



# Doctoral dissertations in logistics and supply chain management

## A review of Nordic contributions from 2002 to 2008

Received September 2009  
Revised March 2010  
Accepted March 2010

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### Abstract

**Purpose** – The purpose of this paper is to identify Nordic doctoral dissertations in logistics and supply chain management (SCM) published from the years 2002 to 2008. The paper then seeks to analyze the identified dissertations by categorizing them in various dimensions, including but not limited to subject, methodology, and type of contribution. Subsequently, the paper compares the analysis of the dissertations with results obtained in a previous study that also concerned Nordic dissertations only published from 1990 to 2001, effectively opening up for longitudinal interpretations.

**Design/methodology/approach** – The paper is based on reviews of 70 Nordic doctoral dissertations within logistics and SCM published at relevant Nordic research institutions. All dissertations were reviewed according to a priori determined categories adopted from a similar, previous study in order to strengthen the validity of the longitudinal comparison.

**Findings** – This paper identifies a clear and significant trend towards: more dissertations based on a collection of articles than monographs; more dissertations focusing on manufacturing companies and fewer on carriers; a shift from a focal company perspective to more dyadic and supply chain-related research and finally; and a decreasing focus on the philosophy in science.

**Research limitations/implications** – Despite the thorough method applied, there is possibility that a few dissertations might not have been identified in this paper.

**Originality/value** – This paper is a continuation of documenting the progress of doctoral work in logistics and SCM within the Nordic countries from the years 2002 to 2008.

**Keywords** Theses, Supply chain management, Finland, Norway, Denmark, Sweden

**Paper type** Literature review

### 1. Introduction

Without PhD students and their research, academic disciplines run the risk of fading over time, leaving what once were emerging disciplines barren, unfinished, and outdated. The reasons for this are that PhD students stimulate theory generation in the academic disciplines and additionally PhD students are likely to be the next generation of established researchers. This is equally true for research that has been carried out prior to the more formalized research process of doctoral students that we know today. As such, academic disciplines are dependent on the work of PhD students in the same way that PhD students depend on the rigor and quality of the academic disciplines in question. Therefore, the work of PhD students is a natural part of every academic

This paper has been accepted through the regular *International Journal of Physical Distribution & Logistics Management* peer review process.



discipline and should subsequently be of interest to everyone involved in scientific pursuits.

Analyzing PhD dissertations are important for at least three reasons. First, creating an overview of the current state of research within an academic discipline naturally leads to a discussion concerning the path, which the discipline currently travels along. This path might be a monolithic, well-paved way or it may shrew in many directions, taking unknown and twisted turns, signalling a more disperse and fragmented discipline. As such, European research has been found to rely more on interviews and case studies than North America (Larson and Halldórsson, 2004), and the same is valid for Nordic research (the Nordic research community is described more in-depth in Section 2 of this paper) (Gammelgaard, 2001, 2004; Gubi *et al.*, 2003; Arlbjørn *et al.*, 2008b). Regardless, such a discussion is important, as it allows us as researchers to identify important gaps within a given discipline, whether these are related to choice of methodology (e.g. quantitative vs qualitative), topics (e.g. material handling vs environmental issues), type of theory generated (e.g. theoretical vs empirical) or technical issues (e.g. books vs collection of articles). Second, the topics, which PhD students choose, significantly impact the topics, which subsequent research inevitably will revolve around. Subsequently, conducting a literature review of PhD dissertations will provide an insight into which future areas of the discipline will spark the majority of interest in the future. Third and finally, carrying out a literature review of PhD dissertations makes it possible to conduct a comparison of previous literature reviews of PhD dissertations, effectively obtaining the benefits of longitudinal studies, which includes the discovery of developmental trends, the ability to exclude time-invariant individual differences and to distinguish short from long-term phenomena (Crouchley, 1987, p. 3).

Two closely related disciplines, supply chain management (SCM) and logistics, have since their emergence experienced an output of numerous PhD dissertations. The reasons for this could be found in the fact that logistics and SCM have gained increased interest in recent years, which on an academic note is evident in the increasing focus on SCM and logistics at conferences (e.g. The Nordic Logistics Research Network (NOFOMA), International Purchasing and Supply Education and Research Association, Logistics Research Network, Council of Supply Management Professionals (CSCMP), and Rencontres Internationales de la Recherche en Logistique). Similarly, interest for the work of PhD students has increased, culminating in several literature reviews specifically focusing on such efforts (Stock, 2001; Gubi *et al.*, 2003; Stock and Broadus, 2006). In this paper, it has been chosen to adopt the relabeling approach by Larson and Halldórsson (2004), signalling the assumption that there is no difference between the terms of logistics and SCM. The reason for this is that this opens up for a treatment of the two disciplines as one, thereby making the conclusions set forward in this paper comparable to those set forward in the similar paper of Gubi *et al.* (2003). Furthermore, it has been chosen to adopt the definition of SCM as being:

Supply chain management encompasses the planning and management of all activities involved in the sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, SCM integrates supply and demand management within and across companies (CSCMP, 2009).

