonomics in material handling system design. Such an approach is rarely seen in logistics research.

The last of the six papers describes a practical test of the developed method in the automotive industry.

Although seemingly normative, the method is relatively theoretical. The method is not likely to offer much to management due to its simplicity as the main idea is merely to spot non-value adding activities to a theoretical optimal. Meanwhile measurements for comparing value-adding to non-value-adding activities, as well as construction of a theoretical optimal, are exceedingly time-consuming approaches for managerial purposes.

1999-2003 SAMPLE

Andersson Jonas (1999) Coordinated multi-stage inventory systems with stochastic demand. Lund Institute of Technology.

Purpose

The main focus of the thesis is the distribution of products and the related inventory control structure and policies. The purpose is stated as “to develop and evaluate methods for coordinated control in multi-stage inventory systems with stochastic demand.” The objective is further divided in two problems: 1) “Coordination of centralised optimisation of local decision rules.” In particular a bullwhip –like effect is analysed in stochastic demand environment. 2) “Coordination of independent decision makers that optimise local decision rules.” The second problem is approached by evaluating various transfer price, penalty and incentive schemes for coordinating the facilities.

Empirical evidence, method and theory

The thesis is article based, including six papers: two journal articles, two conference presentations and two papers which are apparently not previously published. There is no real empirical evidence, all models being imaginary.

The thesis is clearly quantitative and applied a mathematical modelling. The two scenarios that are modelled are clearly pre-defined: 1) One central warehouse with a number of retailers, investigating the decisions on distribution of stocks. 2) Retailer network decision making, which cooperates to cover emergency needs from each others stocks. The models that are developed are validated using simulations.

The approach is characterised by numerous inventory management models that are based on operations analysis research. The approach of this thesis is remarkably similar to that of Marklund (1999), with whom the author cooperated.

Contribution

Academic contribution is found in the developed decision models and simulated validation for distribution systems. I.e. the thesis extends operations analysis constructs by creating new models for decision making.

In principle, this research is very normative but only to the particular situation which in this case is imaginary. Practical applicability of the developed models is limited due to the complexity of the approach and, above all, the limitations in finding practical cases in which the base assumptions of the models would apply. The findings could be applied in the making of analytical software that would support management decision making.

Aronsson Håkan (2000) Three perspectives on supply chain design. Linköping institute of technology.

Purpose

The purpose is stated in several different ways, the main quotation is: “To increase the understanding of supply chain design by using several different perspectives when generating design alternatives”. The purpose is further divided into two research questions about the supply chain design variables and the order in which the variables should be used.

Empirical evidence, method and theory

Empirical evidence is based on a single company (Ericsson) but looking at two units (mobile phones and base stations). Both cases were considered interesting as they were in the process of supply chain re-design. Management interviews were used to capture the importance of different supply chain design variables and also the author’s close involvement for as-is and to-be process design is included in the research process.

The methodology resembles a positivist research in the sense that it uses an a priori framework which is then tested with the empirical evidence. However, the framework is not a deterministic theory but rather the author’s own conceptual development, thus theory testing is more on argumentation and reasoning level. The author calls this approach “satisficing” instead of optimising.

The model built by the author includes supply chain design variables for process, organisation and function. In additions these variables are approached from the point of view of constructs, concepts and activities. I.e. the model takes a rather holistic approach to the supply chain design and structures itself around concepts and methodologies rather than strong theories.

Contribution

Main academic contribution is found in the developed model, describing the areas that should be taken into account for supply chain design. The model is does not possess analytical capabilities, but it is fundamentally a supply chain design methodology that helps in structuring the supply chain design variables.

The main practical contribution is found in the applicability of the model to practical supply chain design projects. The thesis is not openly normative, but it seems obvious from the text that the author has been involved in the supply chain design projects of the case company.

Berglund Magnus (2000). Strategic positioning of the emerging third-party logistics providers. Linköping institute of Technology.

Purpose

The purpose of this dissertation is “to explain strategic positions of the emerging TPL providers (TPLP).” I.e. this thesis investigates the third party logistics phenomenon from the service providers’ point of view. The thesis describes TPLP characteristics and builds a descriptive model of assessing them and thus helping to understand the strategic positioning of the TPLPs.

Empirical evidence, method and theory

54 TPLP firms and qualitative surveys and interviews of 21 TPLPs in several continents are used as empirical evidence.

The approach is a typical “Linköping approach.” It combines a positivistic research approach with qualitative empirical evidence and end up with building a conceptual model of the phenomena.

The thesis combines a positivistic approach of utilising existing theoretical frameworks from strategic core competency theories. However, these theories are applied too loosely explain the TPL phenomena rather than to draw testable hypotheses from them. Instead, this thesis is above all a theory and hypothesis generating research.

Contribution

The “Linköping approach” seems to be capable of providing models that are both academically and practically relevant. However, the author does not use it in a normative way but rather leaves the application to practitioners.

The main academic contribution can be found in the presented model of TPL value creation (the main dimension is strategic vs. operational focus, although more subtle dimensions are also presented). Additionally, academic contribution can be found in the new value creation dimensions that are applicable to service industries and TPL, thus extending the original theories. However, the generated models and hypotheses are not tested.

Practical contribution is not directly evident as this thesis is not normative, or it does not aim to consult any of the specific TPL providers. Instead the developed model is applicable to practitioners, helping to analyse their competitiveness and fit to the needs of potential customers.

Brehmer Per-Olof (1999) Towards a Model of Lean Freight Transport Operations. Linköping institute of Technology.

Purpose

The purpose is “to contribute to the knowledge on management of freight transport operations through developing a conceptual model of lean freight transport operations.” The purpose is further split into six research questions that give more dimensions to the operations.

Empirical evidence, method and theory

The empirical material is collected by qualitative surveys and in-depth interviews in 5 international freight carriers (2 rail, 2 intermodal, 1 road).

The qualitative survey is preceded with a quantitative study, giving a pre-understanding of the investigated phenomena. After this the qualitative data collection and analysis are based on a multiple case study approach with a predetermined framework and questionnaire. Interestingly, the questionnaire framework is also pre-tested with practitioners. As such, this thesis applies principles of positivistic pre-determination and objectivity but reverses the order in qualitative and quantitative methods.

Operations management and principles of lean manufacturing are in the background of this thesis, even though these concepts and principles do not form a clearly definable theoretical framework. These principles and concepts are utilised in the freight transport environment to assess the problems of low capacity utilisation and empty hauls, which largely result from handling of information in isolated silos. The approach is to utilise operations management for efficiency and service (effectiveness) improvement, i.e. an improved ratio between inputted resources and outputted performance and service.

Contribution

The author states that he follows his faculty’s tradition to work with problems that are of importance to the industry. However, this tradition does not provide practical solutions for practitioners but rather conceptualises ideas, making situational practical analysis more structured than it would otherwise be. As such, the practitioners in the industry would benefit from the structured and analytical approach for describing the operational elements and their relations to performance, but they would have to make the application themselves.

Main academic contribution are the developed model for freight transport operations and the related conceptual thinking that applies principles from lean manufacturing to freight transport and distinguishes cost and service focused behaviour. Additional contribution is the model of demand-supply planning in the service industries.

Brodin Maria Huge (2002) Logistics systems for recycling – on the influences of products, structures, relationships and power. Linköping institute of technology.

Purpose

The purpose of the dissertation is “to describe and to analyse how both physical components and co-operative behaviour can influence the effectiveness and efficiency of logistics systems for recycling.”

Empirical evidence, method and theory

This thesis is a direct continuation of the author’s licentiate thesis. Four logistics systems for end-of-life products recycling are used as case studies in the paper and electronics industries. Additionally a survey is conducted to gain quantitative data.

The researcher takes a positivistic stance by being a mere surveyor of the cases and not being directly involved. Also positivistic is the authors seeking for causal relations between the effectiveness and efficiency of the logistics systems to physical components (product properties and structures) and co-operative behaviour components (relationships, power, management) of the system. The systems approach is strongly present and it is combined with an analytical, although not statistical, analysis.

There is no strong theoretical background because of the relative novelty of the topic – as the author states. Instead, rigorous efforts are put to build a strong conceptual framework based on the general logistics concepts of effectiveness and efficiency and to build correlations with observations from the empirical data. This dissertation applies a positivist approach interestingly to theory building, which is an approach that seems to characterise the Linköping school.

Contribution

This thesis combines positivistic approach to invention of new theories, as the hypotheses were not preset but they were raised from the empirical material. As such this thesis contributes to the understanding of how to utilise positivistic approach to theory building in a way that is typically connected more with the hermeneutics approach.

The definition of the applied concepts (effectiveness, efficiency, physical and behavioural components) and their correlations is presented from both academic and practical point of view, although the practical point of view is not intended to be normative.

Franzén Stig E.R. (1999) Public Transportation in a Systems Perspective: A Conceptual Model and an Analytical Framework for Design and Evaluation. Chalmers University of Technology.

Purpose

The purpose is in two parts, aiming to develop a model and then applying it to an actual situation: 1) “To develop a conceptual model (and an accompanying analytical framework) of public transportation (limited to mass passenger transport) for the intended use in design and evaluation activities.” 2) “To demonstrate the explanatory and predictive power of the conceptual model the analytical framework by an empirical validation when the model and the framework are applied in local, real-world context.”

Empirical evidence, method and theory

The latter of the above stated objectives includes empirical work as the developed model is applied to the public transportation system in Gothenburg.

The thesis is predominantly conceptual model development. Also the author states that the model is developed for an ideal world. The model is used as a framework for analysing the public transportation system of Gothenburg, with special attention to the information flows (KomFram system) and steering for disturbances. Overall, the approach in applying the model to real world situation seems predominantly descriptive but also some normative advice is given.

Inputs from the network approach combined with ideas from control theory and cybernetics (“the human machine”) are applied in creating the theoretical framework, which can be used to describe, analyse and steer a public transportation system.

Contribution

Academic contribution is found in the developed conceptual model. The model applies previous works of other authors to develop a specific evaluation model for an ideal world. Additionally other potential usages of the model are explained, such as transportation of goods and intermodal transportation systems.

Practical contribution is found in applying the model to the Gothenburg transportation system. The idea behind is that these information inputs are applied by information centre officers, who steering the transportation system making it more efficient and effective for the passenger. In addition to this, the author of this thesis also clearly aims to serve the society in a practical way. The thesis delivers a feeling that the author considers that by promoting the public transportation system by making it more effective and efficient brings positive societal impacts.

Heikkilä Jussi (2000) Managing demand chain management: case study on the fast growing cellular networks industry. Helsinki University of Technology.

Purpose

The main research question is stated as: “What is the architecture of a well-performing demand chain in a young fast-growing industry selling systems with varying hardware and software content to industrial customers?” This research question is further divided into investigating the flow of control information, organisation of material flow and co-operation of the companies in the chain.

Empirical evidence, method and theory

Six demand chains (the author prefers to use the term demand chain instead of supply chain) in telecommunications/cellular networks industry are analysed. Data is collected through surveys and multiple interviews. Data collection and data analysis cycles are used iteratively.

This thesis is predominantly pragmatic. The author clearly has industry experience and a practical interest in investigate how different customers needs require different demand chains. This is investigated through three constructs: information & material flow, customer-buyer relationships and demand chain performance. Also cross-case patterns are investigated to further understand the reasons behind the differences in the performance in demand chains. The author’s opinions of theory and validity are very positivistic and the author clearly seeks for causal relationships. However, the starting point of the author is practical relevance and seeking of improvement potentials. Therefore, the thesis rather freely combines positivistic and hermeneutic (even grounded) approaches.

Clear theoretical background is not easily recognised, but rather the thesis involves principles from different approaches such as industrial engineering and management approach (aims to practical results), controllability engineering (holistic, seeks improvement potentials), HUT approach (seeks for practical relevance) and IMD’s demand chain management model.

Contribution

Based on the survey, the author states several propositions regarding the efficiency of the demand chain. A model and a list of hypothesis are the main academic contribution.

The predominant contribution of this thesis is pragmatic. The main pragmatic outcome being a normative framework, recommending different demand chains for different customers.

Helo Petri (2001) The dynamics of agile manufacturing in the electronic industry – a product availability based approach. University of Vaasa.

Purpose

The research investigates agility, flexibility (response) and costs in electronics manufacturing systems. Two research questions are stated: 1. “What is the effect of cost on agile response (better product availability) in electronics manufacturing?” and 2. “Can this effect ... be explained by those parameters that correspond to different production environments?”

Empirical evidence, method and theory

The empirical evidence is based on company visits and interviews amongst Finnish printed circuit board manufacturers.

The concepts of agility and flexibility are defined very thoroughly, based on extensive sampling of previous research and literature. Based on this conceptual pre-work, a system dynamics model is built and tested in a single case of electronics supply chain. The outcome of the model is that it evaluates the agility of the analysed case company and the results may be interpreted normatively.

The approach is operations research –based. The research applies a systems approach of the production environment, develops a model of the system and tests the model in a single supply chain case.

Contribution

The construction and testing of the system dynamics model in electronics industry is the most significant academic contribution. As the model is based on previous research on agility and it tested it in the electronics industry, this makes a rather positivistic approach and the wider applicability of this model might be of interest for further research.

The research is likely to have contributed practically to the case company as the analysis of the agility requirements helps steering the company to focus on the right type of agility with an understanding of its costs. However, generally applicable practical contribution is not as clearly found as academic contribution, as the models developed require very thorough, time consuming and skilful tailoring to simulate further outcomes in various situations – and may therefore be unpractical in most decision making instances. This was not even the intention, as the author does not make efforts to prove practical applicability of the model but rather discusses the practical applicability of the agility concept through a literature review.

Hilmola Olli-Pekka (2001) Total productivity and its relation to throughput accounting – a deductive single-case study of electronics contract manufacturing. University of Vaasa.

Purpose

The research purpose is stated in the form of two questions: 1) “How total productivity of manufacturing unit could be improved with the use of throughput accounting methods?” and “Why throughput accounting methods cause productivity improvement?”

Empirical evidence, method and theory

Empirical evidence is gathered from a single case company (electronics contract manufacturer) from both publicly available data and also direct access to the company.

The method of analysis is very quantitative and uses statistical analysis of correlations, with an attempt to test existing theory – or rather to challenge existing thinking in productivity and throughput accounting.

It is difficult to identify any strong theoretical backbone in this thesis in the positivistic sense, but several concepts are applied. The author goes into detailed discussions and definition of the total productivity concepts and additionally, the analysis framework is based on theory of constraints, throughput accounting and cost accounting discussions. Also the concept of price recovery is important in the analysis model.

Contribution

The author challenges what he sees to be the presently dominating understanding in productivity, and that there is a certain correlation between total productivity and price recovery and that total productivity is increased when throughput accounting methods are used.

Practical contribution is implicit, as the calculations and the correlations analysed are practical to the case company for its effort to increase productivity. However, there is no direct effort to show managerial applicability of the analysis methods. Additionally a practical misfit is discussed, as the applied productivity model does not take into account currency changes.

Holmberg Stefan (2000) Supply chain integration through performance measurement. Department of design sciences. Lund University.

Purpose

The thesis is built in a monograph part and two papers and the purpose is “to develop a conceptual framework for supply chain measurement designed to positively influence supply chain integration.” Another statement of the purpose is almost similar: “develop a conceptual framework (a model) of measurement systems designed to support the integration of firms in the supply chain.”

Empirical evidence, method and theory

The thesis includes three case studies, two of which are done within Ikea (one of these already for the licentiate thesis of the author) and one for a North American Food company.

The approach is primarily hermeneutic with some applications of the positivist tradition, helping to control the scope and data collection process. The case method for the case data collection is not totally open, but it is structured around a number of propositions. Respondents are interviewed with a saturation principle, attempting to cover all relevant topics. Additionally a questionnaire has been made for Ikea.

This thesis clearly takes a systems approach and there is no strong theoretical base in the positivistic sense. Instead interesting and thorough discussions are made for comparing different traditional measurements and systems measurement.

Contribution

Academic contribution is found in the expansion of the performance measurement system from firm level to chain level. An academically interesting conceptual construct is based on a thorough discussion of relevant measurement approaches, supply chains as systems, and the applicability of systems approach to measurement systems and supply chain integration. This construct suggests that gaining effectiveness and efficiency benefits through a supply chain integration is facilitated with the right type of performance measurement.

The research purpose has also a practical dimension. However, the results and the framework that the author presents are presented in an academic way. They can rather be used to add to the practical understanding by reporting the findings to the case companies, instead of giving direct normative advice.

Hämäläinen Erkki (2003) Evolving roles of steel distributors. Helsinki School of Economics and Business Administration.

Purpose

The thesis investigates the transformation of the roles of supply chain intermediaries (i.e. the parties between the OEMs and the end customers) in steel supply chain, particularly in the Finnish markets. The purpose of the study is stated rather shortly as “to analyse the intermediary roles.” Additionally three objectives are given related to specifying roles of various operators in steel distribution, identifying trends in logistics operations and product characteristics, and examining the development in Finnish steel distribution over several historical periods.

Empirical evidence, method and theory

The empirical evidence largely based on the author’s long experience in the industry. Several frameworks are presented to describe the nature of the industry and the development trend, including descriptions of developments of several companies and time periods in the Finnish markets. Both qualitative and quantitative information is presented but the analysis is purely qualitative.

The author states that a combination of systems and actors approaches is applied in a case study setting. The investigation is, guided by a predefined framework and case study methods are also predetermined. Thus, the research follows a basically positivist approach although the framework is not based on strong theories.

No strong theories are used but rather loosely determined quadrant-formed typologies: 1) Distribution service model, which explains the relation between delivery capability and inventories. 2) Production capabilities model, which relates product mix decisions and automation in production. 3) A product bulkiness complexity model, which explains product characteristics as determinants of supply chain intermediation.

Contribution

Main academic contribution is in the application of several frameworks, for understanding the transformation of a supply chain characterised by bulky and heavy products.

The author has a long experience as a practitioner in the steel industry. The wealth of empirical evidence also shows that the industry specific knowledge has been effectively used to describe the evolution of the value creation activities in the steel distribution chains. These extensive descriptions make the dissertation a useful framework for practitioners trying to understand the characteristics, developments and future trends in the industry.

Jansen Karl (2001) Network modelling of port terminals – development of a concept and a tool. Chalmers University of Technology.