One of these, Gubi *et al.* (2003), identified 75 and subsequently reviewed 71 doctoral dissertations published in the Nordic countries from the years 1990 to 2001.

All dissertations were classified in a number of categories, which revealed important insights, including but not limited to the majority of dissertations being empirical and a trend towards the dissertations treating traditional, logistical topics. Seen in the light of these important insights and the possibility of identifying a number of gaps within current Nordic dissertations, it would not be unreasonable to suggest that an update of these dissertations from the years 2002 until 2008 would constitute a significant contribution to the SCM and logistics discipline from a Nordic viewpoint.

In a similar vein to the Gubi *et al.* (2003) article, this paper, therefore, seeks to identify and subsequently analyze Nordic dissertations within the logistics and SCM disciplines published from the years 2002 to 2008. Two main analyses are developed from this purpose:

- (1) an analysis of identified Nordic dissertations from the years 2002 to 2008; and
- (2) a longitudinal analysis that compares the first analysis with the results from the Gubi *et al.* (2003) article.

By doing this, several important insights are revealed. Finally, the paper will identify new, potential research areas within the two disciplines in question, which will enable the disciplines to coordinate future research efforts, thereby effectively avoiding unnecessary replication and duplication of previous work.

The paper is organized in the following order. Section 2 provides a brief literature review of earlier contributions dealing with doctoral dissertation reviews. Then follows a section that discusses the methodology for this study and that outlines the limitations concerning the chosen methodology. Subsequently, a section follows that discusses the results obtained from analyzing the dissertations published from 2002 to 2008. Section 5 concludes on the overall purpose of the paper and provides some perspectives on future research activities.

## 2. Review of past papers on doctoral dissertations in logistics and SCM

In the literature, there exist several studies on analyses and classifications of doctoral dissertations in logistics and SCM in the USA and within the Nordic countries. This section comments briefly on six prior studies – first, on four American studies and then on two Nordic studies.

Stock (1987, 1988) made a review of 684 American dissertations concerned with logistics and related subject areas between 1970 and 1986. The study identified a range of gaps such as lack of research in the strategic role of logistics and the utilization of customer service to create competitive advantages. Later in 1993, Stock and Luhrsen (1993) did a review of 422 American dissertations completed in the period of 1987 to 1991. Major conclusions from this study was that the number of dissertations had reached a saturation point, traditional logistics programs did still produce the greatest number of PhDs, traditional areas of logistics were still well researched (e.g. transportation, warehousing, inventory control) and little efforts were afforded topics such as strategic logistics, international logistics, organizational issues, and order processing. In 2001, Stock did his third review of doctoral dissertations by analyzing 317 dissertations from the period of 1992 to 1998. Major findings in this analysis were that subject areas with the greatest interest were miscellaneous transport, general logistics, decision support systems, international logistics, and channels of distribution. Less researched areas were warehousing, inventory, location analysis, materials requirements planning

(MRP)/distribution requirements planning (DRP)/just-in-time (JIT), and kanban. Emerging research areas were customer service/satisfaction, human resources and organizational issues, international logistics, and SCM. In 2006, Stock and Broadus (2006) did the fourth review of US dissertations in logistics and logistics-related areas. In all, 410 dissertations in the period of 1999-2004 were analyzed. Major findings were an increased number of dissertations and a continuous fall in research in topic areas such as transportation, warehousing and storage, DRP, JIT, kanban, and MRP. Engineering logistics, human resources, location analysis, order processing and information systems, packaging, and total quality management continue to be researched infrequently.

In the Nordic countries, a research network named NOFOMA (an abbreviation for Nordic researchers in material administration) exists. The network is informally structured and there is no membership and fees to be paid. The network was founded back in 1988 and each year a research conference has been held that over time has shifted from a rather informal discussion network to a formal conference with reviewed conference papers and with a best paper selection since 2003 to the *International Journal of Physical Distribution & Logistics Management*. Owing to this now more formalized Nordic research network and the subsequent research stemming from this Nordic tradition, two contributions concerning doctoral dissertations within logistics and SCM have been provided. Gubi *et al.* (2003) reviewed 71 Nordic dissertations published from 1990 to 2001. Major findings of this study were a majority of dissertations published as monographs, manufacturers, and carriers as the primary entity of analysis, a majority of descriptive and explorative research and case studies as the most applied research method. About 55 percent did include philosophy of science issues and one-third dealt with system design/structure/effectiveness. Topic areas not addressed were customer demand, strategic sourcing, aligning networks, leanness and agility, environment/sustainability, design for supply chain and e-commerce, information systems and virtual logistics. Finally, Vafidis (2007) investigated 54 Finnish and Swedish dissertations in the period of 1994-2003 regarding their methodological choices. Main findings in this study are an overweight of dissertations relying on qualitative methodologies (multiple case studies) with widespread topic areas (no specialization of the Nordic institutions).

### 3. Methodology

In the study at hand, data derived from Nordic PhD dissertations within logistics and SCM were worked up in three main steps which are explained in the following subsections.

#### 3.1 Developing a gross list of dissertations

The first step in identifying all Nordic dissertations was to contact research institutions within the Nordic countries (Finland, Norway, Denmark, and Sweden) as outlined in Gubi *et al.* (2003). To this list, several new institutions were added, including for instance the Danish Technical University (Denmark), the National Defense University (Finland), Molde University College (Norway), and Gothenburg University (Sweden). These institutions were added via existing institution contacts, who notified about these new structural developments within their respective countries. In total, 36 universities were identified in the final list. All these institutions were contacted via e-mail correspondence, resulting in the identification of the majority (63) of the dissertations.

Most of the dissertations were distributed by formal post for a review. If a dissertation was available in an electronic version, the contact person either notified whether it could be downloaded or e-mailed the dissertation directly as a pdf file.

### 3.2 Validating the gross list

The gross list of dissertations was e-mailed to senior researchers from each of the Nordic countries for a validation. The final list was then compiled and this process added a further 15 dissertations to the list leading to a gross list of dissertations of 78. By using this method, we feel confident that all dissertations relevant for the purpose of this paper within the asked institutions were identified. We cannot, however, rule out the possibility that a few dissertations will remain unidentified.

### 3.3 Reviewing received dissertations

The final step consisted in reviewing the dissertations. During this process, eight dissertations were excluded from a detailed review since they were judged as not being within the scope of the definition of logistics or SCM that was provided in Section 1. For instance, topics such as enterprise reengineering (Alfnes, 2005) (Norway), performance management (Busi, 2005) (Norway), and industrial benchmarks (Putkiranta, 2006) (Finland) was excluded. This leads to a net list of 70 dissertations, which in Appendix 2 are listed by country and university. The review of the dissertations took place against a review framework developed by Gubi *et al.* (2003). This review framework consists of nine elements:

- (1) year of publication;
- (2) dissertation type;
- (3) primary entity of analysis;
- (4) level of analysis;
- (5) main purpose of the dissertation;
- (6) research design applied;
- (7) time frame for the empirically based dissertations;
- (8) type of theory generated; and
- (9) elements of philosophy of science.

For an explanation of these elements, we refer to Gubi *et al.* (2003).

### 3.4 Limitations

Despite its inclusive nature, this research is not without its limitations. Three limitations have been identified. First, the respective authors' subjectivity might have played a role in the reviewing process. In order to obtain a "common" understanding from author to author of the criteria used to evaluate each dissertation each member of the author team completed an individual review of the first five dissertations. These have then been compared and discussed before proceeding with reviewing the rest. However, in spite of this measure, it cannot be guaranteed that all dissertations have been reviewed through identical lenses. Second, the collection of Nordic PhD dissertations within logistics and SCM was limited to the NOFOMA research community. Clearly, other Nordic research institution environments, such as those whose main research fields are operations

management, marketing, and information technology may produce logistics and SCM-related PhD dissertations. This study can only conclude on the number of dissertations identified within the NOFOMA research community and furthermore can only conclude on those papers that are related to the logistics and SCM disciplines and not on those related to for instance the operations management or marketing research disciplines. Third, there has not been provided any definition of logistics and SCM. A potential risk of this is that the contact persons have excluded some dissertations that we might have included.

#### 4. Analysis

This section contains the results generated on the basis of the 70 reviewed dissertations. The data are tabulated and analyzed via the same categories as found in Gubi *et al.* (2003) making it possible to compare with the findings of Gubi *et al.* (2003). As a consequence, the results are presented in table form followed by comments and interpretations.