Purpose

The thesis consists of a short monograph and 5 conference papers and journal publications and the thesis has been part of an EU project (Euroborder).

The main purpose is theoretical and the thesis focuses on development and implementation of a tool for modelling port terminal operations: “to extend combinatorial graph theory to include complex node functionalities so a tool for modelling port terminals can be created.”

Empirical evidence, method and theory

Empirical evidence is based on port terminals but its usage is not clearly explained. Instead, the author states that the lack of accurate enough empirical data was a challenge in the research project.

The thesis applies operations research. A mathematical model of port terminal operations is built and utilised to simulate and optimise the operations.

Systems approach is applied and port terminals are considered as a part of a logistics system. However, the holistic approach, which is common in most systems approach theses, is not applicable to this thesis. This is due to the research area being rather well isolated from the rest of the world, and focusing on creating a deterministic model instead of a holistic system understanding. As such, this thesis seems to have faced pressures to apply the systems approach that is common in Chalmers, even though the applicability of the approach is not necessarily as good as a purely analytical approach would have been. Combinatorial graph theory and neural network theory are combined and applied to model the port terminal operations. Also a strong influence of the network approach can easily be found in the model.

Contribution

The academic contribution is a model which combines and also extends combinatorial graph theory and neural network theory.

The practical contribution is less evident than the academic contribution. The created model can be used primarily to optimise resource utilisation and secondarily cargo flows in port terminals, which are very practical topics. However, making the model an operational tool has not been part of this thesis but is rather left for future research.

Juhantila Olli-Pekka (2002) Establishing intercompany relationships – motives and methods for successful collaborative engagement. Lappeenranta University of Technology.

Purpose

The research question is stated in a very pragmatic manner: “what should an industrial purchasing manager do to assure successful intercompany relationships?”

Empirical evidence, method and theory

Empirical data consists of two case studies that complement each other and a survey. The cases show two intercompany relations of the focal company, one of the cases describing a successful relation and the other one a failure. The survey is conducted for getting more information of these relations from both the customer’s and seller’s perspectives.

The data and the analysis methods are qualitative and largely based on the author’s industry experience, as even the survey is used more like a framework for a structured interview than traditional positivistic surveys.

The author has been an employee of the focal company and a project manager in the specific cases. The author relies heavily on empirical evidence and experiences gained, rather than previous research and theory.

Contribution

The thesis is practically oriented and normative. The practical contribution is a holistic relationship/supplier evaluation model which purchasing managers could use.

As this is a very practically oriented dissertation, academic contribution is not discussed by the author. LUT seems to be the university that takes the practical contribution very seriously, often at the costs of disciplinary contribution.

Kaski Timo (2002) Product structure metrics as an indicator of demand-supply chain efficiency: Case study in the cellular network industry. Helsinki University of Technology

Purpose

The thesis aims to solve the practical problem of how to meet the "...required range of product variations with the delivery lead time and reliability defined by the market as cost efficiently as possible." Additionally the research problem is: "Is it possible to measure a product structure's goodness in terms of demand-supply chain efficiency already in the new product development phase." The research problem is approached from the point of view of developing measurements of the supply-demand chain efficiency and investigating the effects of product structure changes.

Empirical evidence, method and theory

Empirical evidence is collected from a single company (Nokia Networks) in which the author was employed during the preparation of the thesis.

The author states that the approach and the intention is to serve the industry normatively. Additionally, there are traces of a positivistic approach that favours objectivity and seeks for causal relationships. A simulation model is built based on the case company's real business processes, capacity limitations and activity costs. The model is used to investigate effects of product structure changes to operating costs and inventory values for eleven case products. Additionally three real products are investigated for manufacturing and order handling efficiency.

Concepts related to new product development, modularity, mass customisation, product complexity measure, as well as supply and demand chain are discussed as drivers for a product's demand-supply chain efficiency. However, no strong theory in the positivistic sense is identifiable.

Contribution

This is a practically oriented thesis, having a strong motivation to solve practical problems of a single case company. All the models aim to investigate how the case company can improve its operation, and additionally the developed product structure metrics can be applied to many other industries rather easily.

The main academic contributions of this thesis are the developed product structure metrics and the simulation models for a product's demand-supply chain efficiency. Also the developments in the concepts of design for logistics and design for supply chain management are considered disciplinary contribution.

Kämäräinen Vesa (2003) The impact of investments on e-grocery logistics operations. Helsinki University of Technology.

Purpose

This thesis of 5 co-authored journal articles and a summarising monograph approaches e-grocery from a practical perspective, as can be seen from the following objectives: 1) “study how best to implement e-grocery systems to that business can become profitable”, 2) “identify, model and evaluate different logistical solutions that can be used in e-grocery logistics system”, 3) “to find out cost-effective combinations of solutions in different market situations and give guidelines for a successful implementation process.” Additionally the following research questions are stated: 1) “what logistical solutions have the greatest potential in different market situations”, 2) “what is the right combination of logistical solutions”, 3) “how do different logistical solutions and implementation orders affect the overall behaviour of a logistics system.”

Empirical evidence, method and theory

The research is split to three testable and very practically oriented hypotheses, related to distribution centre picking cost efficiency, distribution and grocery reception economical feasibility and payback of investments in e-grocery business. The thesis begins with a rather grounded approach, starting with investigation of literature, observations at companies and practitioner interviews. This is followed by a formulation of hypotheses and the solution models. It is not explicitly stated in the thesis what exact empirical information was used in which state, although there are long lists of practitioners that participated to the project.

The main method is to model picking, distribution and reception solutions to calculate cost efficiency and payback for investment.

The approach is grounded and no strong theoretical framework in the positivistic sense can be identified. However, the systems approach is applied loosely as a basis for the models, with the aim to understand the whole system from a practical perspective.

The research is at partly funded by Tekes (Finnish Funding Agency for Technology and Innovation) and also several other research papers of other authors are related to the same Ecomlog project. Amongst these are also the theses of Punakivi and Yrjölä.

Contribution

The contribution is very practically oriented and directly normative, analysing the distribution and reception solutions and recommending investment approaches for e-grocery.

Academic contribution is not discussed in the thesis but the developed models in a novel research area can potentially be applied in further research.

Lehtinen Ulla (2001) Changing subcontracting – a study on the evolution of supply chains and subcontractors. University of Oulu.

Purpose

The aim of the research is “to improve the understanding of the evolution process of subcontracting chains and explain the managerial aspects connected with the subcontractors’ evolution.”

Empirical evidence, method and theory

The empirical evidence includes three longitudinal case studies from metal and electronics industry from early 1980’s to late 1990’s. Qualitative data from the surveys forms the main empirical evidence and also a supportive quantitative survey is used.

The thesis combines a positivist approach with research and analysis methods that are typically connected to the hermeneutics tradition. The researcher chooses an approach of not getting directly involved in the companies but rather to make long time qualitative observations. Although theory testing is also done to some extent, it is mainly done descriptively and by reasoning than in a typically analytical positivistic way.

Theoretical background is a collection of lean management, supply chain management, manufacturing strategy, IMP (network), strategic network and entrepreneurship concepts, which are then combined in the framework. I.e. this thesis is between theory testing of a positivist approach and a grounded approach which merely uses concepts to structure the information from the cases.

Contribution

Academic contribution includes a four stage evolution model from parts to systems suppliers. The author describes how the relationships in the case studies evolved over time from both the buyer’s and seller’s perspectives and investigates how the co-operation realised. Main features of the supply chain structure are identified and investigated in order to understand how they cause evolution in the relationships. Additionally, the transformation of the subcontractors’ manufacturing strategy during the evolution of the relation has been investigated. As a result, an evolution model and four generic strategies for subcontractors are presented. Practically this is a relevant topic that helps practitioners understand the evolution, but the approach of the author is not normative.

Lehtonen Juha-Matti (1999) Supply chain development in process industry. Helsinki University of technology.

Purpose

The purpose is “to evaluate the applicability of flexible supply chain strategies in the Nordic paper industry environment, to explore appropriate ways to implement those strategies, and to outline and experiment a front-end approach for supporting supply chain development.”

The thesis includes the monograph part and six papers, which were not evaluated as they were not included in the published thesis.

Empirical evidence, method and theory

The empirical evidence is not clearly explained in the monograph parts of this thesis. According to the summarising sections and figures, data is gathered in multiple cases, as well as simulation and modelling. The industry in question is Nordic paper industry.

The approach is clearly positivistic, including pre-set hypotheses and testing of the applicability of flexible supply chain strategies (theories) to the Nordic paper industry. The flexibility strategy is seen as an alternative to the existing efficiency paradigm of the paper industry, and the strategy is approached by discussing principles of JIT, quick response and order penetration point. The author takes a distant from the research object, without the possibility to contribute to the implementation of the developed approach in the industry. The supervising professor seems to have had a big effect to the approach of this thesis, as the “controllability engineering” approach applied to this thesis is developed by the supervisor in the early 1980’s.

Contribution

The models and simulations are not described in the monograph part. However, based on the conclusion and results chapters, these models and simulations form an academically interesting framework for testing the applicability of existing supply chain principles to a specific industry. This is done by testing three preset hypotheses.

Although it is likely that the author has also had some practical intentions, the practical contribution cannot be easily evaluated from the monograph part of this thesis.

Ljungberg Anders (1998) Measurement systems and process orientation with focus on the order process. Lund University.

Purpose

The thesis is a continuation of the author's licentiate thesis and purpose is stated in the form of the following objectives: "Analyse how process measurement methods for the order process can be further developed", "analyse how process-orientated measurement systems for the order process can be effectively developed and implemented", and "analyse the effects of developing process orientated measurement systems for the order process."

Empirical evidence, method and theory

The empirical evidence is from a single case company, which had asked the author to develop an order process measurement system. The approach combines systems and actors approaches, as the research takes a holistic view with the author deeply involved in the case company. Also hints of a constructive approach can be identified, although the construct seems to be generated a posteriori in relation to the empirical phase.

The data and analysis are qualitative and the data was gathered with the researcher being directly involved in the development project of the case company. Also complementary interviews and documentation were used and a field study at another company was conducted.

There is no strong theoretical background in the positivistic sense. The concepts that are applied and explained in detail are measurement and processes – particularly order process is explained in detail and defined widely from customer order to the delivery and customer satisfaction.

Contribution

The case company and the researcher collaborated with a specific business target. I.e. the researcher's primary audience seems to be the management of the case company. The risks associated to a single case study with directly normative aims were largely realised in this research: The author reports severe difficulties with achieving the full benefits with the case company, including a lack of interest of the management, as well as the eventual change of ownership in the company. Consequently the project to which the researcher was involved failed. Great detailed attention is paid to describing the circumstances in the case company during the project, which might be enlightening to novice researchers who wish to research a single case from the inside without having previous company experience.

Academic contribution is significantly limited by the lack of generalisability. This seems to be the issue also with many other actors-approach studies, which are aimed to directly developing the company. A generic "demand-to-measure" method, and a method for how process development projects should be conducted are presented.

Marklund Johan (1999) Supply chain inventory control – Methods for coordination and evaluation. Lund institute of technology

Purpose

The purpose is stated a “to develop methods and models for coordinated inventory control in divergent supply chains with stochastic demand subject to different control structures and information availability.”

Empirical evidence, method and theory

The thesis is article based, including six papers: two journal articles, three conference presentations and one paper which is apparently not previously published. There is no real empirical evidence and all the models are imaginary.

The thesis applies a clearly quantitative, mathematical modelling based approach. The three main scenarios that are modelled are pre-defined: 1) The supply chain control over inventories being centralised in a two level supply chain. 2) The supply chain control over inventories being de-centralised, investigating replenishment and inventory allocation principles in isolation in the supply chain nodes. 3) A supply chain with advance lead time from the customers, which give more opportunities to make inventory decisions. The models that are developed are validated by comparing the outcome of the model to simulated results.

The approach is characterised by the operations research, and combined with probability theory to model the stochastic demand. The approach of this thesis is remarkably similar to that of Andersson (1999) with whom the author collaborated.

Contribution

Academic contribution is found in the developed models for inventory control and utilising the information that is available in the supply chain in an optimal way. I.e. the thesis extends operations analysis constructs by creating new models of decision making.

In principle, this research is very normative but only to the particular situation which in this case is imaginary. Practical applicability of the developed models is very limited due to the complexity and, above all, the limitations in finding practical cases in which the base assumptions of the models would apply – as the outcome of the models is very sensitive to the pre-assumptions that have been made. The findings could probably be best applied in a making of analytical software that would support management decision making.

Medbo Lars (1999) Materials supply and product descriptions for assembly systems – design and co-operation. Chalmers University of Technology.

Purpose

This thesis has resulted of over ten years of hands on project work in assembly systems and related product structures and descriptions in the automotive industry. The objective of the thesis is “to provide a framework for product description with the aim to support and facilitate the operation and design of parallel flow, long cycle time assembly systems.” The thesis consists of a monograph and seven papers (six of these co-authored) in journals and conferences.

Empirical evidence, method and theory

The thesis uses a multiple case approach. A single company (Volvo), yet two separate plants are used for the empirical evidence. The empirical evidence has been collected over various hands-on projects and practical developments.

The thesis is very obviously practically oriented, and can be regarded as a document of very hands on developments over a long period of time. The author indicates that his thesis is predominantly following the ideals of the traditional positivistic and engineering sciences sense, although also approaches of the social sciences have also been included. The natural science approach is dominating when discussing the methods of product design, assembly system layout, components grouping, design of assembly systems and product data in information systems. The social sciences approach is dominating when discussing group work and learning at work. The author sees that “socio-technical systems theory” combines these approaches seamlessly and ensures that the system takes all relevant aspects into account. In addition to hands-on project work, also statistics and experiments have been used as methods.

It is difficult to identify any strong theoretical background in the positivistic sense, as the perspective is to make practical improvements and to investigate topics that support and improve parallel workflows and product descriptions.

Contribution

The author recognises both practical and disciplinary objectives as important. Practical contribution is obvious over the long lists of practical improvements that have been made during the projects, supporting the parallel assembly flow.

Academic contribution is less explicitly than the practical one and is implicitly in the generalisability of the results to other industries.

Näslund Dag (1999) Towards bridging the gap between strategy and operations – a process based framework. Lund University.

Purpose

The purpose is stated as “to develop a framework which facilitates bridging the gap between strategy and operations.”

The thesis investigates the linkage between strategy, operations, change initiatives and measurement, as well as the role of middle managers difficult role in managing this linkage. The thesis is a continuation of the author’s licentiate thesis and it consists of four papers and a summarising monography.

Empirical evidence, method and theory

Three case companies in the Swedish public sector are investigated by interviews and by the author getting directly involved in change projects.

The author’s direct involvement in the investigated organisations appears more of consulting than traditionally research. The approach is clearly based in qualitative analysis and holistic systems thinking, and the author considers it a major achievement of the thesis to do research with an antipositivist and non-quantitative approach. As such, the author of this thesis has a clear methodological preference, which is not common in amongst the dissertations analysed.

There are no identifiable theories in the positivistic sense. Instead, the thesis applies the systems approach and gets directly involved with the research object.

Contribution

Academic contribution is presented in two areas: 1) Defending systems approach, anti-positivism and qualitative methods compared to positivist and quantitative methods and theory testing. 2) A conceptual discussion and modelling of the linkages between strategy, operations, change initiatives and measurement. Apart from the notions that the above areas are interconnected, no model or theory can be identified in the results.

The author has been directly involved in the investigated organisations and that the role has been closer to consulting than research from the distance. Therefore practical contribution in the participating companies is likely to have been significant. However, no serious attempts are made to generalise the finding to practical or normative conclusions. This is probably due to the author’s anti-positivistic approach, which implies that direct involvement with the situation at hands is necessary.

Punakivi Mikko (2003) Comparing alternative home delivery models for e-grocery business. Helsinki University of Technology.

Purpose

The thesis includes five co-authored journal articles and a monograph. This dissertation belongs to the same research project about e-grocery solutions as the theses of Yrjölä and Kämäräinen and follows a similar pragmatic business opportunity evaluation paradigm. This dissertation focuses on the last mile logistics and home delivery of e-grocery logistics and the objectives are “to identify existing and emerging home delivery operations models in the e-grocery business”, and “to analyse and compare the cost efficiency of the alternatives in home delivery solutions by modelling.” The approach is to investigate both cost and environmental efficiency of the different solutions and to compare also to traditional grocery shopping where the customer visits the shop by private car.

Empirical evidence, method and theory

The primary investigation method is to model real point-of-sale data from traditional grocery shopping. Additionally interviews of management in the grocery sector and transportation service providers are used.

As this dissertation is very practically oriented – aiming mainly to evaluate business opportunities and developing a business model for e-grocery – there is no identifiable theoretical background. Rather, logistics, supply chain management, operations management and various operating models are discussed and evaluated. The modelling approach is described by the author as a heuristic model, using a commercially available vehicle routing tool. The approach has been to formulate three practically oriented hypotheses about cost efficiency and environment effects of the various operational models and to answer these with the results of the model. As such this is a typically positivist approach but due to the novelty and the very practical goals the hypotheses are not based in a theoretical foundation but are instead practical cases that are tested for business opportunity validity.

Contribution

The contribution of this dissertation is mainly practical. As the other dissertations in the same research programme (Yrjölä and Kämäräinen), also this dissertation focuses on the development of e-grocery business model. The approach is highly normative.

Academic contribution is not discussed and also the developed models are situational and run with commercially available software. However, the developed models in a novel research can potentially be applied in further research.

Ranta Tapio (2002) Logging residues from regeneration fellings for biofuel production – a GIS-based availability and supply cost analysis. Lappeenranta University of Technology.

Purpose

The thesis investigates the supply and production processes for biofuel and prepares a costs analysis and recommendations for a national supply approach. The purpose is stated as follows: “The main task of this study is to evaluate the availability of logging residues for biofuel production using a GIS-based availability and supply cost analysis.”

Empirical evidence, method and theory

Empirical evidence is collected in field studies and consists mainly of biofuel consumption and costs by geographical location.

Spatial analysis using cartography and GIS models are the main method of this dissertation. The GIS model is done with MapInfo software and includes mainly spatial models of forest fuel resources and related supply costs.

No theoretical framework can be identified. The problem of biofuel supply is summarised around the dimensions of changes in the supply over time and the transportation costs, taking the specific characteristics of each work site into account. A model that includes cost factors for various operation models in a supply chain framework is presented, helping to understand the situational and dynamic characteristics of the investigated phenomena.