##### 4.1 Number and type of dissertations finalized in the period 1990-2001

In Table I, the number of PhD dissertations is sorted by country, year of publication, and type (monograph vs a collection of articles). Together, these three dimensions reveal

	2002	2003	2004	2005	2006	2007	2008	Total (2002-2008)	Total (1990-2001)
<i>All identified dissertations</i>									
Danish	3	–	2	3	1	2	–	11	15
Finnish	2	5	–	6	4	5	–	22	20
Norwegian	–	2	1	1	4	3	6	17	12
Swedish	2	1	3	2	4	7	1	20	28
Total	7	8	6	12	13	17	7	70	75
<i>Reviewed dissertations</i>									
Danish reviewed									
Monograph	3	–	2	2	–	2	–	9	14
Collection of articles	–	–	–	1	1	–	–	2	1
Total Danish	3	0	2	3	1	2	0	11	15
Finnish reviewed									
Monograph	2	4	–	4	1	2	–	13	14
Collection of articles	–	1	–	2	3	3	–	9	3
Total Finnish	2	5	–	6	4	5	–	22	17
Norwegian reviewed									
Monograph	–	2	1	–	1	2	3	9	9
Collection of articles	–	–	–	1	3	1	3	8	2
Total Norwegian	0	2	1	1	4	3	6	17	11
Swedish reviewed									
Monograph	2	–	3	1	1	6	–	13	19
Collection of articles	–	1	–	1	3	1	1	7	9
Total Swedish	2	1	3	2	4	7	1	20	28
Reviewed on total									
Monograph	7	6	6	7	3	12	3	44	56
Collection of articles	–	2	–	5	10	5	4	26	15
Total	7	8	6	12	13	17	7	70	71

**Note:** Comparable data are included from the period 1990 to 2001 based on Gubi *et al.* (2003)

**Table I.**  
Number and type of PhD  
dissertations finalized in  
the period 2002-2008

some interesting developments. The total number of reviewed dissertations from 2002 to 2008 is almost exactly the same as the time period from 1990 to 2001 (70). Of all the Nordic countries, Finland has produced the greatest number (22) of these 70 doctoral dissertations closely followed by Sweden and Norway. Comparing the 70 dissertations with the dissertations identified in the time period of 1990-2001, Sweden has experienced a significant decline in their production of doctoral dissertations, dropping from 28 to 20, while Norway has gone from 12 to 17. Compared to the time period of 1990-2001, this means that the production of doctoral dissertations has evened out among the Nordic countries with Sweden no longer producing a significantly higher number of dissertations. At this point, it should be mentioned that it would be intriguing to study which and to what extent different universities in the Nordic countries contribute to the different findings set forward in this paper. Future research should address and investigate this, as this would open up for a discussion of individual universities' impact on the overall research results of this paper. Owing to space constraints, such an investigation is, however, not possible here.

Interestingly, Table I also depicts a trend in the production of dissertations as either monographs or collections of articles. That is, compared to the previous time period of 1990-2001, the total amount of collection of articles has risen when paralleled to the total number of monographs produced in the years from 2002 to 2008. A reason for this could be that it is less risky to publish mainstream articles than doing a "provocative" dissertation. In general, there is an increasing focus upon international publications with research institutions being performance evaluated on these, which might lead researchers to "progressively lose their ability to communicate with businessmen and students" (Arlbjørn *et al.*, 2008a), as publications in officially high ranked journals does not automatically fulfill the criteria of practical relevance.

As such, the increased focus on the craft (or art or even game) of publishing might lead research institutions in general and supervisors in particular to suggest to their PhD students that a collection of articles in favor of a monograph is a better way to go. Reasons might be that monographs do not count as "heavily" in fulfilling the research institution's publication target and the monographic dissertation might be a more safe way to publish, as they typically contain more alternative, or even provocative research that can be difficult to publish subsequently. Considering the increased pressure to publish, it would not be surprising to find that this trend towards more dissertations as collections of articles will continue in the years to come.

#### 4.2 Primary entity of analysis

In Table II, all 71 dissertations are classified according to their primary entity of analysis and compared with the previous data set from 2003 (Gubi *et al.*, 2003). A number of dissertations turned up as N/A. These were for instance Berling (2005) (a mathematical determination of inventory cost parameters) and Vafidis (2007) (a meta-theoretical discussion).

As can be seen from the above Table II, there has been a small though noticeable development towards a greater focus on wholesalers and retailers as a probable entity of analysis. Wholesaler has had an increase of 3, while retailers have experienced a focused interest from researchers four times. Inventory hotels are still heavily under researched from a Nordic, doctoral point of view with no dissertations focusing on this entity of analysis in 2002-2008. A possible reason for this could be that there is no need for

Entity	Manufacturer		Carrier		Wholesaler		Retailer		Inventory hotel		N/A		Total	
	1990-2001	2002-2008	1990-2001	2002-2008	1990-2001	2002-2008	1990-2001	2002-2008	1990-2001	2002-2008	1990-2001	2002-2008	1990-2001	2002-2008
Danish	9	9	5	1	-	-	-	-	-	-	1	1	15	11
Finnish	11	11	3	4	-	2	-	2	-	-	3	3	17	22
Norwegian	6	9	3	1	-	1	-	1	-	-	2	5	11	17
Swedish	10	11	10	3	-	1	-	1	1	-	7	5	28	20
Total	36	40	21	9	0	3	0	4	1	0	13	14	71	70

**Table II.**  
Primary entity  
of analysis



research in this area to start out with. Instead, the preferred entity of analysis is still manufacturers (rising from 36 to 40, an increase of 11 percent), while research on carriers has dropped significantly from 21 to nine (a decrease of 58 percent). These developments are interesting, as the logistics and SCM literature emphasize a focus on managing material and information flows from the point of origin to the final customer. In a similar vein, it seems reasonable to repeat the conclusion set forward in Gubi *et al.* (2003) that one would have suspected a greater focus on the consumer end of business relations, as this often in logistical terms is home to competitive advantage.

#### *4.3 Level of analysis arranged according to year of publication*

Table III classifies the dissertations with respect to their operative level of analysis as well as year of publication. Of a total of 70 dissertations, the main level of analysis for the dissertations is still within the firm and the firm itself (19 out of 70). Interestingly, there has, however, been a significant development towards analyses that focus on inter-organizational aspects of supply chains in general with the dyadic and chain perspective experiencing the greatest increase (dyads from 8 to 16 and chains from 8 to 15). This development has primarily been driven by Finland and Norway. In other words, there has been a significant decline in dissertations focusing on the focal perspective of logistics and SCM (33-19), instead moving to a broader, inter-organizational focus. Gubi *et al.* (2003) suspected this development to occur from 2002 and onwards and these data, therefore, support and validate this suspicion. This can be seen as a positive development, as we now are in the process of adhering to the formal definitions of the logistics and SCM disciplines, which besides emphasizing the importance of managing the intra-organizational aspects of SCM also underline the importance in managing inter-organizational aspects.

#### *4.4 Main purpose, research design, and time frame*

Table IV classifies the dissertations according to main purpose, research design, and time frame. Dissertations that were interpreted as fulfilling more than one purpose were classified as being representative of only one category. The majority of dissertations were classified as being of an either explanatory (18) or normative nature (18). Dissertations aiming at being descriptive (ten), explorative (nine), or understanding certain phenomena (nine) are also represented in quite substantial numbers with diagnostic and intervening doctoral research being low in numbers (five in total). Compared to the period of 1990-2001, explorative dissertations have dropped drastically together with descriptive PhD's, while explanatory and normative PhD's have risen. The rise in normative and explanatory dissertations and the simultaneous decline in descriptive ones can have two possible explanations. First, research institutions develop naturally towards more profound theories and advanced methodologies, which rub off on PhD students, who are able to carry out more theoretical-oriented dissertations. This is in line with Arlbjørn *et al.* (2008b), who stated that "the lesser research experience, the greater the tendency toward descriptive purposes – and conversely, the greater experience, the greater the tendency toward normative research." Second, the logistics and SCM disciplines have developed and matured since 2001, developing academic constructs that PhD students can rely upon and in turn develop more normative research.

Table IV also contains a categorization of chosen research designs in the 70 dissertations. A significant drop has occurred in theoretical pieces, while qualitative

	2002	2003	2004	2005	2006	2007	2008	Total (2002-2008)	Total (1990-2001)
<i>Danish reviewed</i>									
Function	-	-	-	-	-	-	-	-	3
Firm	1	-	1	1	-	2	-	5	6
Dyad	2	-	1	-	1	-	-	4	3
Channel (rename to chain)	-	-	-	2	-	-	-	2	-
Network	-	-	-	-	-	-	-	-	1
N/A	-	-	-	-	-	-	-	-	2
Total Danish	3	-	2	3	1	2	-	11	15
<i>Finnish reviewed</i>									
Function	-	1	-	1	-	-	-	2	-
Firm	1	-	-	1	1	2	-	5	11
Dyad	1	2	-	2	-	1	-	6	2
Channel	-	1	-	2	1	1	-	5	2
Network	-	1	-	-	2	-	-	3	1
N/A	-	-	-	-	-	1	-	1	1
Total Finnish	2	5	-	6	4	5	-	22	17
<i>Norwegian reviewed</i>									
Function	-	-	-	-	-	-	-	-	-
Firm	-	1	1	-	2	-	1	5	3
Dyad	-	-	-	-	-	1	2	3	3
Channel	-	1	-	1	-	1	1	4	2
Network	-	-	-	-	2	1	2	5	1
N/A	-	-	-	-	-	-	-	-	2
Total Norwegian	-	2	1	1	4	3	6	17	11
<i>Swedish reviewed</i>									
Function	-	-	-	2	1	1	1	5	4
Firm	-	-	-	-	1	3	-	4	13
Dyad	-	-	3	-	1	-	-	4	-
Channel	1	-	-	-	1	-	-	2	4
Network	1	1	-	-	-	-	-	2	2
N/A	-	-	-	-	-	3	-	3	5
Total Swedish	2	1	3	2	4	7	1	20	28
<i>Total</i>									
Function	-	1	1	3	1	1	1	8	7
Firm	2	1	2	2	4	7	1	19	33
Dyad	3	2	3	2	2	2	2	16	8
Channel	1	2	-	5	4	2	1	15	8
Network	1	2	-	-	2	1	2	8	5
N/A	-	-	-	-	-	4	-	4	10
Total	7	8	6	12	13	17	7	70	71