Contribution

This thesis has a practical approach in investigating the Finnish biofuel availability and analyses availability per plant and costs. Consequently, the model recommends operational models for the productions and transportation of the raw materials (in this case only logging residues) for biofuel power production per plant. However, as the model is a rather heavy optimisation model and it is limited to logging residues only (excluding e.g. peat, firewood, ethanol, etc.), it is likely to be of limited practical applicability – except for the author’s personal usage. Additionally, more generic results of the potential and costs on macro level for Finnish biofuel utilisation are presented, which may be practically useful information for policymakers.

The academic contribution is purely on theory generation, as the thesis presents a cost model for a specific industry. This is done by applying existing methods of GIS analysis and time study to analyse and recommend operational approaches in various supply-demand situations.

Seppälä Tero (2003) Three perspectives on buyer-seller relationships: A relationship assessment model for investigating buyer-supplier relationships in inter-organisational, inter-functional and intra-functional perspectives. Turku School of Economics and Business Administration.

Purpose

The dissertation is primarily practically motivated, intending to analyse the buyer-supplier relations in the single case company. However, the purpose is more academically stated: “to develop a relationship assessment model and methodology for studying buyer-supplier relationships from inter-organisational, inter-functional and intra-functional perspectives.”

Empirical evidence, method and theory

The empirical part of this dissertation is made from a single focal company's point of view, yet investigating several cases of buyer supplier relations (inter-organisational), as well as inter functional and intra functional relations. In total 9 suppliers and 5 components structures make for the empirical investigation, and include 68 structured interviews.

The author discusses the methodological standing points using several frameworks (e.g. Arbnor & Bjerke, and Burrell & Morgan frameworks) and concludes that the approach is mostly qualitative, subjectivist, nominalist, antipositivist, voluntarist and idiographic.

As the name of this dissertation suggests, this dissertation investigates the buyer-supplier relationships using three theoretical perspectives or approaches: transaction costs theory, industrial networks (IMP group approach) and relationship marketing approach. A very thorough discussion of the applicability and qualities of these frameworks is done and the reviewed relationship assessment models are used as the basis to build the research model and questionnaire. The main components of the assessment model are trust, communication & information exchange, co-operation, risk & reward sharing and commitment and also a gap analysis between the perceptions of the buyer and supplier.

Contribution

In terms of practical contribution, the dissertation's primary contribution is aimed to serve the focal company, by assessing some of the strategic supplier relations and identifying areas to develop.

The academic contribution of this thesis is mainly in assessing existing relationship assessment models and building the author's own model and the methodology for using the model. The model is generally applicable to comparable situations and especially for identifying trends and problem areas in the supplier relations.

Spens Karen (2001) Managing critical resources through supply network management - a study of the Finnish blood supply network. Swedish School of Economics and Business Administration in Helsinki.

Purpose

The “theoretical objective” of this study: “to increase understanding of supply network management with focus on the supply networks of critical resources.” Additionally “empirical objectives” are states: 1) “describe and analyse the blood supply system in Finland by using the industrial network approach” and 2) “investigate proposed associations between main constructs by using the developed conceptual model.”

Empirical evidence, method and theory

The empirical evidence includes the whole Finnish blood supply network with a focus on red blood cells. The investigated organisations are the Red Cross Blood Centre and some 70 hospitals.

Both qualitative and quantitative methods are used and the rationality in using these is also well explained as a relative rather than absolute view on methodological approaches. The case studies and in-depth interviews in 2 organisations were used to answer the first of the above mentioned empirical objectives (descriptive and model building) and the survey to answer the second one (causal relations seeking).

The network approach is applied to describe the Finnish blood supply network.

Contribution

The academic contribution is in building a supply network model of the blood supply network, by using concepts from logistics and SCM and applying the industrial business network concepts and terminologies. As such the research tests the applicability of these frameworks to an environment where they are not commonly used.

The practical problem in a blood supply network is in maintaining close to 100% service level while at the same time minimising the outdating of blood. I.e. The problem is inventory optimisation with perishable products. The effects of external and internal integration in the supply chain are concluded to affect reaching the practical target and the research will help practitioners in blood centres and hospitals to manage the network better. However, these conclusions are not given as normative advice.

Tuunainen Virpi Kristiina (1999) Different models of electronic commerce. Helsinki School of Economics.

Purpose

Various electronic commerce models and technologies are investigated though several research objectives ranging from identifying ecommerce pre-requisites, illustrating opportunities and problems of the various technologies in various industries and developing a value chain integration framework. The thesis consists of five journal articles (four of which are co-authored) and a summarising monography.

Empirical evidence, method and theory

The thesis covers a wide variety of e-commerce applications, including b-to-b, b-to-c and public sector; it also covers products ranging from services to physical components for manufacturing, as well as consumer goods. As such, the author aims to covering the concept of e-commerce as widely as possible.

Multiple case studies are used and data is collected in personal interviews. Various documents, such as annual reports and data from commercial information services were used as supporting data.

Economics and information system theories and concepts are applied. Main theories are transaction cost theory and principal agent theory, supported by several concepts from the field of information systems research.

Contribution

The thesis is rather pragmatically oriented, as it takes a hands-on approach to identifying e-commerce opportunities and problems in various industries. However, the thesis is not normative. The developed framework would help practitioners to analyse their strategic positioning and direction to developing costs or service based advantage.

Academic contribution is mainly found in the model that illustrates the need for different electronic commerce business models to different customers and products, as well as the pre-requisites of e-commerce and factors that hinder proliferation of e-commerce. The thesis adds to the concept of e-commerce by implementing know logistics communication concepts, such as EDI, ECR and QR and connectivity of the value chain in the context. The thesis was done at the time of the e-commerce hype, which saw the concept mainly as a technology to communicate with customers, and points out that also the connectivity of the value chain is required for successful business.

Töyrylä Ilkka (1999) Realising the potential of traceability – a case study on usage impacts of product traceability. Helsinki University of Technology.

Purpose

The purpose is “...to increase understanding of the use and impacts of traceability data by examining the issue from a competitive perspective, i.e. as a subjects in its own right.” Additionally three research questions are stated and these questions determine the structure throughout the thesis: 1) how is traceability data used in business enterprises? 2) What are the impacts & benefits of using traceability data? 3) What factors enable a business enterprise to fully realise the positive impacts of traceability data?

Empirical evidence, method and theory

The qualitative empirical evidence is collected from nine case companies using interviews, observations and documentation. The case companies are from various industries and backgrounds as it was the intention of the researcher to investigate traceability usage, impact and enablers in as broad perspective as possible.

There is no explicit theoretical framework to this thesis. Rather the thesis is working towards investigating the traceability phenomena in a descriptive way and contributing by pointing out different ways of usage, impact and enablers. As such this research is very descriptive and the approach is grounded.

Contribution

This thesis is clearly driven by the aims of investigating, understanding and conceptualising the phenomena of traceability. The academic contribution of this grounded research can be divided in the following way: 1) Conceptual clarification of the phenomena of traceability. 2) Descriptive discussion and an emerging framework of the use of traceability. 3) An analysis of impacts and enablers. Especially this research adds to the existing body of knowledge a comprehensive analysis organisational settings and the role of requirements that are external to the companies themselves.

Practical contribution has not been the main focus of this research. However, the generated framework can be used as a roadmap to identifying opportunities in traceability.

Waidringer Jonas (2001) Complexity in transportation and logistics systems – an integrated approach to modelling and analysis. Chalmers University of technology.

Purpose

The purpose is “to develop a model of transportation and logistics systems complexity at a conceptual level in order to be able to describe and analyse these systems.”

Empirical evidence, method and theory

Empirical evidence is based on four empirical studies. The empirical studies are a combination of case studies and action research, which include port terminal efficiency, comparison of two supply chains, e-commerce and a study of a passenger terminal system.

Systems approach is applied and the system is believed to be put together of interconnected parts of reality in a holistic way. Transportation and logistics systems are seen as man made cultural constructs. Based on this approach the author does not believe on purely objective positivistic research. Empirical evidence was collected in various projects, and not directly for the research. Instead, empirical evidence was collected in projects over a period of five years and not with an intention to be used in this thesis.

There is no strong theory in the positivistic sense in the framework. Instead a various concepts are applied to build a conceptual model. As such, the thesis focuses more on theory building than application and testing.

Contribution

The thesis is clearly conceptual and focuses to academic contribution. Rigorous definitions of the concept of complexity are included. Main academic contribution is the conceptual model of complexity for transportation and logistics systems, which is based on a multitude of concepts.

Practical requirements for flexibility, speed and cost reduction are addressed. However, the highly conceptual nature of this thesis means that the practical contribution has not been a focus area for the researcher.

Yrjölä Hannu (2003) Supply chain considerations for electronic grocery shopping. Helsinki University of Technology.

Purpose

The objective of the research is very practically oriented business opportunity investigation: “to estimate the cost of building and operating an electronic grocery shopping service that delivers the groceries all the way to the household. This includes constructing the essential operational parts of the service and analysing their cost structure. Furthermore the objective was to gain understanding on the cost drivers of the various operational parts and alternatives and identify suitable performance indicators for the new approach to grocery retailing.”

Empirical evidence, method and theory

The research purpose is further split to five testable hypotheses, which are investigated in the light of supply chain concepts and retailing logistics concepts (but not real theory) and investigating of various eGrocery operations in Finland and abroad.

Alternative operation business models regarding the distribution and transportation approaches are described, and the cost structures of these models are calculated in a manner that is more often found in business case investigations of consulting companies. A pilot of the eGrocery operational model is tested in real environment, making this an example of constructive research. Industry expert opinions for the construct are used for further refinement and validation of the construct. The approach is positivistic and analytical, although the usage of loosely defined concepts, such as supply chain management, instead of a strong theoretical foundation make the theory testing look less robust than what is found in purely positivistic research – which is natural as the motivation of this thesis is mainly practical applicability and not theory testing.

Interestingly, the research is partly funded by Tekes (Finnish national echnology agency) and also several other research papers of other authors are related to the same Ecomlog project. Amongst these are also the theses of Punakivi and Kämäräinen.

Contribution

The author states that the main motivation of this study has been practical. Consultant-like business case calculations are based on predetermined models that may attract further academic interest. Also a number of further research topics are suggested.

Practical contribution is found in an analysis and comparison of the feasibility and cost efficiency of various eGrocery operational models.

APPENDIX 4 SUMMARIES OF THE APPROACHES IN THE REVIEWED DISSERTATIONS

1994-1998 sample

Author	University	Level of Research problem	Level of empirical evidence	Qualitative methods	Quantitative methods	Openness of framework	Contribution to theory testing	Contribution to theory generation	Pragmatism	Main theory applied	Research approach order
Scale		nano, micro meso, macro	nano, micro meso, macro			0-2 (2=very open)	0-2 (2= highly testing)	0-2 (2= highly generating)	0-2 (2=highly pragmatic)	named	
Adjaljhou Christian 1995	Oulu	Meso/macro	Makro/meso		Modelling	0	0	2	1	? (combinatorial, forecasting & gravity models)	(T)-M-O
Andersson Dan 1997	Linköping	Micro	Micro	(case) (not explained) (assumed single case)	Survey	1	2	1	1	TCA	T-M-O
Blinge Magnus 1998	Chalmers	Meso	Nano/meso	(Multiple case)	ELM modelling	1	2	2	1	Systems (LCA) (thermodynamics)	T-M-O
Hagman Thore 1998	Chalmers	Meso	Meso	Multiple case	(Exists but is not definable)	2	0	2	1	Systems	(T)-O
Hultén Lars 1997	Chalmers	??	Micro/Meso	Multiple case (interviews, internal data, observation)	(modelling to a minor extent)	1	0	2	0	Systems	O-M-(T)
Inkiläinen Aimo 1998	HSE	Nano	Nano		Heuristics	0	1	2	2	?? (heuristics)	(T)-M-O
Jahre Marianne 1995	Chalmers	Meso	Meso	(Multiple case) (archives, interview) (supportive role)	Statistics, modelling	1	2	2	1	systems	T-M-O-(T)
Jalkanen Kari 1996	Turku	Meso	Meso	Factor analysis & other statistical methods		1	1	0	0	?? (geographical theories)	(T)-M-O
Janhunen Antero 1994	LUT	Nano	Nano	Simulation		0	1	1	0	??	M-O
Johnsson Mats 1998	Lund	Nano/micro	Nano	Multiple case	Survey	2 overall (Also includes a survey of value 0)	1	2	1	??	M-O-T
Juga Jari 1996	TSEBA	Micro	Micro	Multiple case interviews		1	0	0	1	(network)	(T)-O-M
Korpela Jukka 1994	LUT	Nano	Nano	AHP		2	0	0	2	??	M-O

Author	University	Level of research problem	Level of empirical evidence	Qualitative methods	Quantitative methods	Openness of framework	Contribution to theory testing	Contribution to theory generation	Pragmatism	Main theory applied	Research approach order
Scale		nano, micro, meso, macro	nano, micro, meso, macro			0-2	0-2	0-2	0-2	named	
Lehmusvaara Antti 1998	LUT	Micro/Meso	Micro/Meso	(Multiple case)	AHP linear program. survey, modelling	2 open	0	0	2	??	O-M and M-O
Lehtola Richard 1997	Tampere	Micro	Micro	(Single case) (interviews)	Model	1 (0 for data collection in testing model)	1	2	1	Systems (measurement) (TCA, network)	T-M-O-T
Lindau Roger 1995	Chalmers	Nano	Nano	(Multiple case) (interviews mailed questions)	Simulation	0 to 1 depends on paper	2	0	0	?? (Systems?)	T-M-O
Norman Andreas 1997	Linköping	Micro	Micro	Multiple case		1	0	2	1	Contingency	O-T-M
Ojala Lauri 1995	TSEBA	Meso	Micro/macro	Multiple case	(statistics)	1	2	1	0	TCA	T-O-M
Seppälä Ulla 1997	HUT	Micro	Micro		Modelling	0	2	2	2	Location theories (Evolutionary model)	T-M-O
Seristö Hannu 1995	HSE	Meso	Meso/micro	single case	survey statistics	0	1	1	2	?? (partly systems, cost management)	(T)-M-O
Tanskanen Karl 1994	HUT	Micro	Nano/micro	Multiple case		1	1	1	1	Contingency	T-O-(M)
Tinnilä Markku 1997	HSE	Micro	Micro	Single case Quality Education system method		1	1	1	1	?? (partly TCA)	O-M-T
Virolainen Veli-Matti 1998	LUT	Micro	Nano	Single case open-ended interviews		1	1	0	2	TCA	T-O-M
Wedel John 1996	Chalmers	Micro/nano	Micro	Multiple case (mail-survey) (supporting role)	(mail-survey) (supporting role)	0 to 2 depends on paper	2	1	1	??	(O)-T-M-O
Woxenius Johan 1998	Chalmers	Meso/macro	Meso/macro	Descriptive methods, but not clearly defined	(Weight criterion method. Only supportive role)	2	0	1	1	Systems (networks)	O-(T)-M
Ömertz Birgitta 1998	Chalmers	Nano	Nano	multiple case (observation & interviews)	WLD-method for model testing	2	1	2	1	Systems	O-M-T

1999-2003 sample

Author	Level of research problem	Level of empirical evidence	Qualitative methods	Quantitative methods	Openness of framework	Contribution to theory testing	Contribution to theory generation	Pragmatism	Main theory applied	Research approach order
Scale	nano, micro	nano, micro			0-2	0-2	0-2	0-2	named	
	meso, macro	meso, macro			(2=very open)	(2= highly testing)	(2= highly generating)	(2=highly pragmatic)		
Andersson Jonas 1999	Nano	Nano	Modelling & simulation		0	1	2	0	Operations research	T-M-O
Aronsson Håkan 2000	Micro	Micro	Multiple case		1	0 (only concepts, no hypotheses)	1	1	Systems & contingency approaches	(T)-M-O
Berglund Magnus 2000	Meso	Meso/micro	qualitative surveys & interviews		1	1	2	1	"strategic core theory" & competitiveness (e.g. Porter, Mintzberg)	T-M-O-T (positivistic)
Brehmer Per-Olof 1999	Meso/micro	Micro	qualitative surveys Multiple case		1	1	2	1	Operations analysis Lean manufacturing	(O)-(T)-M-O-T (positivistic)
Brodin Maria, Hüge 2002	Meso	Meso	multiple case	survey	1	1	2	1		O-M-T looks non-positivistic yet it is
Franzén Stig 1999	Macro/meso	Meso/micro	single case (descriptive, observations)		1	1	2	1	network approach cybernetics control theory	T-M-O
Heikkilä Jussi 2000	Meso	Micro	Multiple case interviews	survey	1	1	1	2	industrial eng. HUT approach IMD demand chain model	(O)-M-O-T
Helo Petri 2001	Meso/micro	Micro	(multiple case) (interviews)	simulation modeling	0	2	1	1	Systems	(T)-M-O (positivist)
Hilimola Olli-Pekka 2001	Micro	Micro	(single case)	Statistical correlations	0	2	1	1	theory of constraints throughput accounting (systems)	T-M-O (positivist)
Holmberg Stefan 2000	Meso	Micro	multiple case (interviews)		1	0	2	1		O-M-T
Hämäläinen Erkki 2003	Meso	Micro/meso	mu+E33multiple case		1	1	0	1		(T)-(M)-O (description with a framework)
Jansen Karl 2001	Meso	Meso/nano	Operat. analysis Simulation optimisation		0	2	2	1	Combinatorial graph theory	T-M-O

Author	Level of research problem	Level of empirical evidence	Qualitative methods	Quantitative methods	Openness of framework	Contribution to theory testing	Contribution to theory generation	Pragmatism	Main theory applied named	Research approach order
Scale	nano, micro	nano, micro			0-2	0-2	0-2	0-2		
	meso, macro	meso, macro			(2=very open	(2= highly testing)	(2= highly generating)	(2=highly pragmatic)		
					open	1	2	1	TCA, Principal agent th. IT system frameworks	(T)-M-O-T (Theory too loose for positivist appr.)
Tuunainen 1999		Meso	Micro	Multiple case Interviews	2	0	1	1	none identified	O-T
Töyrylä 1999		Micro/nano	Micro/nano	Multiple case interviews, documentation, observation	2	0	1	1		
Ilkka 1999		Micro	Nano	Multiple case	1	0	2	0	(systems context)	T-M-O
Waldinger 2001										
Yrjölä 2003		Meso	Meso	Multiple case (interviews)	1	1	1	2	(concepts of SCM)	(T)-M-O

APPENDIX 5 CATEGORIES OF JOURNALS

This appendix indicates the categories of the journals, as used in the literature reference database. JOA= Academic Journal and JOT= Trade Journal, OTP=Other publication.

Academy of Management Executive	JOA
Academy of Management Journal	JOA
Academy of Management Review	JOA
Accounting Review	JOA
Administrative Science Quarterly	JOA
Advances in International Marketing	JOA
Advances in Strategic Management	JOA
AIIE Transactions	JOA
Airline Business	JOA
American Economic Review	JOA
American Shipper	JOT
American Sociological Review	JOA
APICS – the Performance Advantage	JOT
Applied Ergonomics	JOA
Applied Mechanics Review	JOA
Applied Stochastic Models and Data Analysis	JOA
Asia Pacific Journal of Quality Management	JOA
Australian Geographer	JOA
Australian Journal of Information Systems	JOA
Barreli (henkilöstölehti)	JOT
Beijing Review	JOA
Bell Journal of Economics	JOA
Biomass and Bioenergy	JOA
Bioresource Technology	JOA
British Accounting Review	JOA
British Educational Research Journal	JOA
British Journal of Management	JOA
Business Marketing (rajatapaus)	JOT
Business Process Management Journal	JOA
Business Week	JOT
Californian Management Review	JOA
Cargo Aktuell	JOT
Cargo Handling	JOT
Cargo Systems	JOT
Case Research Journal	JOA
China Business review	JOT
City and Society	JOA
Communications of the ACM	JOA
Computer Journal	JOA

Computers and Industrial Engineering	JOA
Containerisation International	JOT
Control	JOT
Critique	JOA
Database	JOA
Decision Science	JOA
Decision Support Sytem	JOA
Deutsche Wehrkerhrszeitung)	JOT
Die Bundesbahn	JOT
Die Deutsche Bahn	JOT
e.logistics Magazine	JOT
Ecological Engineering	JOA
eCompany Now	JOT
Economic Inquiry	JOA
Economic Journal	JOA
Economica	JOA
Economist	JOT
ECR Journal	JOT
eDistribution	JOA
Electronic Business	JOT
Electronic Buyers' News	JOT
Energy	JOA
Engineering Costs and Production Economics	JOA
Engineering	JOA
Environment and Planning	JOA
Ergonomics	JOA
ETR	JOT
Eurolog	JOA
Euromodal	JOT
European Business Review	JOA
European Journal of Operations Research	JOA
European Journal of Purchasing & Supply Managem.	JOA
European Management Journal	JOA
European Management Journal	JOA
Finnish Journal of Construction Economics	JOA
FMS Magazine	JOA
Food Logistics	JOT
Forestry Sciences	JOA
Forskning och Framsteg	JOT
Fortune	JOT
Futurist	JOT
General Sytems	JOA
Geography	JOA
H.R.B. Bulletin	JOA
Hansa	JOT
Helvetica Physica Acta	JOA
Hoovering Craft and Hydrofoil	JOT

Human Resource Management	JOA
I/S Analyser	JOA
IBM Systems Journal	JOA
IEE Transactions	JOA
IEEE Control Sytem Magazine	JOA
IEEE Spectrum	JOA
IEEE Transaction and Engineering Management	JOA
IFPMM Publications	JOA
IIE Solutons	JOT
Imede International	JOT
Industrial Engineering	JOA
Industrial Management	JOT
Industrial Management & Data Systems	JOT
Industrial Management Review	JOA
Industrial Marketing Management	JOA
Information Economics and Policy	JOA
Information Strategy - the Executives Journal	JOA
Information Systems in Transport	JOA
Information Systems Management	JOA
Information Technology and People	JOT
Inköp & Logistik	JOT
Interfaces	JOA
Intergrated Manufacturing Systems	JOA
Intermodal 95...96	JOT
Intermodal Shipper	JOT
International Journal of Agile Management Systems	JOA
International Journal of Business Performance Manag.	JOA
International Journal of Computer Integrated Manufact.	JOA
International Journal of Distribution & Logistics Man.	JOA
International Journal of Logistics Management	JOA
International Journal of Marketing	JOA
International Journal of Operations & Production man.	JOA
International journal of Physical Distribution	JOA
International Journal of Production Economics	JOA
International Journal of Production Research	JOA
International Journal of Purchasing and Materials	JOA
International Journal of retail and Distribution Man.	JOA
International Journal of Service Industry Management	JOA
International Journal of Technology Management	JOA
International Journal of Tourism Management	JOA
International Journal of Transport Economics	JOA
International Series on Systems Science...	JOA
Internationale Transportannalen	JOT
Internationales Verkehrswesen	JOA
Inventory Management	JOA
Jounal of Operations Management	JOA
Journal of American Statistical Association	JOA

Journal of Applied Corporate Finance	JOA
Journal of Banking and Finance	JOA
Journal of Business Logistics	JOA
Journal of Cleaner Production	JOA
Journal of Consumer Research	JOA
Journal of Cost Management	JOA
Journal of Economic Literature	JOA
Journal of European Business	JOT
Journal of Federal Reserve Bank	JOA
Journal of Forecasting and Planning	JOA
Journal of Hospitality Financial Management	JOA
Journal of Industrial Ecology	JOA
Journal of Industrial Economics	JOA
Journal of Law and Economics	JOA
Journal of Law	JOA
Journal of Management Studies	JOA
Journal of Manufacturing Systems	JOA
Journal of Marketing Research	JOA
Journal of Operational Research Society	JOA
Journal of Operations and Production Management	JOA
Journal of Purchasing and Materials Management	JOA
Journal of Regional Science	JOA
Journal of Retailing	JOA
Journal of Royal Statistical Society	JOA
Journal of Supply Chain Management	JOA
Journal of the Academy of Marketing Science	JOA
Journal of the Transportation Research Forum	JOA
Journal of Transport Economics and Policy	JOA
Journal of Transport Geography	JOA
Journal of Transportation Engineering	JOA
Kehittyvä elintarvike	JOT
Kemia – Kemi	JOA
Knowledge: Creation, Diffusion, Utilisation	JOA
Kuljetus	JOT
Kybernetes	JOA
Leadership and Organisation Development	JOA
Ledelse & Erhvervsøkonomi	JOA
Lloyd's Shipping Economist	JOA
Logistics and Transportation Review	JOA
Logistics Development International	JOT
Logistics Europe	JOA
Logistics Information Management	JOA
Logistics Management	JOA
Logistics Resources International	OTP
Logistics World	JOT
Logistik im Unternehmen	JOT
Long Range Planning	JOA

Management Accounting	JOT
Management Decision	JOA
Management Education and Development	JOA
Management International Review	JOA
Management Journal	JOA
Management Science	JOA
Management	JOA
Manufacturing & Service Operations Management	JOA
Manufacturing Engineering	JOT
Manufacturing Systems	JOT
Maritime Policy and Management	JOA
Marketing News	JOT
Materialaaltalious	JOT
Material Flow	JOA
Materials Handling Engineering	JOT
Mathematica	JOA
Mathematical Programming	JOA
McKinsey Quarterly	JOT
Mechanical Engineering	JOT
MET Tekninen Tiedotus	JOT
Modern China	JOA
National Productivity Review	JOA
Nature	JOA
Navigator	JOT
Netherlands Journal of Agricultural Science	JOA
Networks	JOA
New Zealand Journal of Forestry Science	JOA
Nieuwsblad Transport	JOT
Nordic Rail	JOT
Nordisk Samh�lsgeografisk Tidskrift	JOA
Northwestern University Law Review	JOA
Numerische Matematik	JOA
OECD Observer	JOT
Official Journal of the European Communities	OTP
�konomi og Politik	JOA
Omega – International Journal of Management Science	JOA
Operations Research	JOA
OR/MS Today	JOA
Organization Studies	JOA
Organizational Dynamics	JOA
Organizations	JOA
ORSA	JOA
Packaging Technology and Science	JOA
Pain	JOA
Physical Review	JOA
Planning Review	JOA
Production and Inventory Management Journal	JOA

Production Planning and Control	JOA
Production Research	JOA
Produktivitet och Lönsamhet verstäderna	JOT
Produktivitet	JOT
Professional Geographer	JOA
Professional Geographer	JOA
Pulp and Paper	JOA
Purchasing and Supply Chain Management Review	JOA
Quality Progress	JOT
Quarterly Journal of Economics	JOA
Rail et Recherche	JOA
Rail International	JOA
Railways	JOT
Rand Journal of Economics	JOA
Regional Science and Urban Economics	JOA
Research in marketing supplement	JOA
Research Policy	JOA
Research Technology Management	JOT
Resource Recycling	JOT
Retail Trade Review	JOT
Review of Economics and Statistics	JOA
RoRo 94	JOT
S.A.M. Management Journal	JOA
Sales and Marketing Management	JOA
Scandinavian Journal of Forest Research	JOA
Scandinavian Journal of Management	JOA
Scandinavian Journal of Materials Administration	JOA
Schiff & Hafen	JOT
Science of the Total Environment	JOA
Science	JOA
Scientific American	JOA
Seewirtschaft	JOA
Shipshape 2000	JOT
Skandinavisk Transportteknik	JOT
Sloan Management Review	JOA
Small Business Report	JOT
Sociological Quarterly	JOA
Southern Economic Journal	JOA
SPHE Technical Journal	JOT
Stores	JOT
Strategic Management Journal	JOA
Strategy + Business	JOT
Suomen Merenkulku	JOT
Supermarket Business	JOT
Supply Chain Management Review	JOT
Supply Chain Management	JOA
Svenska Dagbladet	OTP

Technological Forecasting and Social Change	JOA
Technovation	JOA
Terra	JOA
The Columbia Journal of World Business	JOA
The Information Society	JOA
The McKinsey Quarterly	JOA
The Professional Geography	JOA
TIMS Studies in the Management Science	JOA
Today's Executive	JOA
Total Quality Management	JOA
TQM Magazine	JOT
Traffic and Distribution	OTP
Traffic Management	JOA
Traffic Quarterly	JOA
Trafikmagasinet	JOT
Transport & Hantering	JOT
Transport iDAG	JOT
Transport logistics	JOA
Transport Policy	JOA
Transport reviews	JOA
Transportation and distribution	JOT
Transportation Journal	JOA
Transportation Planning and Technology	JOA
Transportation Quarterly	JOA
Transportation Research Record	JOA
U.S. News and World Report	JOT
Wirtschaftswoche	OTP
Work Study	JOT
World Freight International	JOT
Yale Law Journal	JOA
ZEV + DET	JOT

APPENDIX 6 WEB-BASED SURVEY

Page 1:

I GENERIC INFORMATION

This section of the questionnaire aims to collect background information that describes the surroundings in which you prepared your doctoral dissertation.

1. Your name

2) Which year did you actively start your doctoral dissertation project?

3) What degrees did you possess before your doctor's degree? (tick all that apply)

☐ Bachelor's in business/economics

☐ Bachelor's in technology

☐ Master's in business/economics

☐ Master's in technology

☐ Licentiate in business/economics

☐ Licentiate in technology

☐ Other, what?

4) What was/were your major subject(s) of your first degree?

☐ Logistics

☐ Marketing

☐ Production/industrial management

☐ Economics

☐ Other, what?

5a) Names and universities of the formal supervising professors of your thesis?

5b) Names and universities of individuals that were not your formal supervisors but still had a significant impact on your dissertation project?

5c) Names and universities of the external pre-examiners of your thesis?

6) If you conducted part of your doctoral research project in other universities than the one where it was published, please list the universities here.

List only universities where you stayed at least one month

7) Please explain how and why you chose your research topic.

Next -->

Page 2:

II INTEREST GROUPS AND THEIR INFLUENCE ON YOUR RESEARCH

This section of the questionnaire aims to collect information about the interest groups related to your doctoral research project.

8) How was your doctoral research funded?

	1- 20%	21- 40%	41- 60%	61- 80%	81- 100%	0
a) Salary or grants related directly to your research, e.g. salary from university or grants from foundations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Sponsoring or salary from organisation(s) that had an interest in the practical applicability of your research (e.g. case or sponsoring companies)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Own funds, e.g. savings or salary from work that was not related to your research	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Other (please explain what in the field below)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9a) Did you work in a job outside the university between receiving your first degree but before starting your doctoral research project?

- ☐ No, I continued directly with research/teaching after my first degree ([please go to question number 9c](#))
- ☐ Yes. How many years in total before starting your doctoral research project?

9b) Was your doctoral research related to your job outside the university?

- ☐ No
- ☐ Yes (please explain how they were related in the field below)

9c) Did you work outside the university during your doctoral research project?

Tick yes, if you worked at least half time

- ☐ No
- ☐ Yes

10) How much influence did the following groups of people have to your research choices during your doctoral research project

1 = Low influence, 5 = High influence

- | | 1 | 2 | 3 | 4 | 5 |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| a) Academics, such as the supervising professor(s), external examiners and academic peers? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| b) Practitioners, i.e. people outside the research community and who were primarily interested in the practical applicability of your research? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

11) How strongly did the academic community influence your decisions in the following areas of your research?

1 = Expectations were not stated strongly / I felt that I was free to make any choices without feeling any conflict between their preference and my research approach

5 = Expectations were very strongly stated / I felt that I was expected to follow their preferred approach on a detailed level

0 = Not relevant

- | | 1 | 2 | 3 | 4 | 5 | 0 |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| a) Selecting and defining the research topic | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| b) Setting the research objectives and problems | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| c) Choosing the theories for the framework | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| d) Choosing qualitative or quantitative approach | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| e) Choosing methods for collecting empirical data (E.g. stating preferences for using interviews, surveys, observations, etc.) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| f) Choosing data analysis methods (e.g. statistics, modelling, simulation, case study methods) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

12) How strong opinions did the practitioners in your case/sponsoring organisations have in influencing your decisions in the following areas of your research?

Apply the same scale as with the previous question.

- | | 1 | 2 | 3 | 4 | 5 | 0 |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| a) Selecting and defining the research topic | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| b) Setting the research objectives and problems | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| c) Choosing the theories for the framework | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| d) Choosing qualitative or quantitative approach | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| e) Choosing methods for collecting empirical data (E.g. stating preferences for using interviews, surveys, observations, etc.) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| f) Choosing data analysis methods (e.g. statistics, modelling, simulation, case study methods) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

13) Please evaluate the following questions in light of how you felt during the final stages of your doctoral research project

1 = Not much/had many doubts, 5 = Very much/had few doubts

- | | 1 | 2 | 3 | 4 | 5 |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| a) How assured were you that your research was significant, interesting and worth researching from the academic point of view? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| b) How assured were you that your research had practical relevance? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| c) How clear was it for you which primary research methods to choose (e.g. surveys, case studies, models, simulations, heuristics, etc.)? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| d) How certain were you regarding to which analysis tools to choose (e.g. computer programs to support in organising and analysing your data)? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

<-- Previous

Next -->

Page 3:

III RESEARCH MOTIVES AND AREAS OF INTEREST

This section of the questionnaire aims to collect information about the researcher motives and areas of interest.

14) Generally, how easy was it for you to maintain your motivation over your doctoral research project?

1 = Very difficult, I was not sure whether it was worthwhile to work on the thesis and/or I took long breaks in the research project

5 = No significant motivation problems, I was assured that I was doing something interesting and important and I kept focused and worked steadily over the entire research project

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

15) How much do you agree with the following statements related to your doctoral research process?

1 = Strongly disagree, 5 = Strongly agree

- | | 1 | 2 | 3 | 4 | 5 |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| a) The thesis and the research project should contribute to the discipline, through rigorous development and/or testing of theory and application of a sound methodological approach. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| b) The thesis and the research project should contribute to practitioners (i.e. people and organisations outside the academia or teaching) by being practically applicable or even solving actual problems that the case or sponsoring organisations were having. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| c) The thesis and the research project should improve your skills and knowledge. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

16) How interesting was it for you to spend time in the following areas of your doctoral research project?

1 = Not interesting at all, 5 = Highly interesting

- | | 1 | 2 | 3 | 4 | 5 |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| a) Working on philosophical, ontological and epistemological issues | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| b) Developing your data collection and analysis methods | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| c) Gaining access to and collecting empirical evidence | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| d) Reading and studying previous research around the topic | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| e) Building the theoretical framework | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| f) Writing the text of the thesis | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| g) Making the data analysis | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| h) Drawing conclusions | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| i) Writing articles and conference papers | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| j) Discussing with academics related to your research | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| k) Discussing and consulting with practitioners related to your research | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

17) How true are the following statements regarding your career aspirations during your doctoral research?

1 = Strongly disagree, 5 = Strongly agree

- | | 1 | 2 | 3 | 4 | 5 |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| a) I was interested in a researcher career | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| b) I was interested in a teaching career | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| c) I was interested in a practitioner career (i.e. work in an organisation that is not primarily focusing in teaching or academic research) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| d) The career possibilities were not really in my mind but I found the research as a good overall way to develop my skills and knowledge | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

18) What were the major reasons that de-motivated or frustrated you with your doctoral research? Why?[<-- Previous](#)
[Next -->](#)

Page 4:

IV PERCEIVED THESIS VALUE AND CAREER CONSEQUENCES

The remaining questions refer to the time after the completion of your dissertation

19) What career path have you mainly followed after completing your doctoral dissertation?

- ☐ Pursuing a research and/or teaching career in logistics
- ☐ Pursuing a practitioner career in logistics (i.e. a career in logistics that is not research or teaching related).
- ☐ Pursuing a career that is not related to logistics, what?

20) How does the career that you have had after your research correspond with what you expected during the doctoral research?

21) Please evaluate the following questions about the significance and value of the doctoral research project to your career.

1 = Not much, 5 = Very much

- | | 1 | 2 | 3 | 4 | 5 |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| a) How significant has your doctoral research been to your career generally? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| b) How valuable have the <u>skills and knowledge</u> that you gained during the research process been to your career? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| c) How valuable have the industry and research <u>experience</u> that you gained during in the research process been to your career? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| d) How valuable have the personal <u>relationships</u> that you developed during the research process been to your career? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| e) How valuable has it been to your career to possess a <u>doctors degree</u> ? (E.g. getting job offers, better salary, more credibility)? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

22) Have you actively done academic research after the completion of your thesis, either as main job or occasionally along your daily job?