**Table III.**  
Level of analysis  
arranged according to  
year of publication

research has risen in general. The rise in qualitative PhDs are in line with the conclusions set forward in Arlbjørn *et al.* (2008b), who note that the use of case study methodology in logistics and SCM is evident. In addition, it should be remarked that this finding can be confirmed with the drop of in T2 theory (see later Section 4.5).

Additionally, Table IV depicts the time frame element inherited in the dissertations. The snapshot approach is still dominant in the disciplines of SCM and logistics, although longitudinal studies are on the rise. Six dissertations are categorized as N/A, as for instance, theoretical dissertations do not relate to this issue (for instance Olsson, 2007),

	Danish	Finnish	Norwegian	Swedish	Total (2002-2008)	Total (1990-2001)
<i>Purpose</i>						
To describe	–	4	3	3	10	14
To explore	2	2	2	3	9	19
To explain	1	4	4	9	18	7
To understand	3	4	2	–	9	12
To diagnose	–	1	–	1	2	–
To be normative	3	5	7	3	18	15
To intervene	2	1	–	–	3	2
N/A	–	1	–	–	1	2
Purpose total	11	22	18	19	70	71
<i>Research design</i>						
Theoretical (desk research)	–	4	7	3	14	21
Empirical quantitative	–	2	3	4	9	6
Empirical qualitative	6	9	7	9	31	27
Empirical triangulation	5	7	–	4	16	17
Research design total	11	22	17	20	70	71
<i>Time frame</i>						
Snapshot	7	10	8	14	39	41
Longitudinal	3	3	2	3	11	6
N/A	1	5	0	0	6	3
Time frame total	11	18	10	17	56	50
<i>Type of theory generated</i>						
T1	6	4	12	11	33	16
T2	3	5	1	2	11	21
T3	2	13	4	7	26	34
Total	11	22	17	20	70	71
<i>Containing philosophy of science</i>						
Yes	6	5	2	7	20	39
No	5	17	15	13	50	32
Total	11	22	17	20	70	71

**Table IV.**  
Research design  
and time frame

who modeled lateral transshipments and perishable items in inventory systems), while others are not explicit enough about the time frame chosen (see for instance Ulstein (2005), who amongst other investigated tactical planning of offshore petroleum production).

#### 4.5 Type of theory generated

Table IV also depicts the dissertations categorized in T1, T2, and T3 theories. T1 theory aims at developing solutions to practical problems, while using a relatively small theoretical platform. Theories developed from T1 typically consist of a set of principles, procedures, or concepts, which is obtained via an experimental trial-and-error process. T2 theory is theoretical in nature and therefore provides answers to theoretical problems. Thus, the main function of T2 theory is to be explanatory by using a deductive approach. Lastly, theories generated by applying T2 theories to practical problems are called T3 theories. As a result, T3 theory combines empirical data with theories in order to ascertain, how practical problems can be solved in an effective way. As can be seen from Table IV, T2 and T3 theories have diminished in general, while T1 theory has risen proportionally. Mainly, Sweden and Norway account for this development. A possible reason for this

development could be that the rise in normative theory as established earlier in this section leads to more applied research, which means an increase in T1 theory.

#### 4.6 Dissertations dealing with the philosophy of science

Finally, Table IV also deals with the philosophy of science. From this table, it can be seen that there is a discernable decline in dissertations dealing with the philosophy of science. Reasons for this are fourfold. First, it is not obligatory for PhD's to participate in PhD courses relating to meta-theoretical discussions (an element discussed by Arlbjørn and Halldórsson, 2002). There are only requirements to pass courses in methodology. Second, a cross tabulation of the variable "articles/monographs" and the variable "dealing/not dealing with the philosophy of science" shows that 17 of the monographs dealt with the philosophy of science, while only three dissertations published as a collections of articles dealt with the philosophy of science. In that sense, PhD researchers publishing collections of articles do not have to concern themselves with the philosophy of science to the same degree as PhD researchers publishing monographs, as peer-reviewed, international SCM and logistics are not usually concerned with the philosophy of science in the methodological sections. Third, as Arlbjørn *et al.* (2008a) noted that there is an increased pressure to obtain external funding for research, the requirement for PhD researchers to provide something relevant and practical is higher and as a result, the philosophy of science might be less prioritized (which also explains the drop in the theoretical T2 theory). Fourth and last, the decline in the philosophy of science could be due to the logistics and SCM disciplines being close to industry.