- ☐ Yes ☐ No

Page 5:

V METHODOLOGICAL LOYALTY

The remaining questions are relevant only if you answered that you have done academic research after the completion of your doctoral dissertation. If you answered no, please skip the rest of the questions

23) What aspect of the methodological approach, theories and methods from your doctoral thesis have you actively retained in your latter research?

(e.g. quantitative or qualitative data collection and analysis methods, certain theoretical frameworks, data collectiong through cases or surveys, data analsysis methods and tools, etc.)

24) What aspect of the methodological approach and methods of your thesis have you actively abandoned and/or replaced with others?

<-- Previous

Next -->

APPENDIX 7 SURVEY RESPONCES

Question 1 asks for the names of the respondents and is not shown here.

2. 2) Which year did you actively start your doctoral dissertation project?

1. 1992 (3654506)

2. 1989 (3654512)

3. 1987-1989, 1996-2000 (3654693)

4. 1999 (3654960)

5. 1998 (3654720)

6. 1994 (3654722)

7. 1990 (3654707)

8. 1991 (3654688)

9. 1994 (3654507)

10. 1988 (3654515)

11. 1995 (3654715)

12. 1997 (3654703)

13. 1993 (3654710)

14. 1997 (3654695)

15. 1997 (3654697)

16. 1989 (3654704)

17. 1993 (3654696)

18. 1998 (3654713)

19. 1992 (3654700)

20. 2004 (3654502)

21. 1991 (3654505)

22. 1994 (3654721)

23. 1990 (3654503)

24. 1998 (-4355606)

25. 1990 (3654511)

26. 1991 (3654699)

27. ~90-95 (3654725)

28. 1989 (3654509)

29. 1997 (3654702)

30. 1992 (3654514)

31. 1993 (3654694)

32. 1990-1995 (3654961)

33. 1998 (3753948)

34. 1995 (3654717)

35. 1992 (3654690)

36. 1994 (3654698)

37. 1994 (3654691)

38. 1975&1999 (3654692)

39. 1990 (3654510)

40. 2000 (3654724)

41. 1996 (3654701)

42. 1991 (3654508)

3. 3) What degrees did you possess before your doctor's degree? (tick all that apply)

Number of question respondents: 42 (avg: 4,5)

(3.1) Bachelor's in business/economics

4,8%

2

(3.2) Bachelor's in technology

2,4%

1

(3.3) Master's in business/economics

23,8%

10

(3.4) Master's in technology

57,1%

24

(3.5) Licentiate in business/economics

21,4%

9

(3.6) Licentiate in technology

35,7%

15

(3.7) Other, what?

7,1%

3


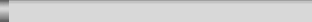
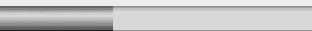


Question [3.7] (3) What degrees did you possess before your doctor's degree? (tick all that apply). Other, what?

1. I had a master in business, and a licentiate in bus. from CTH from 1992 (3654512)

2. An MBA almost completed (3654702)

3. Bachelor's in Learning Psychology (3654961)

4. 4) What was/were your major subject(s) of your first degree?**Number of question respondents: 42** (avg: 2,6)

(4.1) Logistics		47,6%	20
(4.2) Marketing		2,4%	1
(4.3) Production/industrial management		35,7%	15
(4.4) Economics		2,4%	1
(4.5) Other, what?		23,8%	10

Question [4.5] (4) What was/were your major subject(s) of your first degree?. Other, what?)

1. Applied mathematics (3654722)
2. International Marketing & Shipping economics (3654707)
3. Information Technology (3654715)
4. economic geography (3654703)
5. Information technology (3654695)
6. Accounting (3654696)
7. Engineering design (3654503)
8. Information Systems Science (3654725)
9. Economic geography (3654509)
10. Building economics (3654702)
11. International business (3654694)
12. Electrical Engineering (3654961)
13. mechanical engineering (3753948)
14. Operation Reserach (3654698)
15. Mech Eng. / Naval Architecture (3654510)

5. 5a) Names and universities of the formal supervising professors of your thesis?

1. Jorma Taina, Turku School of Economics & Business Administration (3654506)
2. Goran Persson, Norwegian School of Management Lars Sjøstedt, Chalmers (3654512)
3. Sten Wandel and Mats Abrahamsson during different time periods. Both at Linköping University, school of the technology (3654693)
4. Kari Tanskanen, HUT Jan Holmström, HUT (3654960)
5. Lauri Ojala (3654720)
6. Ph. D. Ari-Pekka Hameri, Helsinki University of Technology (3654722)
7. Prof. Karin Holstius, TuKKK (3654707)
8. Everth Larsson, Lund niversity (3654688)
9. Prof. Sven Axsater, Lund Institute of Technology (3654507)
10. Kenth Lumsden, Chalmers (3654515)
11. Professor Sten Wandel, Linköping university Professor Lauri Ojala, Åbo universitet (3654715)
12. Jan-Åke Törnroos, Åbo Akademi (3654703)
13. Ari vepsäläinen, HSE (3654710)
14. HUT, Professor Kari Tanskanen (3654695)
15. Prof. Eero Eloranta Helsinki University of Technology (3654697)
16. Professor Eero Eloranta, Helsinki University of Technology (3654704)
17. Helsinki University of Technology, Eero Eloranta (3654696)
18. Lappeenranta University of Technology, Professor Veli-Matti Virolainen (3654713)
19. Kenth Lumsden, Chalmers University of Technology (3654700)
20. Ari P.J.Vepsäläinen, HSE (3654502)
21. Main supervisor Sten Wandel Linköping University, Institute of Technology Assistand supervisor Mats Abrahamsson Linköping University, Institute of Technology (3654505)
22. I do not know, who is the formal supervisor - originally Eino Tunkelo, University of Oulu (3654721)
23. Lappeenranta tekninen yliopisto / Anita Lukka (3654503)
24. Josu Takala, Vaasa (-4355606)
25. Prof. Lars Sjøstedt, Chalmers (3654511)
26. Lars Sjøstedt, Chalmers UT (3654699)
27. Timo Saarinen, HSE Ari Vepsäläinen, HSE (3654725)
28. Pentti Yli-Jokipii, Turun yliopisto (3654509)
29. Eero Eloranta, TTKK (3654702)
30. Klaus Kerppola - TTKK (3654514)
31. Reijo Luostarinen, HKKK (3654694)
32. Prof. Lars Sjøstedt, Chalmers University of Technology (3654961)
33. Helén Anderson, Docent in Industrial Marketing, Linköping University, Institute of Technology (3753948)
34. Everth Larsson, Lund University (3654717)
35. Lars Sjøstedt (Prof. of the department), Tomas Engström (Assoc. prof) and Mats Johansson (in the end of the project Assoc prof, the main supervisor the entire process, informally in the beginning since he was not Assoc. prof at the time) at Chalmers University of Technology (3654690)
36. Professor Sven Axsäter, Lund University, Sweden. (3654698)
37. Everth Larsson, LTH Carl-Henric Nilsson, Lund School of Economics (3654691)
38. Professor Ari P.J. Vepsäläinen, Helsinki School of Economics Professor Aimo Inkiläinen, Helsinki School of Economics (3654692)
39. Kenth Lumsden, Chalmers University of Technology Jadwiga Igielska, Chalmers University of Technology (first part of project up to lic eng.) (3654510)
40. HUT / Professor kari Tanskanen and docent Jan Holmström (3654724)
41. Kenth Lumsden Chalmers University of Technology (3654701)
42. Markku Tuominen, Lappeenranta University of Technology (3654508)

6. 5b) Names and universities of individuals that were not your formal supervisors but still had a significant impact on your dissertation project?

1. Karin Holstius, Lauri Ojala Turku School of Economics & Business Administration (3654506)
2. Geir Gripsrud, Norw.sc.of mmgt. (3654512)
3. Staffan Brege, same as above. (3654693)
4. Eero Eloranta, HUT Aimo Inkiläinen, HESE Michael Browne, University of Westminster, UK (3654960)
5. Andreas Norrman (Lund) (3654720)
6. Prof. Peter Allen, Cranfield University, UK Prof. Jukka Ranta, Helsinki University of Technology Prof. Eero Eloranta, Helsinki University of Technology Prof. Juri Kaniowski, International Institute of Applied Systems Analysis, IIASA, Austria" (3654722)
7. Prof. Sten Wandel, Linköping University, Dr. Mats Abrahamsson, Linköping Prof. Nils H Winter, ÅA (3654707)
8. Various. (3654688)
9. Professor Lars Sjöstedt, Hamburg university (3654715)
10. Timo Saarinen, HSE (3654710)
11. HUT, Jan Holmström, Docent (3654695)
12. Dos. Jan Holmström Helsinki University of Technology (3654697)
13. Helsinki University of Technology - Paul Lillrank (3654696)
14. None (3654713)
15. --- (3654700)
16. Dr.Sc.(Econ.) Markku Kuula, HSE (3654502)
17. (3654721)
18. Research group: Tauno Kekälä, Olli-Pekka Hilmola, Ari Maunuksela. All topics were related and Josu Takala supervised the thesis of all of these. (-4355606)
19. Prof. Anne-Marie Tillman, Chalmers Assoc. prof. Göran Wall, Chalmers (3654511)
20. Dag Björnland, Göteborg University Anna Dubois, Chalmers (3654699)
21. Ken Peffers, University of Hong Kong Ali Farhoomand, University of Hong Kong (3654725)
22. Juhani Vainio, Merenkulkualan koulutus- ja tutkimuskeskus Jorma Taina, Turun kauppakorkeakoulu (3654509)
23. Professor Jukka Ranta, TKK Professor Eila Järvenpää, TKK Professor Thomas E. Vollmann, IMD, Switzerland Professor Robert S. Collins, IMD Professor Carlos Cordon, IMD Professor Andrew C. Boynton, IMD (3654702)
24. Erkki Uusi Rauva - TTKK Sten Wandell - Linköping (3654514)
25. Prof. Rigas Doganis & prof. Fariba Alamdari, both Cranfield University; Prof. Yair Aharoni, Tel Aviv Univ. ; (3654694)
26. Dr Ove Svidén, Linköping University (3654961)
27. Dan Andersson, Linköping University (3753948)
28. Lauri Ojala, Turku School of Economics (3654717)
29. Prof Roland Örtengren, Chalmers University of Technology, Dept of Injury prevention (3654690)
30. Jonas Andersson, Lund University, Kaj Rosling, at the time at Lund University now at Växjö University. (3654698)
31. Dr.Sc.(Econ.) Katariina Kemppainen, Helsinki School of Economics Dr.Sc(Econ.) Jouni Laine Helsinki School of Economics (Singapore University) (3654692)
32. Lars Sjöstedt, Chalmers University of Technology (3654510)
33. Cardiff Business School / Dr. Mohammed naim and Stephen Disney University of Lausanne / Prof. AP Hameri (3654724)
34. Lars Hultén, Chalmers University of Technology (3654701)
35. Kullervo Lehtonen, Logistics Director, Kymmene Corp. (3654508)

7. 5c) Names and universities of the external pre-examiners of your thesis?

1. Ari Vepsäläinen, Helsinki School of Economics Göran Persson, Norwegian School of Management (3654506)
2. Gunilla Jönsson, Lund A lady from another dept. at CTH (do not remember her name) Opponent: Hans Christian Pfohl, Darmstadt (3654512)
3. Do not remember. (3654693)
4. Aimo Inkiläinen, HESE Michael Browne, University of Westminster, UK (3654960)
5. Wesley Johnston (Michigan State) Björn Axelsson (Stockholm Business) (3654720)
6. Ph.D. Urho Pulkkinen, National Technical Research Centre (VTT) Prof. Anita Lukka, Lappeenranta University of Technology (3654722)
7. Porf. Tage Skjøtt-Larsen, CBS, Assoc. prof. P-O Bjuggren, Linköping University (3654707)
8. Various. (3654688)
9. Ass. Professor Lars-Olof Rask, Växjö University Ass. Professor Johan Woxenius, Chalmers university (3654715)
10. Susanne Hertz, Handelshögskolan i Stockholm Martin Christopher, Cranfield (3654703)
11. Tapio Reponen, Turku school of business Chris Edwards, Cranford business school (3654710)
12. Alan McKinnon, Heriot-Watt university, Edinburgh Lauri Ojala, Turun kauppis (3654695)
13. Aimo Inkiläinen Helsinki School of Economics Jan Olhager Linköping University of I don't know (3654697)
14. PhD Suzanne de Treville, Harvard University Professor John Johanssen, Aalborg University (3654704)
15. Lappeenranta University of Technology (CERN) (3654696)
16. Professor Peter Hines Cardiff University Docent Arto Suominen Turku School of economics and Business Administration (3654713)
17. Göran Persson, Bedriftsekonomisk Institut, Oslo Dag Ericsson, KTH, Stockholm Tage Skott-Larsen, Copenhagen University (3654700)
18. Ph.D Ricardo Ernst, Georgetown University, USA Dr.(Tech.) kari Tanskanen, HUT (3654502)
19. Prof. Pekka Kess, University of Oulu (3654721)
20. Do not remember any more! (3654503)
21. Denis Towill, Gradiff (system dynamics) Angappa Gunasekaran, Univ. Massachusetts Dartmouth (-4355606)
22. Prof. Gunilla Jönsson, Lund University Don't remember the others... (3654511)
23. Lauri Ojala, Turku Arne Jensen, Göteborg University Lennart Sundström, Swedish State Railways (from industry, but former adj professor Linköping University) (3654699)
24. Uday Apte, Southern Methodist University, Tx Reima Suomi, TuKKK (3654725)
25. Nils Winter, Åbo Akademi Jorma Taina, Turun kauppakorkeakoulu (3654509)
26. Professor John Johansen, Aalborg University, Denmark Dr Ulla Tapaninen, Finn carriers (3654702)
27. Nils G Storchagen - Linköping xxx - Lund (3654514)
28. Prof. Manek Kirpalani, Concordia Univ. Canada; prof. Ari Vepsäläinen, HKKK (3654694)
29. Prof. Elsa Rosenblad, Chalmers University of Technology Prof. Bengt Holmberg, Lund Institute of Technology (3654961)
30. Marianne Jahre, BI, Oslo (pre-seminar) Grading committee for the finished thesis: Prof. Ove Brandes, Industrial Marketing, Linköping University Prof. Gunilla Jönsson, Lund University Prof. Susanne Hertz, Jönköping University (Sweden) Opponent: Prof. Nathalie Fabbe-Costes, CRET-LOG, Université d'Aix-en-Provence (3753948)
31. cannot recall at the moment (3654717)
32. Gunilla Jönsson, Lund Univ. of Technology Jan Lindér, Chalmers Univ of Technology (3654690)
33. I did not have any pre-examiners outside the members of the graduating board which recieved the thesis when it was in print. (3654698)
34. Britta Gammelgaard, Copenhagen Business School (3654691)
35. Prof. Olav Solem, Trondheim University of Tecnology Dr.Sc(Eng) Kari Tähtinen, Helsinki University of Tecnology/ Imatra Steel (3654692)
36. Anders Ulfvarsson, Chalmers Ove Granstrand, Chalmers + 1 more I am not sure who. Might have been Anna Dubois, Chalmers (3654510)
37. HKKK / Marrku Tinnilä Cardiff / Dr. Mohammed Naim (3654724)
38. Gunilla Jönsson, Lunds University Sten Wandel, Lunds University Lauri Ojala, Turku (3654701)
39. Pentti Sierilä, Association of Finnish Forest Industries Janos Acs, Vienna University of Technology (3654508)

8. 6) If you conducted part of your doctoral research project in other universities than the one where it was published, please list the universities here.

1. I was enrolled at Chalmers, but mostly spending my time at NSM BI. (3654512)
2. None (3654720)
3. Cranfield University International Institute of Applied Systems Analysis, IIASA, Austria (3654722)
4. Linköping University Åbo Akademi (3654707)
5. - (3654695)
6. - (3654697)
7. None (3654713)
8. --- (3654700)
9. None (3654502)
10. MIT (3654505)
11. Cranfield in 1999 for about 6-9 months (-4355606)
12. University of Hong Kong (3654725)
13. International Institute for Management Development - IMD, Switzerland (3654702)
14. Cranfield University, U.K. for one year (3654694)
15. Penn State University, State College, PA, USA (3654717)
16. Stuttgart University of Technology (3654690)
17. University of California, Irvine (3654691)
18. One week: University of San Fransisco, Philadelphia and San Mateo (USA), Århus and Copenhagen University (DK) (3654692)
19. Cardiff Business School and University of Lausanne (3654724)

9. 7) Please explain how and why you chose your research topic.