As such, it should be noted that the claim by Skjøtt-Larsen (Arlbjørn *et al.*, 2008c, p. 19) that the disciplines of logistics and SCM in the Nordic countries have a higher theoretical point of departure compared with USA can be disproven with these data. Generally speaking, the drop in the philosophy of science can be regarded as an inexpedient development, in that an often cited source in the logistics and SCM disciplines argue that researchers will only be able to generate more valid research if "... [such] work is based on a conscious assumption about reality – when the creator of knowledge understands what knowledge is and how it comes about" (Arbnor and Bjerke, 1997, p. 4). It would, therefore, be an inexpedient development, if the trend towards a lesser focus on the philosophy of science continues.

#### 4.7 Dissertations distributed according to topic groups and country of origin

In Table V, the reviewed dissertations are grouped into nine different topic groups. As can be derived from the table, there has been less focus on the topics of system design/structure/effectiveness and material handling. Sweden is the main driver behind the rise in the focus of material handling, going from three to eight dissertations researching the topic. A gap remains, however, with environmental issues, which still have not received much attention despite it being a hot topic in today's political debate, having a significant impact on the design and effectiveness of supply chains and logistical activities.

#### 4.8 Topics not addressed by the dissertations analyzed

When reviewing the dissertations, it became evident that especially five topics within the disciplines of logistics and SCM have been lesser prioritized by the various research institutions in the Nordic countries. These topics are (not in order of significance):

**Table V.**  
Division of dissertations  
according to topic groups  
and country of origin

No.	Topic groups	Danish		Finnish		Norwegian		Swedish		Total	
		1990-2001	2002-2008	1990-2001	2002-2008	1990-2001	2002-2008	1990-2001	2002-2008	1990-2001	2002-2008
1	System design/structure/effectiveness	5	4	10	6	5	-	5	2	25	12
2	Distribution/route planning	1	-	3	-	2	7	3	1	9	8
3	Organizational development/competencies	3	5	1	1	-	2	3	2	7	10
4	System integration/integration enablers	1	-	1	3	1	2	5	1	8	6
5	Environmental issues/CSR	-	1	-	1	-	-	2	1	2	3
6	Interorganizational collaboration/third party logistics	3	1	3	3	2	2	3	4	11	10
7	Material handling	-	-	-	3	-	3	3	8	3	14
8	Transport/transport systems	2	-	2	4	2	-	4	1	10	5
9	N/A	-	-	-	1	-	1	-	-	-	2
	Total	15	11	20	22	12	17	28	20	75	70

- (1) *Globalization*. Although the world is becoming more and more tightly knitted effecting the management of supply chains and logistical-related activities to a large extent, it seems peculiar that this subject is not treated more extensively in the dissertations reviewed.
- (2) *Environmental issues/corporate social responsibility (CSR)*. This topic was also mentioned in the previous study by Gubi *et al.* (2003), yet having received little attention in the 71 reviewed dissertations. This seems peculiar, as global warming, CO<sub>2</sub> emissions, sustainability, and social responsibilities are frequently mentioned terms in today's political debates.
- (3) *Risk management*. The danger of for instance currency fluctuations are always issues in SCM and as such should be regarded as important topic, as risk management is closely related to economical thinking and acting. Firms cannot act without relating to the issue of risk.
- (4) *Security*. Terror, corruption, and general political instability are always subjects that should be paid close attention to, as they impact the functioning of supply chains, especially when looking at them in the context of topic number one.
- (5) *Humanitarian logistics*. This topic is only treated sparsely, although vital information is needed in order to tackle acute natural disasters and other humanitarian accidents and conflicts. It is urged to research this topic more closely in future years to come.

## 5. Conclusion

This paper analyzed the development in Nordic doctoral research in logistics and SCM from the years 2002 to 2008 by categorizing the doctoral dissertations in various dimensions, including but not limited to subject, methodology, and type of contribution. Subsequently, the paper compared the analysis of these dissertations with results obtained in a previous study that also concerned Nordic dissertations only published from 1990 to 2001, effectively opening up for longitudinal interpretations. The paper is the first continuation of documenting the progress of doctoral work in logistics and SCM within the Nordic countries from the years 2002 to 2008.

The study found several important developments within the doctoral SCM and logistics disciplines. First, it was uncovered that more dissertations are based on a collection of articles. It was discussed that a possible reason for this could be the increased pressure to publish. Second, with respect to the dissertations' primary entity of analysis, fewer dissertations focused on carrier companies while more dissertations focused on manufacturing companies. Third, a shift from a focal company perspective to an inter-organizational perspective was evident when comparing the two data sets. Especially, dyadic and supply chain-related research has risen. Fourth and finally, a decreasing focus on the philosophy in science has occurred. Via cross tabulation, it was concluded that this development is caused by the rise in dissertations being published as collections of articles and furthermore that it is an inexpedient trend as regards the rigor of the disciplines of logistics and SCM.