1. As a continuing work to licentiate thesis. (3654506)
2. External funding and views from companies, i.e. Norsk Hydro (3654512)
3. Two reasons, interesting area, and funding was available. (3654693)
4. e-commerce and especially e-grocery business was "booming" in 1999=>2000 world wide. So it was interesting as a whole to see the development of a evolving and new type of business. Additionally, I had already done my Masters Theses on somewhat the same kind of issues, dealing with combining transportation flows in the city environment. This e-grocery was actually only an extension to that not delivering only to the shops but all the way to customers home. Additionally, the interest was to somehow upgrade the service level and to analyse if new profitable business could be found/created by research and developing this area. (3654960)
5. Overall the topic area was clear the beginning: purchasing. Yet the topic refinement was a process in which I was balancing academic and business relevance including methodological considerations (e.g. what is science?) The process itself took some 3-4 months in the more intense way, but it basically continued until the very end in the way of minor adjustment (emphasising something, playing down some part). (3654720)
6. Based on Ari-Pekka Hameri's Ph.D. I was found the evolutionary modelling an fascinating idea. In Cranfield University UK I learned more about it and realised how it could be used to enlarge the present ways of solving the old "facility location problem" (3654722)
7. There was a simultaneous push from the theoretical side to try to use (then relatively new) Institutional economics type of approach, especially transaction cost approach in the sphere of international trade and transport; and there was a clear research need in Finland for this type of things. Also my previous lic. thesis on ports and port management had shown that this type of approach is applicable to a wider context (i.e. organisations dealing in trade and transport); my general interest and previous work experience in the field also contributed (3654707)
8. Combination of opportunity, luck and personal interest (3654688)
9. Had worked in manufacturing and found that there was a gap between MPCs and data capture. (Shit in, shit out). Wanted to highlight this and find out how this could be improved. (3654515)
10. Interest in a topic which we gained external funding for. (3654715)
11. Interested in medicine and a father who was a medical doctor who explained that they have so many and similar logistical problems as I was talking about. Therefore health care and how you can improve logistical integration. (3654703)
12. I had already started the topic on my licentiate thesis. It was also close to my professors topics. (3654710)
13. From personal interest, I hate grocery shopping (3654695)
14. We had a TEKES-project with Jaakko Pöyry in 93-95 and that gave me enough material so I thought I can finish it. It was that simple. (3654697)
15. It was close to my project work (3654704)
16. The topic - product traceability - was close to my responsibility area in my work at Nokia Mobile Phones. I was trying to read some books that would help me in my work. As I couldn't find basically any existing literature, I decided to do my thesis on this topic. (3654696)
17. The topic has been of great interest over several years due to practicing the subject and the obvious lack of holistic research view of the subject. (3654713)
18. It was the most interesting and hot at the moment then (3654700)
19. Personal interest, working experience on the subject, access to company cases, interest of supervising professor. (3654502)
20. It was a result of the topic of my master thesis, and I did more or less not chose this it was a coincident that lead to this topic (3654505)
21. Based on the earlier studies; licentiate thesis which research topic was originally from prof. Juhani Pykkänen's research interest and area in 1980's (3654721)
22. Need for the method in my duties in Operations Planning and Coordination Manager. (3654503)
23. - Production was interesting and articles + books about flexibility inspired. Agility was an interesting theme. (- 4355606)
24. It was a big debate if alternative motor fuels were good or bad if the whole life cycle is considered. The question of energy and emission efficiency in the production process of motor fuels resembles the methodology in logistics. After a couple of years I realised that my topic were very similar to LCA methodology. (3654511)
25. Interested in transportation, a PhD position in a project on intermodality was advertised (3654699)
26. Interest in the topic (models of EC) grew out of interest in EDI. (3654725)
27. Meri, merikuljetukset ja satamat olleet aina lähellä sydäntä. Satamiin liittyvän aiheen valitsin osittain siksi, että siihen liittyy akateemista tutkimusta Suomessa tehty vähän. (3654509)
28. The thesis was made at VTT as a part of a large TEKES & company funded logistics research project. (3654514)
29. Leading university in Europe in research related to air transport. (3654694)
30. A gradually increasing interest in the area of "human roles and need for ICT-based support in complex socio-technical systems" (my present research field) based on systems theory and cybernetics, learning psychology and human factors engineering (or HMI) and a deep insight into the "frontiers" of information and communication technologies. Transportation was just a very interesting "application" where the basic ideas were developed and based on my specific work in two projects. The first an EU-funded project HINT - Human Implications of New Technologies, focused on mainly the area of passenger transport services and covering all transport modes. The second a Swedish programme (GoTIC) with the aim to perform basic research to understand how information services for travellers and passengers using public transport services should be analysed, designed and evaluated. NB. My first degree was in Electrical Engineering, my second in Learning Psychology, my third (Lic.Eng.) in Control Engineering (Man-Machine Systems) and the fourth in Transportation and Logistics (in principle starting from scratch, i.e. the PhD is not an extension of my Lic. thesis). (3654961)
31. A new and challenging area, which allowed me to address the area in a broad sense, and not just digging into details. (3753948)
32. It was a relevant and interesting topic within logistics at the time - and still is. Combining supply chain integration with measurements is still a largely unexplored area. (3654717)
33. There was a research program Ergonomics in materials handling which had just been funded, where I applied for a job. I had just finished my exam work for my MSc with Mats Johansson as a supervisor, and he was involved in this program as well. (3654690)
34. The general topic was given since my advisor had received a research grant for that topic. The specific research questions evolved within this general topic. The general topic was "Methods and models for coordination and information exchange in supply chains" (3654698)
35. It developed over time (3654691)
36. I joined HSE doctoral program at an early stage and worked actively in top management. I had profound professional experience in steel service centers and steel distribution. I attended several international symposiums and visited numerous steel service centers and mills in the Western Europe, Eastern Europe and USA. This gave access to key information and sources; otherwise difficult to obtain. (3654692)
37. First part, container logistics, was introduced by my first tutor Jadwiga Igielska who came from the shipping industry and knew that this was a problem. Second part, to go for studies of cybernetics, complexity and information theory came from own interest that arose during the studies. (3654510)
38. Interested in the combination of IT and waterborne transport, later Chaos and complexity theory, concepts and models (3654701)
39. I started working in the logistics department of Kymmene Corp in 1988. I was able to combine my work and academic studies very well as I was responsible for the logistics strategic planning process. (3654508)

II INTEREST GROUPS AND THEIR INFLUENCE ON YOUR RESEARCH

10. 8) How was your doctoral research funded?

Number of question respondents: 42

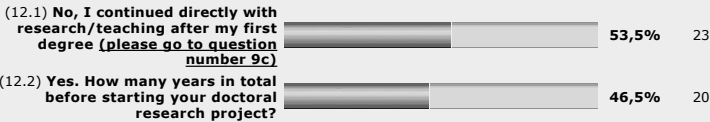
	1-20% (value: 1)	21-40% (value: 2)	41-60% (value: 3)	61-80% (value: 4)	81-100% (value: 5)	0 (value: 6)
a) Salary or grants related directly to your research, e.g. salary from university or grants from foundations (avg: 3,919; total: 37)	16,2% 6	8,1% 3	5,4% 2	10,8% 4	56,8% 21	2,7% 1
b) Sponsoring or salary from organisation (s) that had an interest in the practical applicability of your research (e.g. case or sponsoring companies) (avg: 3,048; total: 21)	38,1% 8	14,3% 3	4,8% 1	4,8% 1	23,8% 5	14,3% 3
c) Own funds, e.g. savings or salary from work that was not related to your research (avg: 4,357; total: 14)	7,1% 1	21,4% 3	0% 0	7,1% 1	28,6% 4	35,7% 5
d) Other (please explain what in the field below) (avg: 4,5; total: 10)	20% 2	10% 1	0% 0	0% 0	10% 1	60% 6
avg: 3,841; total: 82	20,7% 17	12,2% 10	3,7% 3	7,3% 6	37,8% 31	18,3% 15

11.

- Other extra work that was needed to support the family & parallel research (3654707)
- The work was mainly funded by EU and companies in a research project (3654704)
- Got some small stipendies, which I cannot any more give details. (3654503)
- Playing in the stock exchange brought much to the funding (-4355606)
- Sedish State Railways paid for the research, but I was employed by Chalmers. (3654699)
- Salary from VTT - partly channeled via TTKK (3654514)
- Based on work in different projects, funded by EU and/or Swedish Agencies, projects reports were used as the backbone of my thesis work. The project reports were often written with the purpose of presentation at scientific conferences (and in journals) and held a good scientific quality. The thesis work was "just" a parallel work to on-going project activities to bring the ideas, the application oriented results, etc. into a form that could be regarded as a doctoral thesis. That is why the format was a monograph with extended appendices and not a compilation of four or five scientific and reviewed papers. It's a matter of interpretation how my work was "paid". The project work was funded, but the practical monograph work was conducted during my "free time" over about one calendar year. (3654961)
- Academic awards from foundations (3654724)

12. 9a) Did you work in a job outside the university between receiving your first degree but before starting your doctoral research project?

Number of question respondents: 43 (avg: 1,5)



Question [12.2] (9a) Did you work in a job outside the university between receiving your first degree but before starting your doctoral research project?. Yes. How many years in total before starting your doctoral research project?)

- 1. 6 years (3654693)
- 2. 2 years (3654960)
- 3. 1 year (3654720)
- 4. 2 (3654515)
- 5. 3 (3654715)
- 6. 3 (3654710)
- 7. 20 (3654695)
- 8. 8 (3654713)
- 9. 5 (3654700)
- 10. 24 (3654502)
- 11. 6 (3654912)
- 12. 25 (3654503)
- 13. less than 1 (-4355606)
- 14. 10 years (3654702)
- 15. worked with VTT (3654514)
- 16. 6 (3654694)
- 17. 20-25 years (3654961)
- 18. 6 (3654717)
- 19. 1 (3654691)
- 20. 1969-1999 (30years) (3654692)
- 21. 3 (3654508)

13. 9b) Was your doctoral research related to your job outside the university?

Number of question respondents: 24 (avg: 1,6)



14.

- 1. It was related to the Masters Thesis I did for a consultancy company before taking a job at an industrial company (ABB). (3654960)
- 2. I had a position in purchasing prior to my PhD studies, which was also related to purchasing and B2B relationships. (3654720)
- 3. Got the practical feeling for the problem formulation and its practical impact (3654515)
- 4. I was responsible for product traceability at Nokia Mobile Phones. We needed to conceptually define how Nokia should approach this area. There was not much existing material and thus, the thesis supported me in my work. (3654696)
- 5. The research subject was directly related to the unanswered questions related to the work I conducted over a period of approximately 10 years prior to starting the research project. (3654713)
- 6. I worked as a Management Consultant for 5 years within the same area (3654700)
- 7. One of the three case companies was the employer (1972-1983) One case company was the subject of a masters' thesis supervised by me With the third case company I had a consulting relationship during the Lic. thesis process. (3654502)
- 8. I worked as a research scientist in the research group from this field (3654912)
- 9. I was responsible for planning and coordination of European wide distribution activities. The relation between delivery time and delivery accuracy was interesting. Short delivery times were requested and became expensive. Accuracy was seen as a way to buy longer delivery times. A method to plan the accuracy was required. (3654503)
- 10. ERP consulting was partly related (-4355606)
- 11. Not directly, but both are industrial management and industrial development (3654702)
- 12. Worked as Marketing Research Analyst at Finnair, and consultant at McKinsey & Co. (3654694)
- 13. My project work as an international consultant and expert in my own consultancy firm. However, close links to university activities has always been maintained. (3654961)
- 14. I was working at IKEA between the MSc and the doctoral program. IKEA is a quite integrated supply chain in applicable parts, still struggling with many issues around practical integration - and how to use measurement to leverage performance (3654717)
- 15. I had personally designed and managed a new value-added logistic service concept in real business life (16 years) and attended simultaneously doctorate program at HSE (1975-99 lessons and empirical surveys) (1999-2003 active research, theory and dissertation). Dissertation was a long-term commitment to combine long business career with a dissertation in the same field. (3654692)
- 16. Comments 9c. I started working before finishing my dissertation. (I worked for TFK transport research institute.) (3654510)
- 17. As explained earlier, I was responsible for the logistics strategic planning process in Kymmene. My thesis was on decision support systems in logistics strategic management, and thus I was able to combine the theoretical framework with the practical experiences. (3654508)

15. 9c) Did you work outside the university during your doctoral research project?**Number of question respondents: 43** (avg: 1,3)

(15.1) No		69,8%	30
(15.2) Yes		30,2%	13

16. 10) How much influence did the following groups of people have to your research choices during your doctoral research project**Number of question respondents: 43**

	1	2	3	4	5
a) Academics, such as the supervising professor(s), external examiners and academic peers? (avg: 3,488; total: 43)	7% 3	4,7% 2	32,6% 14	44,2% 19	11,6% 5
b) Practitioners, i.e. people outside the research community and who were primarily interested in the practical applicability of your research? (avg: 3,186; total: 43)	9,3% 4	16,3% 7	25,6% 11	44,2% 19	4,7% 2
avg: 3,337; total: 86	8,1% 7	10,5% 9	29,1% 25	44,2% 38	8,1% 7

17. 11) How strongly did the academic community influence your decisions in the following areas of your research?**Number of question respondents: 43**

	1	2	3	4	5	0
a) Selecting and defining the research topic (avg: 2,186; total: 43)	34,9% 15	30,2% 13	18,6% 8	14% 6	2,3% 1	0% 0
b) Setting the research objectives and problems (avg: 2,558; total: 43)	20,9% 9	25,6% 11	30,2% 13	23,3% 10	0% 0	0% 0
c) Choosing the theories for the framework (avg: 2,698; total: 43)	16,3% 7	27,9% 12	27,9% 12	25,6% 11	2,3% 1	0% 0
d) Choosing qualitative or quantitative approach (avg: 2,524; total: 42)	21,4% 9	35,7% 15	19% 8	16,7% 7	7,1% 3	0% 0
e) Choosing methods for collecting empirical data (E.g. stating preferences for using interviews, surveys, observations, etc.) (avg: 2,14; total: 43)	25,6% 11	41,9% 18	20,9% 9	4,7% 2	4,7% 2	2,3% 1
f) Choosing data analysis methods (e.g. statistics, modelling, simulation, case study methods) (avg: 2,465; total: 43)	18,6% 8	32,6% 14	27,9% 12	14% 6	4,7% 2	2,3% 1
avg: 2,428; total: 257	23% 59	32,3% 83	24,1% 62	16,3% 42	3,5% 9	0,8% 2

18. 12) How strong opinions did the practitioners in your case/sponsoring organisations have in influencing your decisions in the following areas of your research?**Number of question respondents: 43**

	1	2	3	4	5	0
a) Selecting and defining the research topic (avg: 2,465; total: 43)	27,9% 12	20,9% 9	14% 6	27,9% 12	4,7% 2	4,7% 2
b) Setting the research objectives and problems (avg: 2,047; total: 43)	25,6% 11	34,9% 15	23,3% 10	7% 3	2,3% 1	7% 3
c) Choosing the theories for the framework (avg: 1,186; total: 43)	62,8% 27	27,9% 12	0% 0	0% 0	0% 0	9,3% 4
d) Choosing qualitative or quantitative approach (avg: 1,488; total: 43)	51,2% 22	25,6% 11	9,3% 4	4,7% 2	0% 0	9,3% 4
e) Choosing methods for collecting empirical data (E.g. stating preferences for using interviews, surveys, observations, etc.) (avg: 1,86; total: 43)	34,9% 15	32,6% 14	16,3% 7	9,3% 4	0% 0	7% 3
f) Choosing data analysis methods (e.g. statistics, modelling, simulation, case study methods) (avg: 1,326; total: 43)	53,5% 23	32,6% 14	4,7% 2	0% 0	0% 0	9,3% 4
avg: 1,729; total: 258	42,6% 110	29,1% 75	11,2% 29	8,1% 21	1,2% 3	7,8% 20

19. 13) Please evaluate the following questions in light of how you felt during the final stages of your doctoral research project


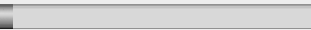
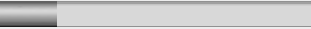
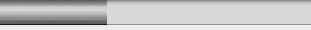

Number of question respondents: 43

	1	2	3	4	5
a) How assured were you that your research was significant, interesting and worth researching from the academic point of view? (avg: 3,744; total: 43)	2,3% 1	4,7% 2	32,6% 14	37,2% 16	23,3% 10
b) How assured were you that your research had practical relevance? (avg: 3,977; total: 43)	2,3% 1	4,7% 2	20,9% 9	37,2% 16	34,9% 15
c) How clear was it for you which primary research methods to choose (e.g. surveys, case studies, models, simulations, heuristics, etc.)? (avg: 3,372; total: 43)	2,3% 1	18,6% 8	27,9% 12	41,9% 18	9,3% 4
d) How certain were you regarding to which analysis tools to choose (e.g. computer programs to support in organising and analysing your data)? (avg: 3,302; total: 43)	2,3% 1	25,6% 11	25,6% 11	32,6% 14	14% 6
avg: 3,599; total: 172	2,3% 4	13,4% 23	26,7% 46	37,2% 64	20,3% 35

III RESEARCH MOTIVES AND AREAS OF INTEREST

20. 14) Generally, how easy was it for you to maintain your motivation over your doctoral research project?

Number of question respondents: 43 (avg: 4)

(20.1) 1		4,7%	2
(20.2) 2		4,7%	2
(20.3) 3		18,6%	8
(20.4) 4		34,9%	15
(20.5) 5		37,2%	16

21. 15) How much do you agree with the following statements related to your doctoral research process?

Number of question respondents: 44

	1	2	3	4	5
a) The thesis and the research project should contribute to the discipline, through rigorous development and/or testing of theory and application of a sound methodological approach. (avg: 3,636; total: 44)	0% 0	15,9% 7	25% 11	38,6% 17	20,5% 9
b) The thesis and the research project should contribute to practitioners (i.e. people and organisations outside the academia or teaching) by being practically applicable or even solving actual problems that the case or sponsoring organisations were having. (avg: 3,523; total: 44)	0% 0	15,9% 7	29,5% 13	40,9% 18	13,6% 6
c) The thesis and the research project should improve your skills and knowledge. (avg: 4,591; total: 44)	0% 0	0% 0	6,8% 3	27,3% 12	65,9% 29
avg: 3,917; total: 132	0% 0	10,6% 14	20,5% 27	35,6% 47	33,3% 44

22. 16) How interesting was it for you to spend time in the following areas of your doctoral research project?**Number of question respondents: 44**

	1	2	3	4	5
a) Working on philosophical, ontological and epistemological issues (avg: 2,636; total: 44)	18,2% 8	38,6% 17	18,2% 8	11,4% 5	13,6% 6
b) Developing your data collection and analysis methods (avg: 3,386; total: 44)	0% 0	13,6% 6	38,6% 17	43,2% 19	4,5% 2
c) Gaining access to and collecting empirical evidence (avg: 4,047; total: 43)	2,3% 1	9,3% 4	11,6% 5	34,9% 15	41,9% 18
d) Reading and studying previous research around the topic (avg: 4,045; total: 44)	0% 0	6,8% 3	15,9% 7	43,2% 19	34,1% 15
e) Building the theoretical framework (avg: 3,977; total: 44)	2,3% 1	2,3% 1	22,7% 10	40,9% 18	31,8% 14
f) Writing the text of the thesis (avg: 3,488; total: 43)	2,3% 1	14% 6	34,9% 15	30,2% 13	18,6% 8
g) Making the data analysis (avg: 3,886; total: 44)	0% 0	4,5% 2	34,1% 15	29,5% 13	31,8% 14
h) Drawing conclusions (avg: 4,318; total: 44)	0% 0	2,3% 1	9,1% 4	43,2% 19	45,5% 20
i) Writing articles and conference papers (avg: 3,841; total: 44)	0% 0	6,8% 3	29,5% 13	36,4% 16	27,3% 12
j) Discussing with academics related to your research (avg: 4; total: 44)	2,3% 1	2,3% 1	20,5% 9	43,2% 19	31,8% 14
k) Discussing and consulting with practitioners related to your research (avg: 4,295; total: 44)	0% 0	6,8% 3	6,8% 3	36,4% 16	50% 22
avg: 3,811; total: 482	2,5% 12	9,8% 47	22% 106	35,7% 172	30,1% 145

23. 17) How true are the following statements regarding your career aspirations during your doctoral research?**Number of question respondents: 44**

	1	2	3	4	5
a) I was interested in a researcher career (avg: 3,302; total: 43)	4,7% 2	18,6% 8	32,6% 14	30,2% 13	14% 6
b) I was interested in a teaching career (avg: 2,488; total: 43)	18,6% 8	32,6% 14	34,9% 15	9,3% 4	4,7% 2
c) I was interested in a practitioner career (i.e. work in an organisation that is not primarily focusing in teaching or academic research) (avg: 3,488; total: 43)	4,7% 2	16,3% 7	18,6% 8	46,5% 20	14% 6
d) The career possibilities were not really in my mind but I found the research as a good overall way to develop my skills and knowledge (avg: 3,477; total: 44)	11,4% 5	20,5% 9	13,6% 6	18,2% 8	36,4% 16
avg: 3,191; total: 173	9,8% 17	22% 38	24,9% 43	26% 45	17,3% 30

24. 18) What were the major reasons that de-motivated or frustrated you with your doctoral research? Why?

1. The loneliness. Being by myself in a department that at the time did not have any other ph.d.students and did not focus much on research. Dividing time between BI and CTH was not that easy - not belonging strongly any of the places. (3654512)

2. Funding / salary level (3654960)

3. I was alone in many cases lacking support or guidance in the areas some areas of the study. Perhaps nowadays PhD research is done more in project teams/research groups, which include both senior and junior researchers working with common problems and assisting each other. (3654720)

4. I was allowed to choose my topic outside the discipline that was familiar to my professors. Therefore I felt often very lonely, nobody really understood what I was doing and therefore could not give good advice. (3654722)

5. No major de-motivating factors; frustration especially with finalising the text into a somewhat coherent entity, also frustration with the absence of good discussion partners in the early stages of the process. Managing with time in combination with work & home & research was often a very big problem (3654707)

6. No reason, no frustration. (3654688)

7. The academic world is too slow and progress is not measured in weeks, rather years. (3654515)

8. Not enough respondents to be able to make a survey, had to find other ways of collecting data. Sometimes motivation was just lacking because of personal issues, (small children) (3654703)

9. The external pre-examination process. One of the examiners was not really qualified to do the job. (3654695)

10. Slow journal acceptance process and, of course, peer review process when I did get my article published. (3654697)

11. During the time when I did my thesis there was not much knowledge on how to do case-based research. However, that was the only approach I found reasonable for my research problem. Therefore the result was not as good as it could be if the same study would be done today. (3654704)

12. - Early phases of the project were difficult. I was not sure if the research project would be successful, I lacked the skills of doing the research and was not confident if my topic would be relevant from academic point of view. - I had a full-time job while studying. Using the evenings and weekends to do the studies was tough. At the same time, changing the mindset from work to studies also required time. After work, when you got in speed with the studies, you already needed to stop and go to sleep. (3654696)

13. Lack of time: the contradiction in combining non academic work, the research project and family life (3654713)

14. Lack of supervisor action delayed the work, or it could have been much faster (3654700)

15. Amount of teaching Number of masters' theses and bachelors' theses supervised Finding the funding for living (3654502)

16. I don't feel any big motivation problems (3654912)

17. The research took long time and the supervising was minimal. (3654721)

18. Critics without concentrating or even reading the research documents. (3654503)

19. Loneliness and lack of discussion. Lack of supervising. (-4355606)

20. The complexity of the research area and no consensus among the professors which way to go. I spend 1 year trying to turning my topic to the logistics research discipline. (3654511)

21. I wanted to make a dissertation with practical relevance and that took a lot of extra effort. I should have modified my ambitions on that point. (3654699)

22. Kiistat ohjaavien välillä ja kiista teenölö väitöskirjan Turun yliopistoon vai Turun kauppakorkeakouluun. (3654509)

23. The research and work itself was highly motivating. The lack of real support from own university and supervising professor was frustrating. (3654514)

24. None (3654694)

25. Funding and research is a cumbersome equation; you might have funding, but it does not match research interests, since too far politics etc. is involved in decision-making. (3654712)

26. The rigid system inside a university. I was "outside" the university and my project work was accepted by practitioners as useful. However, changing from one School of Engineering to another at Chalmers was a bureaucratic "nightmare", as I started from "scratch" in the "new" School. (see above). Compared to industry, the process of "handling paper work" and decision-making was very slow and un-predictable. (3654961)

27. Sometimes students when I was teaching, as they popped up every now and then and sometimes disturbed the process. Not so little frustration in the beginning due to unclear direction and advice from a previous supervisor. Balance with private life - I guess that mastering a balance between family and professional and interesting tasks really takes some time, usually more than the 4-5 years of doctoral studies. Also, the time-race between us PhD-students turned out as frustrating, as I went on parental leave and was sometimes still compared with those that did not. Sometimes a very macho-like atmosphere, which was NOT encouraging, only lowering the self-esteem. (3753948)

28. I was somewhat stalled by teaching responsibilities and developing teaching material. (3654717)

29. If it was all worth the hard work in general (3654690)

30. It takes a long time to get started. The models I have been working with are quite complex and requires a lot of training to feel comfortable with. It can also be very frustrating to face a problem you cannot find a correct solution to. Experience teaches you not to get stuck too long on problems that are essentially unsolvable. (3654698)

31. 1. Professors had few experience of real business operation. 2. It was impossible to have grants for my research (as a board member of foundations, which financed this kind of research) Finance only for international presentations of working papers (USA, Denmark). 3. Routines and bureaucracy of the university after real business experiences. (3654692)

32. Lack of critical mass and focus due to diverse research projects at the department (as well as other universities). Lack of strong research tradition. Lack of guidance. (3654510)




33. The academic environments inability to encompass change (3654701)

IV PERCEIVED THESIS VALUE AND CAREER CONSEQUENCES












The remaining questions refer to the time after the completion of your dissertation

25. 19) What career path have you mainly followed after completing your doctoral dissertation?

Number of question respondents: 44 (avg: 1,7)

(25.1) Pursuing a research and/or teaching career in logistics		52,3%	23
(25.2) Pursuing a practitioner career in logistics (i.e. a career in logistics that is not research or teaching related).		22,7%	10
(25.3) Pursuing a career that is not related to logistics, what?		25%	11

Question [25.3] (19) What career path have you mainly followed after completing your doctoral dissertation?. Pursuing a career that is not related to logistics, what?)

1. General management (3654720) 
2. management consultant (3654688) 
3. Financial Analysis and Trading (3654507) 
4. director of research centre (3654695) 
5. Legal (3654503) 
6. academic career in ISS (3654725) 
7. research and teaching in industrial/operations management, logistics as part of it (3654702) 
8. general management (3654514) 
9. Much wider than logistics - as mentioned above (3654961) 
10. corporate governance (3654692) 
11. Marketing and Supply Chain Management (3654508) 

26. 20) How does the career that you have had after your research correspond with what you expected during the doctoral research?

1. very well, except for the amount of administrative work when climbing the academic ladder and problems in finding funds for subsequent research projects (3654506)
2. Corresponds pretty well. I was allowed to develop courses and take part as a senior as soon as I showed I had/could finished. (3654512)
3. Do not really remember what I expected, did not have so many expectations. (3654693)
4. I have still close connections to the research community at HUIT as well as VTT (The National Research Centre). At the moment I'm responsible for identifying, preparing, co-ordination and funding organising of development projects focusing on logistics area. (3654960)
5. The industry in Finland does not really recognise a doctorate degree as a major merit. It's of course nice to have and I basically new this already prior to joining the ranks of practitioners. Competence and track record counts, not the titles or the degrees you have. (3654720)
6. I knew that my dissertation work had hardly any practical relevance as it is, so I was prepared to work as a practitioner with other problems. However, being educated as a researcher has helped me a lot in my career. (3654722)
7. Corresponds very much; also the context and approach I had used in the dissertation has lately proven extremely good and useful (much more so that I had thought at the time) in e.g. the type of Trade and Transport Facilitation work I have done with the World Bank, ADB and others (3654707)
8. Well. (3654688)
9. I have had a career that at the time of my doctoral studies did not think was possible for me. I am very satisfied with how things have become career wise. (3654507)
10. ok (3654515)
11. Following but into new theoretical fields (3654715)
12. Corresponds well (3654703)
13. I work is director in a research and consulting firm, so rather close connection but not quite. (3654710)
14. It has no correspondence. (3654695)
15. I did not have much expectations, so it is pretty hard to answer. I knew it already then that it is bullshit if someone says that you'll be more qualified for business if you spend 3-5 years in academia doing research. But I did it anyway. To question 21 I answer in comparison to a likely alternative path - vacuum/doing nothing is not a relevant comparison. (3654697)
16. I had no expectations or plans. (3654704)
17. - I thought that I would be a specialist and now as a consultant, the role I have is relatively close to my earlier ideas of future career. - On the other hand, the area I am working with is wider - logistics in general - and not specifically focused on the issues I studied. - Methodologies I used when studying have been surprisingly useful at work. (3654696)
18. Not much. I was expecting to move more towards research and especially teaching. This actually happened, but only for a period of less than two years. (3654713)
19. Very fine. I started a academic career, but changed it due to financial benefits in industry (approx double income) (3654700)
20. circa 80 per cently, combining teaching, research, academic networking and consulting (3654502)
21. It has corresponded a lot, since I work in the same research field, so I have had possibility to develop the methods used in my dissertation. (3654912)
22. First very well, but now after four years I do not have any career or post - so not so well at all. In general, the post-doctoral researchers are a problem for universities because they do not "produce money anymore". (3654721)

23. Restructuring the industry got me to leave the logistics activities. There were too strong owners opinions to "wrong" direction (my opinion-not necessarily true!). (3654503)
24. (Have done both research and practitioner job about 50-50%.) Corresponds pretty well. Existing project are pretty much "selling" of projects, defining, planing and starting research project and following up what is relevant for research. It is interesting to be able to use time to investigate interesting areas. (-4355606)
25. About what I expected. (3654511)
26. Well (3654699)
27. very well (3654725)
28. The logistics/SCM domain knowledge was highly important in early stages of career and helped to get first crucial positions - thus career evolved as expected. later on other issues have had more profound impact on career. (3654514)
29. Well (3654694)
30. The "career" does not develop just by waiting; you need to work a lot after dissertation to have positive development. World is full of doctors, but real researchers are rare. (3654712)
31. The PhD made a clear difference in Sweden when being asked to manage research projects, but in Europe I was already accepted and recognised as an expert in the field and the effect was not that high. However, in certain countries the Dr. in front of your name makes a difference. (3654961)
32. Quite good, with the exception that it has been so difficult to find time for my own research. Much more time than expected has gone to application processes, which have not been too rewarding with a general hit-rate of getting funds of about 10%. Should I have spent half the time I have spent on applications on writing journal articles instead, I would be close to promotion to higher academic degrees. I think this is the main frustration of the after-PhD-life, and it feels like a waste!! (3753948)
33. I am less involved in research related tasks that I expected or hoped for. (3654717)
34. I use the knowledge daily, working at a research institute, but more implementation than at the university. I wanted a career outside univ, and I got both academic and practical aspects in my work. (3654690)
35. Quite well. Directly after the completion of my degree I went out in industry, working as a management consultant at the Boston Consulting Group. I then realised I missed the research work and decided to return to academia. I was offered a position at a US Business school and worked there for several years. For personal reasons I then decided to return to Sweden and my family and friends here. (3654698)
36. Very well (3654691)
37. Teaching and supervising in logistics is far easier to make. It is difficult to benefit in the university life after business career. No practical effect on career, however, a doctoral thesis is highly appreciated. (3654692)
38. Pretty much in line. I started at a research institute, then moved on to industry, first as supply chain manager at one company and now as director supply chain at another company. (3654510)
39. Some of both, being a consultant makes it possible to choose (3654701)
40. Very well. I left the logistics dept. in 1998 and joined the sales dept. in UPM. Currently, I work in Marketing in UPM and I am responsible for sales and supply chain processes in the company. (3654508)

27. 21) Please evaluate the following questions about the significance and value of the doctoral research project to your career.

Number of question respondents: 43

	1	2	3	4	5
a) How significant has your doctoral research been to your career generally? (avg: 4,047; total: 43)	0% 0	7% 3	23,3% 10	27,9% 12	41,9% 18
b) How valuable have the <u>skills and knowledge</u> that you gained during the research process been to your career? (avg: 3,884; total: 43)	2,3% 1	2,3% 1	25,6% 11	44,2% 19	25,6% 11
c) How valuable have the industry and research <u>experience</u> that you gained during the research process been to your career? (avg: 3,651; total: 43)	2,3% 1	11,6% 5	25,6% 11	39,5% 17	20,9% 9
d) How valuable have the personal <u>relationships</u> that you developed during the research process been to your career? (avg: 3,395; total: 43)	2,3% 1	16,3% 7	27,9% 12	46,5% 20	7% 3
e) How valuable has it been to your career to possess a <u>doctors degree</u> ? (E.g. getting job offers, better salary, more credibility)? (avg: 4,116; total: 43)	4,7% 2	4,7% 2	14% 6	27,9% 12	48,8% 21
avg: 3,819; total: 215	2,3% 5	8,4% 18	23,3% 50	37,2% 80	28,8% 62

28. 22) Have you actively done academic research after the completion of your thesis, either as main job or occasionally along your daily job?

Number of question respondents: 44 (avg: 1,2)

(28.1) Yes	<div><div></div></div>	84,1%	37
(28.2) No	<div><div></div></div>	15,9%	7

V METHODOLOGICAL LOYALTY

The remaining questions are relevant only if you answered that you have done academic research after the completion of your doctoral dissertation. If you answered no, please skip the rest of the questions

29. 23) What aspect of the methodological approach, theories and methods from your doctoral thesis have you actively retained in your latter research?

1. I have used mixed methods (3654506)
2. Case studies, theoretical framework, at least the same stream of research (3654512)
3. Have used all the methods, but also some different types of methods such as simulation. (3654693)
4. I have used cases and qualitative -semi structured interviews. (3654960)
5. I've been attempting to apply the research methodology I developed in my dissertation in my latter research. (3654720)
6. Mostly policy-making studies, but also case-based SCM-related things as well as some survey-based industry- or meso level analyses. (3654707)
7. Mainly following the quantitative path but regularly works with statistical material and qualitative data,. (3654715)
8. I have been working much with the SCM framework, but used different data collection methods as telephone interviewing is such a difficult way, i.e. used surveys instead. (3654703)
9. qualitative methods, some frameworks (3654710)
10. Action research (=constructive reasearch) (3654695)
11. Quantitative modeling, basically. Some cases. (3654697)
12. Case study approach (3654704)
13. As a long-term practitioner and due to the very business orientated nature of supply management it has been natural to use qualitative research methods. (3654713)
14. Quantitative research together with others from universities (3654700)
15. The five managerial heuristic rules of the thesis The constructive research approach as such (3654502)
16. quantitative data collection and analysis method, e.g. optimization-models, GIS-analysis (3654912)
17. Data collection and analysis methods. Both qualitative (case studies) but even more quantitative (especially multivariate data analysis). Also some of the theoretical core has been kept. (3654505)
18. I have retained in case studies and lean supply theory. (3654721)
19. Not too many! Legal research is totally different! (3654503)
20. - Kvantitative methods - Several literature references (logistics basics) - Supply chain chain thinking, although this has developed over the years - Simulation tools (-4355606)
21. The systems approach, relevant in both logistics and LCA (3654511)
22. I have mainly been faithful to my empirical research topic, methods have changed but mainly as case studies or studies based on qualitative empirical evidence. (3654699)
23. all, both in my own research but particularly in supervising students (MSc and PhD) (3654725)
24. Practically all aspects from my doctoral thesis have been used in my latter research, augmented my new aspects in learnt in the new research projects. (3654702)
25. Mostly cases, some statistics thru surveys, mainly via supervised doctoral students (3654694)
26. Literature review, and data collection & analysis. (3654712)
27. All of it more or less. My goal has been to develop my conceptual model further into both passenger and goods transportation. I have also further developed the system approach to cover the field "sustainable mobility and accessibility" as well as "future urban transport" both for goods and people. And I have worked in a dedicated way to establish my field of research, i.e. "the human role and need for ICT-based support in complex socio-technical systems". (3654961)
28. qualitative data collection, case analysis methods (pattern-matching), theoretical analysis / conceptualisation (3753948)
29. Case study methodology, qualitative data collection, further development of model i thesis to a practical tool used in industry. (3654690)
30. I have continued my research in the field of operations research and supply chain inventory control models. The methodological tools are essentially the same as during my dissertation work. (3654698)
31. Its too hard to describe here....the US is extremeley quantitative (read structural equation modeling now while I still value the case/action research based orientation of Scandinavian research) (3654691)
32. International surveys of railway logistics (Russia, China, Finland), data collection of logistics (qualitative and quantitative), networking in logistic research, managerial information and tools in supply chain mamagement. Lessons in universities and among businessmen (3654692)
33. Case methodology, constructive approach et. but I have mainly done management & administration job in academic world. (3654724)
34. The actual concept, methods and theoretical framework that I developed in my Thesis (3654701)
35. Most of the conference and journal papers are in the area of applying decision support systems (especially the AHP) in supply chain management/logistics. (3654508)

30. 24) What aspect of the methodological approach and methods of your thesis have you actively abandoned and/or replaced with others?