Lastly, it should be noted that having conducted this study, areas of future research present themselves. First, it would be interesting to review articles reviewing dissertations in other fields (like strategy, marketing, etc.) in order to investigate the role of SCM in these dissertations. Second, it would be deemed a valuable research purpose

to analyze the identified dissertations via shorter time-periods of comparisons. In doing so, different patterns than the ones reported in this paper might emerge. Third, a review of doctoral dissertations published in Europe would be useful, as this would open for a comparison of the Nordic dissertations identified with the European ones. Fourth and last, future research could relate the number of dissertations to the number of universities in a country in order to investigate, which and to what extent universities contribute to the respective findings reported in this study.

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### Further reading

- Stock, J.R. (1997), "Applying theories from other disciplines to logistics", *International Journal of Physical Distribution & Logistics Management*, Vol. 27 Nos 9/10, pp. 515-39.

### Appendix 1. Research institutions contacted

#### Denmark

- Copenhagen Business School.
- Aalborg University.
- University of Southern Denmark.
- Roskilde University.
- Aarhus School of Business.
- Danish Technical University.
- Institute for Transport Studies.

#### Finland

- Helsinki University of Technology.
- Helsinki School of Economics and Business Administration.
- Lappeenranta University of Technology.
- Turku School of Economics and Business Administration.
- Tampere University of Technology.
- VTT – Technical Research Center of Finland.
- University of Oulu.
- Swedish School of Economics and Business Administration.

#### Norway

- Norwegian School of Management BI.
- SINTEF Industrial Management.
- Institute of Transport Economics.



- Western Norway Research Institute.
- Norwegian Institute of Fisheries and Aquaculture.
- Norwegian School of Economics and Business Administration.
- Norwegian University of Science and Technology.

*Sweden*

- Chalmers University of Technology.
- Linköping University.
- Lund University.
- Swedish National Road and Transport Research Institute.
- Transport Research Institute.
- Gothenburg University.
- Växjö University.
- Örebro University.

**Appendix 2. Doctoral dissertations reviewed**

*Danish dissertations*

*Aalborg University:*

- Christensen, J.B. (2002), *Order Fulfilment, Coordination, and Social Logic: A Critical Perspective on Operations Management*, Center for Industrial Production, Aalborg.
- Gubi, E. (2004), *Concurrent Product and Supply Chain Creation: An Analysis of Product/Supply Chain Fit*, Center for Industrial Production, Aalborg.
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*Finnish dissertations*

*Helsinki University of Technology:*

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- Auramo, J. (2006), *Implications of Supply Chain Visibility: Benefits in Transaction Execution and Resource Network Management*, Helsinki University of Technology, Helsinki.
- Collin, J. (2003), *Selecting the Right Supply Chain for a Customer in Project Business*, Helsinki University of Technology, Helsinki.
- Herold, M. (2007), *A Multinational Perspective to Managing End-of-life Electronics*, Helsinki University of Technology, Helsinki.
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- Kaski, T. (2002), *Product Structure Metrics as an Indicator of Demand-supply Chain Efficiency: Case Study in the Cellular Network Industry*, Helsinki University of Technology, Helsinki.
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- Kämäräinen, V. (2003), *The Impact of Investments on E-grocery Logistics Operations*, Helsinki University of Technology, Helsinki.
- Kärkkäinen, M. (2005), *Forwarder Independent Tracking Systems: Problem Description and Solution Design Proposal*, Helsinki University of Technology, Helsinki.
- Punakivi, M. (2003), *Comparing Alternative Home Delivery Models for E-grocery Business*, Helsinki University of Technology, Helsinki.
- Småros, J. (2005), *Information Sharing and Collaborative Forecasting in Retail Supply Chains*, Helsinki University of Technology, Helsinki.
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*Helsinki School of Economics:*

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- Hämäläinen, E. (2003), *Evolving Logistic Roles of Steel Distributors*, Helsinki School of Economics, Helsinki.
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*Hanken, School of Economics and Business Administration:*

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*Turku School of Economics:*

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*Swedish dissertations*

*Chalmers University of Technology:*

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- Helstad, K. (2006), *Managing Timber Procurement in Nordic Purchasing Sawmills*, Växjö University Press, Gothenburg.

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*Bergen:*

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*Molde University College:*

- Hannås, G. (2007), *Vertical Electronic Coordination and Specific IT Investments in Business-to-business Relationships*, Molde University College, Molde.
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