1. the statistics and simulations (3654512)
2. none (3654693)
3. Modelling has not been used at all anymore, since the dissertation research. Modelling work takes too much time... (3654960)
4. Not abandoned, complemented with new understanding. If I was asked to do my dissertation research again I would ally more rigorous and perhaps also quantitative methdology. (3654720)
5. I had used some quantitative modelling (economteric type of models) in parts of the study, and earlier in lic. thesis also simulation, these I have not used very much later on. (3654707)
6. Limiting the number of cases in the research. Multiple cases as in the thesis is difficult to analyse and should be limited to 3-4 ones. (3654715)
7. None (3654703)
8. none (3654695)
9. None (3654697)
10. No (3654704)
11. None (3654713)
12. --- (3654700)
13. None (3654502)
14. - (3654912)
15. Nothing has been abandoned. (3654505)
16. Nothing - I would prefer now more qualitative data collection in case studies - back to basics in SCM ? (3654721)
17. Almost all! (3654503)
18. None (-4355606)
19. None. (3654511)
20. I have not actively abandoned any, but rather that new research questions have required other methods. (3654699)
21. None (3654694)
22. Not directly abandoned, but enlarged the scope with all of the possible other approaches have been used. (3654712)
23. None (3654961)
24. none (3753948)
25. None (3654698)
26. Switch from models to field research and qualitative data collection. (3654692)
27. None basically, but perhaps a bit more modest :-) (3654701)

Please click to submit your responses.

APPENDIX 8 LITERATURE REFERENCES BY AUTHOR

This appendix shows the reference literature distribution for each dissertation to journal articles (JOA), theses (THE), working papers (WOR), trade journals (JOT), textbooks (TEX), other published references (OTP) and other unpublished references (OUT). Additionally the total number of references, the average age of the references and the standard deviation of the reference publication years are presented. It is assumed that each dissertation was published in the middle of the its publication year for the calculation of the average age of references. The results of this appendix are analysed in chapter 6.2.3.

Author	JOA	THE	WOR	JOT	TEX	OTP	OUT	Total ref.	Avg. ref. age	Stand. Dev.
Abrahamsson, Mats	21 %	0 %	20 %	3 %	50 %	3 %	3 %	66	6,32	4,97
Adjadjihoue, C.	31 %	2 %	26 %	3 %	8 %	31 %	0 %	140	14,50	9,10
Andersson, Dan	56 %	11 %	12 %	0 %	16 %	5 %	0 %	94	7,93	9,28
Andersson, Jonas	72 %	2 %	16 %	0 %	10 %	0 %	0 %	58	9,21	11,34
Aronsson, Håkan	41 %	6 %	7 %	7 %	38 %	1 %	0 %	148	11,92	10,60
Berglund, Mats	40 %	7 %	10 %	4 %	28 %	12 %	0 %	154	8,21	7,60
Blinge, Magnus	10 %	6 %	23 %	1 %	17 %	43 %	0 %	111	4,91	3,69
Brehmer, Per-Olof	41 %	7 %	7 %	6 %	32 %	7 %	0 %	197	10,44	9,94
Carlsson Jan	29 %	2 %	3 %	30 %	22 %	8 %	5 %	130	10,43	5,97
Dreyer, Heidi	23 %	3 %	18 %	14 %	34 %	7 %	0 %	146	7,72	6,39
Enarsson, Leif	21 %	1 %	9 %	12 %	46 %	10 %	0 %	215	14,99	8,33
Franzén, Stig	15 %	0 %	35 %	0 %	28 %	23 %	0 %	110	9,45	10,98
Freytag, Per	23 %	0 %	7 %	10 %	52 %	6 %	1 %	205	12,78	9,43
Füssel, Lanni	39 %	1 %	5 %	3 %	38 %	10 %	4 %	151	10,99	9,44
Gammelgaard, Britta	19 %	1 %	5 %	23 %	13 %	38 %	1 %	221	6,33	5,14
Gjesing-Hansen, Leif	27 %	0 %	4 %	5 %	39 %	25 %	1 %	154	8,48	10,00
Hagman, Thore	14 %	3 %	21 %	7 %	24 %	26 %	5 %	121	9,64	10,86
Heikkilä, Jussi	44 %	1 %	13 %	3 %	22 %	16 %	1 %	167	7,85	7,82
Hellberg, Roland	31 %	0 %	10 %	1 %	45 %	10 %	2 %	249	8,82	5,65
Helo, Petri	60 %	1 %	12 %	7 %	16 %	3 %	1 %	187	9,11	11,79
Hilmola, Olli-Pekka	50 %	1 %	28 %	2 %	18 %	1 %	0 %	163	9,48	8,16
Holmberg, Stefan	48 %	0 %	6 %	8 %	33 %	4 %	0 %	114	7,39	5,57
Holmström Jan	39 %	5 %	10 %	2 %	37 %	2 %	5 %	59	10,01	15,35
Huge Brodin, Maria	47 %	11 %	8 %	6 %	22 %	6 %	0 %	196	9,21	7,96
Hultén, Lars	32 %	4 %	17 %	13 %	24 %	10 %	0 %	149	13,59	15,93
Hämäläinen, Erkki	8 %	2 %	2 %	9 %	22 %	36 %	21 %	119	9,38	10,09
Inkiläinen, Aimo	65 %	4 %	5 %	2 %	17 %	5 %	2 %	96	9,30	10,31
Jahre, Marianne	28 %	2 %	5 %	27 %	17 %	20 %	1 %	104	6,59	7,64

Author	JOA	THE	WOR	JOT	TEX	OTP	OTU	Tota ref.	Avg. ref. age	Stand. Dev
Jalkanen, Kari	20 %	4 %	20 %	15 %	10 %	25 %	4 %	259	14,72	10,77
Janhunen, Antero	23 %	3 %	17 %	15 %	35 %	7 %	1 %	143	4,79	6,38
Jansen, Karl	41 %	3 %	14 %	5 %	24 %	9 %	4 %	76	12,36	28,24
Johnsson, Mats	27 %	1 %	6 %	4 %	48 %	12 %	2 %	110	9,68	6,12
Jonsson, Patrik	6 %	2 %	8 %	48 %	33 %	2 %	0 %	248	9,21	6,83
Juga, Jari	46 %	4 %	7 %	1 %	41 %	1 %	0 %	164	14,30	8,86
Juhantila, Olli-Pekka	44 %	2 %	3 %	3 %	31 %	14 %	2 %	181	6,17	6,41
Kalsaas, Bo Terje	29 %	2 %	9 %	11 %	27 %	19 %	4 %	218	9,47	9,83
Kaski, Timo	53 %	6 %	18 %	2 %	19 %	0 %	3 %	118	7,71	6,31
Kornum, Nils	8 %	5 %	27 %	0 %	32 %	28 %	0 %	75	4,81	4,61
Korpela, Jukka	61 %	1 %	4 %	4 %	27 %	4 %	0 %	216	7,20	7,05
Kämäräinen, Vesa	37 %	5 %	9 %	9 %	19 %	12 %	9 %	182	7,30	8,46
Lehmusvaara, Antti	60 %	7 %	7 %	1 %	20 %	6 %	1 %	121	7,24	6,67
Lehtinen, Ulla	37 %	4 %	11 %	10 %	39 %	0 %	1 %	168	9,74	10,05
Lehtola, Richard	41 %	4 %	7 %	0 %	39 %	9 %	0 %	216	15,92	12,60
Lehtonen, Juha-Matti	39 %	9 %	7 %	3 %	32 %	9 %	0 %	118	6,93	6,39
Lindau, Roger	39 %	3 %	13 %	2 %	40 %	4 %	0 %	124	12,19	6,73
Ljungberg, Anders	12 %	1 %	7 %	2 %	72 %	5 %	0 %	123	3,63	8,89
Lysgaard, Jens	69 %	2 %	2 %	18 %	10 %	0 %	0 %	175	10,20	7,59
Marcussen, Carl H.	34 %	4 %	23 %	13 %	17 %	7 %	1 %	140	9,00	5,63
Marklund, Johan	74 %	1 %	18 %	0 %	7 %	0 %	0 %	88	8,61	9,13
Medbo, Lars	22 %	10 %	17 %	3 %	26 %	22 %	0 %	252	12,06	13,33
Møller, Charles	27 %	1 %	14 %	4 %	49 %	3 %	2 %	391	6,49	6,64
Näslund, Dag	54 %	0 %	5 %	9 %	28 %	3 %	0 %	251	6,78	5,43
Norby, Merete	11 %	0 %	4 %	0 %	75 %	5 %	4 %	73	7,99	8,27
Norrman, Andreas	53 %	8 %	7 %	2 %	27 %	3 %	0 %	144	9,95	10,77
Ojala, Lauri	29 %	6 %	21 %	3 %	16 %	23 %	3 %	362	5,88	7,24
Öjmertz, Birgitta	41 %	9 %	11 %	2 %	31 %	6 %	0 %	160	8,11	7,37
Petzäll, Jan	9 %	7 %	36 %	0 %	4 %	42 %	1 %	135	9,50	6,21
Pirttilä, Timo	10 %	4 %	0 %	54 %	23 %	6 %	2 %	81	11,17	7,56
Punakivi, Mikko	26 %	5 %	11 %	9 %	6 %	31 %	11 %	208	5,79	7,38
Ranta, Tapio	19 %	8 %	49 %	0 %	10 %	14 %	0 %	177	5,42	4,58
Sarv, Hans	59 %	0 %	2 %	1 %	29 %	7 %	1 %	256	12,04	11,32
Seppälä, Tero	67 %	1 %	7 %	4 %	19 %	0 %	2 %	195	8,91	8,58
Seppälä, Ulla	61 %	1 %	8 %	1 %	25 %	3 %	1 %	182	13,82	11,27
Seristö, Hannu	45 %	4 %	4 %	5 %	30 %	4 %	7 %	73	10,30	8,76
Spens, Karen	39 %	3 %	10 %	7 %	23 %	8 %	10 %	121	8,51	7,20
Stentoft Arlbjörn, Jan	33 %	2 %	2 %	2 %	47 %	6 %	7 %	127	9,84	9,20
Svensson, Göran	48 %	1 %	3 %	9 %	33 %	6 %	0 %	439	19,58	21,80
Tanskanen, Kari	33 %	2 %	14 %	6 %	37 %	8 %	0 %	49	7,93	3,11
Tinnilä, Markku	46 %	3 %	8 %	3 %	37 %	4 %	0 %	120	8,81	6,76
Tuunainen, Virpi	48 %	2 %	10 %	10 %	15 %	11 %	5 %	150	5,07	5,66
Töyrylä, Ilkka	32 %	2 %	2 %	24 %	33 %	8 %	0 %	116	7,34	5,58
Virolainen, Veli-Matti	56 %	10 %	0 %	1 %	5 %	3 %	25 %	193	6,44	6,09
Waidringer, Jonas	27 %	9 %	20 %	10 %	31 %	1 %	1 %	106	12,42	17,09
Wedel, John E.	15 %	2 %	10 %	2 %	65 %	4 %	2 %	147	8,20	8,74
Woxenius, Johan	13 %	8 %	19 %	12 %	25 %	20 %	3 %	241	6,72	7,52
Yrjölä, Hannu	28 %	2 %	2 %	12 %	21 %	28 %	7 %	186	8,02	7,10
Avg. on total sample	36 %	4 %	12 %	7 %	28 %	11 %	2 %	160,8 2	8,73	8,73

APPENDIX 9 METHODOLOGICAL APPROACH AND RESEARCH INTERERST CORRELATIONS

Number in parentheses refers to survey question number (see appendix 6 for the questions in detail)		Arbnor & Bjerke and Neilimo & Näsi categories (see chapters 4.1.2 and 4.1.3 for explanations)							
		A&B Ana.	A&B Sys.	A&B Act.	N&N Conc.	N&N DO	N&N AO	N&N NO	N&N Cons.
(15a) Disciplinary contribution important	Correlation Coefficient	0,377	-	-	0,059	0,197	-0,202	-	0,121
	Sig. (2-tailed)	0,012	0,092	0,156	0,704	0,200	0,188	0,120	0,433
(15b) Practical contribution important	Correlation Coefficient	-	0,139	0,217	0,386	-	0,288	-	-
	Sig. (2-tailed)	0,201	0,370	0,158	0,010	0,225	0,058	0,195	0,068
(15c) Personal contribution important	Correlation Coefficient	-	-	-	-0,195	-	-0,020	0,197	0,106
	Sig. (2-tailed)	0,023	0,038	0,053	0,204	0,117	0,900	0,199	0,494
(16a) Interest in philosophical issues	Correlation Coefficient	-	0,012	-	0,138	-	0,184	-	0,087
	Sig. (2-tailed)	0,008	0,937	0,036	0,373	0,028	0,232	0,224	0,575
(16b) Interest in data collection and analysis methods	Correlation Coefficient	0,244	-	0,008	-0,256	0,103	-0,123	0,224	-
	Sig. (2-tailed)	0,110	0,089	0,959	0,094	0,506	0,427	0,144	0,088
(16c) Interest in collecting data	Correlation Coefficient	-	0,208	0,078	0,096	-	0,121	0,096	-
	Sig. (2-tailed)	0,162	0,176	0,616	0,303	0,045	0,435	0,535	0,025
(16d) Interest in studying previous research	Correlation Coefficient	0,030	-	0,081	-0,099	0,088	-0,056	-	0,174
	Sig. (2-tailed)	0,845	0,090	0,601	0,524	0,571	0,718	0,175	0,260
(16e) Interest in building framework	Correlation Coefficient	0,148	-	-	0,367	0,202	-0,063	-	-
	Sig. (2-tailed)	0,337	0,046	0,034	0,014	0,187	0,683	0,415	0,020
(16f) Interest in writing	Correlation Coefficient	0,043	-	0,178	0,109	-	0,109	-	-
	Sig. (2-tailed)	0,781	0,012	0,248	0,483	0,012	0,482	0,204	0,048
(16g) Interest in analysis	Correlation Coefficient	0,296	-	-	-0,144	0,250	-0,167	0,209	-
	Sig. (2-tailed)	0,051	0,204	0,067	0,352	0,102	0,278	0,174	0,015
(16h) Interest in concluding	Correlation Coefficient	0,214	-	0,137	-0,029	0,186	0,038	0,004	0,033
	Sig. (2-tailed)	0,163	0,203	0,374	0,853	0,228	0,808	0,979	0,831
(16i) Interest in article writing	Correlation Coefficient	-	0,169	-	0,091	0,210	0,222	-	0,073
	Sig. (2-tailed)	0,149	0,273	0,005	0,558	0,172	0,147	0,236	0,637

(16j) Interest in academic discussion	Correlation Coefficient	0,016	0,364	- 0,214	0,146	0,104	0,062	- 0,177	- 0,047
	Sig. (2-tailed)	0,917	0,015	0,163	0,345	0,501	0,691	0,250	0,762
(16k) Interest in practitioner discussion	Correlation Coefficient	- 0,181	0,283	0,108	0,164	- 0,010	0,213	- 0,077	- 0,084
	Sig. (2-tailed)	0,241	0,063	0,487	0,289	0,950	0,166	0,620	0,587
(17a) Research career interest	Correlation Coefficient	0,213	- 0,006	- 0,296	0,064	- 0,067	-0,058	0,336	- 0,130
	Sig. (2-tailed)	0,165	0,969	0,051	0,678	0,668	0,709	0,026	0,402
(17b) Teaching career interest	Correlation Coefficient	0,002	- 0,135	- 0,074	0,172	- 0,164	0,111	0,067	- 0,092
	Sig. (2-tailed)	0,990	0,383	0,634	0,265	0,287	0,473	0,666	0,553
(17c) Practitioner career interest	Correlation Coefficient	- 0,130	- 0,226	0,212	0,115	- 0,047	-0,124	- 0,144	0,056
	Sig. (2-tailed)	0,401	0,140	0,167	0,458	0,762	0,422	0,352	0,716
(17d) Interest in development not career	Correlation Coefficient	- 0,090	- 0,118	0,208	-0,119	0,083	-0,116	- 0,231	- 0,002
	Sig. (2-tailed)	0,562	0,447	0,176	0,444	0,594	0,454	0,132	0,988

**TURUN KAUPPAKORKEAKOULUN JULKAISUSARJASSA A OVAT
VUODESTA 2006 LÄHTIEN ILMESTYNEET SEURAAVAT JULKAISUT**

- A-1:2006 Anne Vihakara
Patience and Understanding. A Narrative Approach to
Managerial Communication in a Sino-Finnish Joint Venture
- A-2:2006 Pekka Mustonen
Postmodern Tourism – Alternative Approaches
- A-3:2006 Päivi Jokela
Creating Value in Strategic R&D Networks. A Multi-actor
Perspective on Network Management in ICT Cluster Cases
- A-4:2006 Katri Koistinen
Vähittäiskaupan suuryksikön sijoittumissuunnittelu.
Tapaustutkimus kauppakeskus Myllyn sijoittumisesta Raision
Haunisiin
- A-5:2006 Ulla Hakala
Adam in Ads: A Thirty-year Look at Mediated Masculinities in
Advertising in Finland and the US
- A-6:2006 Erkki Vuorenmaa
Trust, Control and International Corporate Integration
- A-7:2006 Maritta Ylärinta
Between Two Worlds – Stakeholder Management in a
Knowledge Intensive Governmental Organisation
- A-8:2006 Maija Renko
Market Orientation in Markets for Technology – Evidence from
Biotechnology Ventures
- A-9:2006 Maarit Viljanen
“Täytyykö töissä niin viihtyäkään?” – Henkilöstövoimavarojen
johtamisen tuloksellisuus tietotekniikka-ammateissa
- A-1:2007 Jarmo Tähtäpää
Managing the Information Systems Resource in Health Care.
Findings from two IS Projects
- A-2:2007 Elina Jaakkola
Problem Solving within Professional Services. A Study of
Physicians’ Prescribing Decisions
- A-3:2007 Dimitrios Vafidis
Approaches for Knowledge and Application Creation in
Logistics. An Empirical Analysis Based on Finnish and Swedish
Doctoral Dissertations Published Between 1994 and 2003

Kaikkia edellä mainittuja sekä muita Turun kauppakorkeakoulun julkaisusarjoissa ilmestyneitä julkaisuja voi tilata osoitteella:

KY-Dealing Oy
Rehtorinpellonkatu 3
20500 Turku
Puh. (02) 481 4422, fax (02) 481 4433
E-mail: ky-dealing@tse.fi

All the publications can be ordered from

KY-Dealing Oy
Rehtorinpellonkatu 3
20500 Turku, Finland
Phone +358-2-481 4422, fax +358-2-481 4433
E-mail: ky-dealing@tse.fi